Social Reorganization in the Mimbres Region of Southwestern New Mexico: The Classic to Postclassic Mimbres Transition (A.D. 1150 to 1450)

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SOCIAL REORGANIZATION IN THE MIMBRES REGION OF SOUTHWESTERN NEW MEXICO: THE CLASSIC TO POSTCLASSIC MIMBRES TRANSITION (A.D. 1150 to 1450)

by

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A thesis submitted to the
Faculty of the Graduate School of the
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of the requirement for the degree of
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2015
This thesis entitled:
Social Reorganization in the Mimbres Region of Southwestern New Mexico:
The Classic to Postclassic Mimbres Transition (A.D. 1150 to 1450)
written by Kathryn J. Putsavage
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The final copy of this thesis has been examined by the signatories, and we find that both the content and the form meet acceptable presentation standards of scholarly work in the above mentioned discipline.
In the Mimbres region of southwestern New Mexico, there are two notable periods of transition (around 1150 A.D. and again around 1300 A.D.) during the Postclassic Period. These periods are marked by dramatic changes in material culture, settlement reorganization, and population decline. The first represents the transition from the Classic Mimbres period (1000 to 1150 A.D.) to the Black Mountain phase (1150 to 1300 A.D.). The second represents the transition from the Black Mountain to the Cliff phase (1300 to 1450 A.D.). The scale (size of the population reorganizations), chronology (timing of the reorganizations), and nature (social processes behind the reorganizations) of these changes are not fully understood. Three processes have been proposed to account for the changes: depopulation followed by population replacement (immigration), population decrease with remaining groups changing material culture and reorganizing economic and social networks, or some combination of these scenarios. The Black Mountain site (LA 49), near Deming, NM, in the Lower Mimbres Valley, is the type site for the Black Mountain phase. It represents one of the largest Black Mountain phase settlements and also contains a large Cliff phase room block. Through field excavations and laboratory analyses, this dissertation explores whether the change in material culture represents cultural continuity or cultural change at the Black Mountain site. Multiple artifact classes (radiocarbon and dendrochronology data as well as ceramic and obsidian sourcing data) suggest the transitions represent both a continuation of resident groups and immigration of new populations. This dissertation also provides a comparison of Black Mountain phase data from other sites and provides evidence that the transition from the Classic to Postclassic periods was not a uniform process throughout the region.
To Linda.

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CHAPTER I
INTRODUCTION

Introduction

In the Mimbres region of southwestern New Mexico, there are two notable periods of transition during the Postclassic period. The first represents the transition from the Classic Mimbres period (A.D. 1000 to 1150) to the Black Mountain phase (A.D. 1150 to 1300). The second represents the transition from the Black Mountain to the Cliff phase (A.D. 1300 to 1450). Previous research on these transitions suggests that both were characterized by population decline and shifts in settlement patterns. Changes in material culture across these periods include the appearance of new pottery types and wares and a shift in architecture from cobblestone masonry to adobe room blocks. Mortuary practices exhibited a marked decrease in flexed inhumations and an increase in cremations (Creel 1999, 2006c; Hegmon et al. 1999; LeBlanc 1977, 1989; Nelson and LeBlanc 1986; Shafer 1999; Taliaferro 2014).

Since the 1970s, researchers in the Mimbres region have debated whether these shifts in material culture represent cultural continuity or change from the Classic Mimbres to the Black Mountain phases. Three processes have been proposed to account for the changes: depopulation followed by population replacement (immigration); population decrease, with remaining groups changing material culture and reorganizing economic and social networks; or some combination of these scenarios. Still, the scale (size of the population reorganizations), chronology (timing of the reorganizations), and nature (social processes behind the reorganizations) of these events are not fully understood, and archaeologists have competing interpretations (e.g., Anyon and LeBlanc 1984; Blake, et al. 1986; Creel 1999, 2006b; Hegmon et al. 1998; Hegmon et al. 1999;

Since researchers still debate the scale, timing, and nature of these events, in this study I investigate these two periods of change, focusing on the Classic to Black Mountain phase transition, at the Black Mountain site (LA 49) (Figures 1.1 and 1.2). Black Mountain is the type site for the Black Mountain phase. Located in southwestern New Mexico in the Lower Mimbres River Valley, about 60 km north of the modern US-Mexico border, LA 49 provides an ideal location to investigate these two understudied Postclassic periods because it contains both Black Mountain and Cliff phase room blocks. The site includes three distinct areas of architecture, from west to east: a Late Pithouse period (A.D. 750 to 1000) component (Locus 3); a large Black Mountain phase room block with Black Mountain phase pit structures built below the room block (Locus 2); and a large, compact Cliff phase pueblo (Locus 1), which appears to be built over earlier, presumably Black Mountain, phase structures (Figure 1.3, Table 1.1). The Black Mountain site likely represents one of the largest Postclassic period villages in the Mimbres Valley.

The Black Mountain site was vandalized extensively throughout the late nineteenth and early twentieth centuries and was mechanically graded in the 1970s. As a result, its contribution to archaeological understanding of the region has been limited. Through investigations at LA 49, the Black Mountain Archaeological Project (BMAP) found that intact deposits remain (Putsavage and Lekson 2010). Through excavation of these stratified deposits, BMAP gained data to further refine the chronology, scale, and processes behind the changes in material culture.
Figure 1.1 Map of American Southwest showing Mimbres and Eastern Mimbres regions and Upper Gila Valley. Black Mountain site is starred.
Figure 1.2  Map of the Mimbres region with the Black Mountain site and all sites discussed in the study. (Adapted from Creel 2006c:Figure 1.)
Figure 1.3 Topographic map of the Black Mountain site (LA 49) showing occupation areas. Locus 1 is large C-shaped room block on eastern edge of site. Locus 2 is room block in center (Black Mountain phase). Locus 3 (Late Pithouse period) is two areas on far western edge of site. Map created by Mike Brack of Archaeology Southwest (2010) and adapted as additional areas were excavated.
Table 1.1 Descriptions and Date Ranges of Periods and Phases in the Southern Southwest

<table>
<thead>
<tr>
<th>Period</th>
<th>Phase</th>
<th>Date Range</th>
<th>Subregion</th>
<th>Archaeological Characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Pithouse</td>
<td></td>
<td>550-1000</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Georgetown</td>
<td>550-650</td>
<td>Mimbres Region</td>
<td>Subterranean architecture, appearance of communal structure, increased elaboration of ceramic decoration</td>
</tr>
<tr>
<td></td>
<td>San Francisco</td>
<td>650-750</td>
<td>Mimbres Region</td>
<td>Unpainted pottery and San Francisco Red, circular pithouses in small villages</td>
</tr>
<tr>
<td></td>
<td>Three Circle</td>
<td>750-1000</td>
<td>Mimbres Region</td>
<td>Mogollon R/b pottery, rectangular pithouses with rounded sides, increase in size of communal structures</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Three Circle R/w, Mimbres B/w pottery (Style I and II), rectangular pithouses with squared corners, increase in size of communal structures</td>
</tr>
<tr>
<td>Early Pueblo</td>
<td></td>
<td>1000-1250</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pueblo</td>
<td></td>
<td>1000-1130/50</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Classic Mimbres</td>
<td>1000-1130/50</td>
<td>Mimbres Region</td>
<td>Classic Mimbres B/w pottery (Style III), corrugated brownwares. Aboveground masonry pueblos, large aggregated villages.</td>
</tr>
<tr>
<td>Early Postclassic (Late Pueblo)</td>
<td></td>
<td>1130-1300</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Terminal Classic Mimbres</td>
<td>1130-late 1100s</td>
<td>Mimbres Valley Eastern Mimbres</td>
<td>Continued occupation in Classic villages, small amounts of Mimbres B/w with Chupadero B/w, El Paso Polychrome, Playas Red Incised, and Tularosa and Chihuahuan corrugated</td>
</tr>
<tr>
<td></td>
<td>Reorganization</td>
<td>1130-early 1200s</td>
<td>Eastern Mimbres</td>
<td>Small masonry hamlets, Mimbres B/w, Chupadero B/w, El Paso Polychrome, Plays Red Incised, White Mountain Redwares, and Tularosa corrugated</td>
</tr>
<tr>
<td>Period</td>
<td>Phase</td>
<td>Date Range</td>
<td>Subregion</td>
<td>Archaeological Characteristics</td>
</tr>
<tr>
<td>--------</td>
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<td>-----------</td>
<td>-------------------------------</td>
</tr>
<tr>
<td>(Early Postclassic, cont.)</td>
<td>Black Mountain</td>
<td>late 1100s-1300</td>
<td>Mimbres Valley</td>
<td>Adobe architecture, White Mountain Redwares, Chupadero B/w, Playas Red Incised, El Paso Bi/Polychrome, plain and corrugated brownwares</td>
</tr>
<tr>
<td></td>
<td>El Paso</td>
<td>1250/1300-1475</td>
<td>Jornada</td>
<td>Adobe architecture and platform hearths. El Paso Bi/Polychrome, Playas Red Incised, White Mountain Redwares, Chupadero B/w, Chihuahuan polychromes, Salado polychromes, corrugated brownwares, and small amounts of Roosevelt Red Ware.</td>
</tr>
<tr>
<td>Late Postclassic (Late Pueblo)</td>
<td>Cliff/Salado</td>
<td>1300-1450+</td>
<td>Upper Gila Mimbres Valley</td>
<td>Aboveground adobe or masonry architecture, a diversity of ceramics Roosevelt Red Wares, Late El Paso Polychrome, Chihuahuan ceramics</td>
</tr>
<tr>
<td>Medio</td>
<td>Buena Fe, Paquimé, and Diablo or Early and Late Medio</td>
<td>1200-1450+</td>
<td>Casas Grandes Valley</td>
<td>Multiple-story adobe architecture, thick (up to 1 meter), puddled, coursed adobe walls coated with plaster. Platform hearths, colonnaded rooms, and T-shaped doors. Chihuahuan polychromes, Playas Red Incised, Gila Polychromes, El Paso Polychromes, and brownwares.</td>
</tr>
</tbody>
</table>

*Note: Adapted from Peeples 2010:Table 1. Because the start of the Medio period is disputed (Dean and Ravesloot 1993 Lekson 2011; Whalen and Minnis 2009) and because these researchers suggest the phases created by Di Peso (1974) are no longer useful, the individual phase dates for that period are not included.*
The Postclassic Mimbres

At the height of the Classic Mimbres phase in southwestern New Mexico, estimated regional population totaled as many as seven thousand people, with nearly half of the inhabitants aggregated in about twenty large towns in the Mimbres Valley, the Upper Gila and Rio Grande drainages, the San Simon region, and southeastern Arizona (Nelson 1999:28-29). Previous research indicates that there was a population decrease around 1150 in the Mimbres Valley (Blake et al. 1986; Creel 1999; Peeples 2011; Taliaferro 2014) or a complete depopulation sometime after 1150, with small groups of migrants moving in around 1200 (LeBlanc 1977, 1980b; Shafer 1999). The transition from the Classic Mimbres to the Black Mountain phase (ca. A.D. 1130/50) was first defined through research by the Mimbres Foundation in the 1970s (Anyon et al. 1981; Blake et al. 1986; LeBlanc 1977, 1980b, 1989). Early researchers designated this Postclassic period as the Animas phase (Kidder et al. 1949). In 1977, LeBlanc called for renaming the beginning of the Postclassic period in the Mimbres region the Black Mountain phase.

Archaeologists use changes in material culture to define archaeological phases. Changes in material culture reflect some type of shift in behavior, such as how people decorate their pottery. These material culture changes may also reflect much larger behavioral shifts, such as changes in regional social or exchange networks, the arrival of immigrants, the void left by emigrants, or the emergence of new ceremonial practices and belief systems. Although this project uses the phase name to frame the discussion of the cultural and social shifts, this is not to imply that the prehistoric people categorized these shifts in the same way. In other words, my use of the phases to talk about the changes in material culture is a methodological device that provides a framework for understanding the changes observed over time in relation to proposed shifts in social and economic connections. Previous research has highlighted that the transition
was a complicated process, but this research has been historically framed through the investigation of change between the Classic Mimbres and Black Mountain phases (Blake et al. 1986; Creel 1999, 2006c; Hegmon et al. 1999; Shafer 1999). While this is a complicated question, since we are still trying to work out the timing and scale of the transition, the use of phases is appropriate for this question because it draws on and ties into earlier research frameworks.

The changes in material culture documented by previous research (the work of the Mimbres Foundation, the NAN Ranch project, and excavations at Old Town) include a shift from cobblestone masonry to adobe room blocks; the cessation of Mimbres Black-on-white pottery and the appearance of new ceramic types (such as Playas Red wares, El Paso Polychrome, St. Johns Polychrome, and Chupadero Black-on-white); and changes in mortuary practices (an increase in cremations) (Ayon and LeBlanc 1984; Blake, et al. 1986; LeBlanc 1977, 1980b, 1989; Creel 1999, 2006b; Hegmon et al. 1998; Hegmon et al. 1999; Lekson 2006; Nelson 1999; Nelson and Hegmon 2001; Shafer 1999).

Research at LA 49 had two goals. The first was to refine the chronology of the Black Mountain site and phase. Since the timing of the transition from the Classic Mimbres to the Black Mountain phase is still in question (Creel 1999, 2006b; Hegmon et al. 1999; LeBlanc 1977; Nelson 1999; Shafer 1999; Taliaferro 2014), refinement of the chronology of the Black Mountain site is the first step to understanding the transition. Beyond chronology, this research examines three alternative explanations for the changes seen in the Mimbres region between the Classic Mimbres phase and the Black Mountain phase. (1) The people at the Black Mountain site during the Black Mountain phase were new immigrants to the region. (2) Individuals at the Black Mountain site represent people who lived in the region during the Classic Mimbres phase.
(resident populations). (3) These people represent groups who lived in the region during the Classic Mimbres (resident groups) and groups who migrated after 1150. These alternatives are considered using a suite of methods including geophysical survey, test excavations, and laboratory analysis. Three seasons of fieldwork (2010 to 2012) and several months of laboratory analysis of the excavated materials inform this dissertation. Since field research was mainly focused on the Black Mountain architecture in Locus 2, the transition between the Classic Mimbres phase and the Black Mountain phase is the primary focus.

While the Classic Mimbres phase has long been a focus of research in southwestern New Mexico (Anyon and LeBlanc 1984; Bradfield 1931; Cosgrove and Cosgrove 1932; Creel 2006b; Gilman and Powell-Mari 2006; Hegmon 2002; Hegmon et al. 1999; LeBlanc 1983; LeBlanc and Whalen 1980; Lekson 2006; Nelson 1984, 1999; Nelson and Hegmon 2001; Nesbitt 1931; Shafer 2003), only a few Black Mountain phase sites have been excavated (e.g., Anyon and LeBlanc 1984:143-148; Creel 2006b; Putsavage and Lekson 2010; Taliaferro 2014; Ravesloot 1979). As Harry Shafer (2006:31) comments, “archaeologists know so little about the Black Mountain phase sites that follow the Classic Mimbres phase that one cannot even begin to speculate on how the society may have been structured,” highlighting the need for further research on the Black Mountain phase. Although the archaeological record provides numerous examples of changes in material culture, which likely indicate social reorganization, the nature of these transformations is an open and important area of research.

The transition from the Black Mountain to Cliff phase has received only limited research attention in the Mimbres Valley (LeBlanc and Nelson 1976; Nelson and Anyon 1996; Nelson and LeBlanc 1986). More work has been conducted on Cliff phase sites in the Upper Gila Valley (Dungan et al. 2012; Lekson 2002; Mills et al. 2013; Nelson and LeBlanc 1986; Clark 2010;
Huntley et al. 2014; Wallace 1998). But since there are few (or no) Black Mountain phase sites in the Upper Gila Valley (Lekson 2002; see also LeBlanc and Nelson 1976; Nelson and LeBlanc 1986:246-247), the transition from the Black Mountain to Cliff phase has not been a research focus.

While this second transition saw only a slight population decline in the Mimbres Valley and a less dramatic change in material culture (adobe room blocks still constructed and continued increase in cremations), one of the main changes is a marked increase in Roosevelt Red Wares (Salado polychromes) and Chihuahua polychromes. The Roosevelt Red Wares are associated with the Salado phenomenon, a fourteenth- and early fifteenth-century ceramic horizon in the southern Southwest that functioned to connect disparate groups of local and migration populations under a unified ideology (e.g., Crown 1994; Dean 2000; Lyons and Lindsay 2006). The Chihuahua polychromes are associated with the rise of the Casas Grandes regional system, which had social, economic, political, and ritual connections to both Mesoamerica and the American Southwest from the thirteenth through the fifteenth centuries (e.g., Di Peso 1974; Lekson 1999a, 1999b; VanPool 2003; Whalen and Minnis 2003, 2009). Both the Salado phenomenon and the Casas Grandes regional system are detailed in Chapter Two.

The remainder of this chapter provides background for the study. First, I review previous research on the transition from the Classic Mimbres to Black Mountain phase. I also briefly describe the environmental setting of the Black Mountain site. I then provide a summary of BMAP excavations to give the reader a framework for addressing the question of whether the shifts in material culture represent cultural continuity or change. Finally, I provide a brief summary of each chapter.
Previous Research on the Classic Mimbres to Black Mountain Phase Transition

Three scenarios are currently posited for the social, economic, and political reorganization that occurred in the Mimbres region around 1150 (e.g., Creel 1999; Nelson and Hegmon 2001; LeBlanc 1989; Shafer 1999; Taliaferro 2014). These scenarios are: (1) complete depopulation of resident groups and immigration of new groups after 1150; (2) population decline (but not a complete depopulation), accompanied by the reorganization of economic and social networks, around 1150; and (3) migration of some populations from the Mimbres Valley to the Eastern Mimbres, accompanied by the reorganization of economic and social networks in the Mimbres region. Scenarios two and three both suggest the reorganization of economic and social networks, but focus on different subregions within the larger Mimbres region. This research addresses these debates and previous research as a complement to the research conducted at LA 49. Below, I provide a summary of the three central arguments, which are discussed at length in Chapter Two, focusing on the transition from the Classic Mimbres to Black Mountain phase.

In the first scenario, scholars propose that people living in the Mimbres region during the Classic Mimbres phase completely depopulated the region around A.D. 1150. New people, possibly from the Jornada region to the east, entered the Mimbres region about 50 years later and settled in the Lower Mimbres Valley (Ayon and LeBlanc 1984: 24; Blake et al. 1986; LeBlanc 1977, 1980b, 1989; Shafer 1999). Although these scholars acknowledge that some archaeological traits show a connection between the Classic Mimbres and Black Mountain phase people, they argue that the Black Mountain phase represents a cultural, and, in large part, a demographic break (Blake et al. 1986; LeBlanc 1989:192-194; Shafer 1999:131-133). Researchers indicate that the cessation of Classic Mimbres Black-on-white pottery (Style III), with imagery and iconography inspired by Mesoamerican origin stories (Brody 2004:174–175;
Gilman et al. 2014; Hegmon and Nelson 2007; Moulard 1984:113, 115, 124; Schaafsma 1999; Shafer 1995, 2003:212; Thompson 1994), signified an abandonment, or at least a reorganization, of Mimbres phase ideologies (Shafer 1999:131-133). Changes in architecture (masonry to adobe room blocks) and mortuary practices (a decrease in flexed inhumations with “killed” bowls and an increase in cremations) also represent breaks from Classic Mimbres phase behaviors.

The second perspective suggests that Classic Mimbres phase populations living in the Mimbres Valley continued to occupy the area, at a greatly reduced density. Creel (1999, 2006a, 2006b) and Taliaferro (2014) argue for continuity because of continued cultural practices such as burial techniques and the organization of lithic and ceramic production. In the Mimbres Valley, there is strong evidence that some of the Black Mountain phase cultural traits, such as new ceramic types (e.g., Playas Red Wares), round hearths, and adobe architecture, first appeared during the end of the Classic Mimbres and Terminal Classic phases (Creel 1999:108-110, 116-117). The appearance of new cultural traits suggests reorganization and expansion of social and economic networks. These changes, however, first appeared in the earlier Classic Mimbres (and Terminal Classic) phases; therefore, these scholars propose that the new traits do not support a cultural break.

The third perspective focuses on the Eastern Mimbres area (Figure 1.1) and suggests that the depopulation of residential sites in the Mimbres Valley was caused by population growth followed by drought and resource depletion at the beginning of the twelfth century (Minnis 1978, 1985; Nelson 1981; Nelson and Diehl 1999; Nelson and Schollmeyer 2003; Schollmeyer 2005). Nelson and Hegmon (2001) call this period of transition the Reorganization phase (Table 1.1). During this phase, the authors suggest that some groups remained in the Mimbres Valley while others relocated to hamlets in the Eastern Mimbres to cope with the increasing social and
economic stresses caused by environmental pressures (Hegmon et al. 1998; Nelson 1999; Nelson and Hegmon 2001; Nelson et al. 2006; Nelson and Schollmeyer 2003; Schollmeyer 2009). These hamlets were present during the Classic Mimbres phase. The population in the Eastern Mimbres nearly doubled during the Postclassic period transition, presumably representing relocation of Mimbres Valley peoples (e.g., Nelson 1999; Nelson and Hegmon 2001; see also Peeples 2010). This perspective suggests a change in settlement patterns from large villages in the Mimbres Valley to smaller hamlets in the Eastern Mimbres area, with a continuous occupation throughout the region (Hegmon et al. 1998; Nelson and Hegmon 2001). Nelson and colleagues (2011:para. 6) note that “changes in observable levels of diversity in pottery, and in other forms of material culture…are components of the changing social processes involved in consolidation and reorganization” and represent a broadening of social and economic networks beyond those of the earlier Classic Mimbres phase.

It seems unlikely that population reorganization was uniform across the Mimbres region, and these three perspectives indicate the diversity of possible events during the population reorganization. Because the Black Mountain site is the type site and one of the largest of the phase, research at LA 49 has refined our understanding of the scale and chronology of reorganization in this critical period, while addressing questions surrounding replacement or continuity. Since the Black Mountain site does not contain a Classic Mimbres occupation, it provides a unique opportunity to define Black Mountain phase features.

Because there are few (if any) Classic sites found at or near LA 49, all people living at the site are “migrants.” However, as described in more detail in Chapter Three, in this dissertation migrants are defined as individuals or groups who relocate for the long term. These individuals and/or groups move beyond their community boundaries (Clark 2011:84; Cabana and
Clark 2011:5; Ortman and Cameron 2008:234-236). A *community* is defined as a group of people who live in close proximity, have a collective history, and interact regularly through social, economic, and political ties (Clark 2011:85). In other words, in this context, *migrants* are populations that did not live in the Mimbres Valley during the Classic period and had only a weak historical connection to the valley. Because there was an overall population decline sometime after 1150, if migrants played a role in the changes seen in material culture, these would have been small groups. Groups and individuals (or their direct ancestors) who inhabited the Mimbres Valley during the Classic period and settled the Black Mountain site are referred to in this study as *resident* populations. These residents have a historical connection to the valley.

**The Black Mountain Site (LA 49)**

The Black Mountain site (LA 49) is well known in the archaeology of southern New Mexico but it has not contributed to academic research because of the perception that the site was destroyed by extensive vandalism (Minnis and LeBlanc 1979). H. P. Mera first recorded the site in the 1930s. Throughout the first half of the twentieth century, the Black Mountain site was heavily looted. In the late 1970s, the site was mechanically graded, destroying large portions of the adobe architecture (Minnis and LeBlanc 1979).

In 1976, prior to the mechanical grading, the Mimbres Foundation produced a sketch map of the site (Ravesloot and Minnis 1976). The Museum of New Mexico conducted a second survey in 1977, after the site had been graded (Peckham 1977). The survey notes four or more refuse concentrations and no surface evidence of architecture. No other work was conducted at Black Mountain until 2010, when the Department of Anthropology at the University of Colorado began preliminary field research. Initial work determined that much of the site survived, despite a century of looting and mechanical disturbance. A detailed summary of fieldwork and
excavations from 2010 to 2012 is provided in Appendix A. Because of the grading, there is little visible architecture. The Cliff phase component (Locus 1) is a subtle, yet visible mound, while the abode architecture can only be seen after excavation. Limited test excavations in 2010 revealed that significant areas of subsurface architecture remain (Putsavage and Lekson 2010; Putsavage 2011).

LA 49 is immediately west of the Mimbres River, 16 km northwest of Deming, New Mexico, and directly across the Mimbres from Black Mountain, a prominent feature in the Deming area (Figures 1.1 and 1.2). Black Mountain, standing 1,638 m tall, is a mass of volcanic ash and sand capped by a sheet of quaternary basalt (Elyea and Gerow 1999:11). The Black Mountain site is located on a low bench directly above the Mimbres River floodplain and extends at least 650 m east-west and 250 m north-south (16.25 hectares).

Environmental Setting and Landscape

The archaeological traits that define the Mogollon, Mimbres, and surrounding regions are elaborated in Chapter Two. Here I provide an overview of the environmental setting and landscape of the Mimbres region.

The Mimbres region encompasses several river valleys in southwestern New Mexico, northern Mexico, eastern Arizona, and western Texas (Figures 1.1 and 1.2). The Mimbres Valley is one of the main drainages within the Mimbres region, and is divided into three subregions: the Upper, Middle, and Lower Mimbres Valley (Figure 1.2). The valley has been considered the heartland of the Mimbres region, and some researchers suggest that the valley had control over resources and production in surrounding areas, especially the circulation of ceramics (see Anyon and LeBlanc 1984; Hegmon 2002; Hegmon et al. 1999). Other researchers suggest Mimbres society was non-hierarchical and decentralized, and argue that the distribution of resources
would not support centralized control over production (e.g., Gilman et al. 1994; Powell-Marti and Gilman 2006; Lekson 1990, 2006; Shafer 2003). The upper, middle, and lower portions of the valley show slight differences through time in settlement patterns, settlement locations, and population densities (e.g., Diehl and LeBlanc 2001; Schollmeyer 2005; Lekson 2011; Nelson and Anyon 1996; Powell-Marti and James 2006; Shafer 2006).

The Mimbres Valley receives an average yearly precipitation of 7 to 28 inches, depending on altitude (Gabin and Lesperance 1977), with the uplands receiving over 24 inches and the desert lowlands receiving as little as 9 inches per year (Clothier 2013). Tree-ring data suggest that average rainfall was similar prehistorically (Creel 2006a). Temperatures in the valley average 53° F at lower elevations around Deming and are only slightly cooler (average 51° F) in the higher elevations around Silver City (Clothier 2013; Gabin and Lesperance 1977). Temperatures rarely drop below freezing anywhere in the valley. The wettest months occur in late summer (June to August), with rains from the monsoons providing a majority of the average rainfall (Minnis 1985). The region is considered arid to semiarid because of low annual rainfall and high levels of evaporation. During the Mimbres Classic phase, human settlement depended on small-scale diversion irrigation systems for farming (Herrington 1979; LeBlanc 1983; Lekson 1986; Minnis 1985; Nelson et al. 2010; Sandor 1992; Shafer 2003). At this time, it is unclear if the irrigation canals from the Classic Mimbres continued to be used during the Black Mountain phase, and I am unaware of any projects that have investigated this question.

To the north of the Mimbres region lies the Mogollon Plateau, which is composed of volcanic mountains ranging in altitude from 2200 to 3000 meters. Three major drainages, the Gila, San Francisco, and Mimbres Rivers, flow out of the Mogollon Plateau. The eastern slopes of the Mogollon uplands drain into the Rio Grande. The Gila and San Francisco Rivers
eventually flow into the Colorado River, while the Mimbres submerges in the Chihuahuan desert at the southern end of the Mimbres Valley. The southern part of the Mogollon Plateau includes the Upper Mimbres and Upper Gila River Valleys. The Mogollon uplands, which include the Upper and Middle Mimbres River Valley, are composed of dense, high elevation pine forests. In the Middle Mimbres, there are extensive ponderosa pine forests, with spruce, aspen, and fir at higher elevations (Diehl and LeBlanc 2001; Minnis 1985; Lekson 2006). This area was an important resource for people living in the Mimbres region. Small and large mammals include mule deer, elk, pronghorn, cottontail, and jackrabbits (Diehl and LeBlanc 2001).

The southern portion of the Mimbres region, including the Lower Mimbres Valley and parts of the southern end of the Middle Mimbres Valley, is composed of basin and range, with many range areas containing playas or intermittent lakes. This area is the northern end of the Chihuahuan Desert and ranges in elevation from about 1,220 to 1,525 meters. The Sierra Madre range lies at the northern edge of the Chihuahuan Desert. The higher elevation of the Chihuahuan Desert contains high desert grassland while the lower elevations are mainly composed of creosote, mesquite, yucca, and desert scrub (Diehl and LeBlanc 2001; Minnis 1985; Lekson 2006). Along the drainages in these lower elevations, there are cottonwood, oak, and walnut. Mule deer, pronghorn, cottontail, and jackrabbits inhabit the Lower Mimbres Valley (Diehl and LeBlanc 2001). The Black Mountain site is located in the lower elevation of desert scrub and has a lower average rainfall than the Mogollon Plateau.

LA 49 sits on the first bench/terrace above a drainage approximately 0.8 km west of the Mimbres River’s present channel. The bench is covered in goosefoot and creosote with only a few mesquite bushes. The site is relatively flat, but there is a slight rise to the south. Site
architecture is located on about 1-2 m of sandy soils, which sit on top of a layer of caliche (nominally regarded here as “sterile”) (Virginia McLemore, personal communication 2010).

The average rainfall at the Black Mountain site (8 to 10 inches) is below the average for the region. However, the site occupies the bench above the largest part of the floodplain and corresponds with a perched water table along the Mimbres River. The floodplain is large near the site because of a major bend in the Mimbres River. The volcanic intrusion of the Black Mountain geological feature, east of the Mimbres River, underlies the river’s channel and floodplain, and forces subsurface water flow to the surface. Thus, the area between the site and the Mimbres River would have been a favorable area for agriculture (Fred Nials and Mike Brack, personal communication 2010), and the people living at the site may not have been as heavily impacted by the low level of rainfall as other people living in the Lower Mimbres Valley.

**Black Mountain Site Architecture**

The following section familiarizes the reader with LA 49 by describing the three areas of architecture (Loci 1, 2, and 3; see Appendix A; Figure 1.3) and summarizes the magnetometry surveys conducted during 2011. On the far western side of the site there are two concentrations of probable pit structures, termed Locus 3. Locus 3 was not excavated, but diagnostic ceramics were collected from the surface. These suggest that the pit structures date to the Late Pithouse period (A.D. 550 to 1000) and likely the Three Circle phase (A.D. 750 to 1000), based on the presence of Mogollon Red-on-brown, Three Circle Red-on-white, and Mimbres Style I (Appendix B; Figure 1.3; Table 1.1). The two areas of pit structures sit just above the floodplain on a bench and are about 50 m apart. Each area of architecture contains approximately 10 pit structure depressions. Locus 3 was not affected by the mechanical grading and was not heavily looted.
The second area of architecture, Locus 2, contains a Black Mountain phase room block and is about 150 m east of Locus 3 (Figure 1.4). The room block is about 1,750 m$^2$ with a probable room count of about 85 rooms.\textsuperscript{1} During excavation and the magnetometry survey, the BMAP uncovered two pit structures in Locus 2 (Pithouses A and B) beneath the Black Mountain phase room block. BMAP excavated a portion of each of these pit structures. Ceramic types (such as Playas series, El Paso Polychromes, and St. John’s Polychromes) (Appendix A, B) and three radiocarbon dates (Chapter Five) indicate that the pit structures date to the Black Mountain phase. Only two sherds of Late Pithouse period and Classic Mimbres phase pottery (Undifferentiated Mimbres Ware and Mogollon Red-on-brown) were recovered from Pithouse B. Since these sherds came from the upper levels of fill that were disturbed by the mechanical grading, they probably do not represent the construction or occupation of the pit structures. Therefore, as detailed in Chapter 5, it appears that the pit structures predate the room block but date to the Black Mountain phase.

In Locus 2, BMAP excavated portions of four rooms (A, B, C, and D) (Appendix A). These four rooms contained three occupation surfaces (OS 1, 2, and 3). Because Locus 2 was heavily impacted by looting and the mechanical grading, these surfaces are no longer visible in all excavation units and rooms. However, the stratigraphy in these areas (ponding events and

\textsuperscript{1} This estimate is preliminary, as the magnetometry did not provide a signature for the outline of the western room block. We only defined one of the exterior walls during excavation. The area and room estimates are based on the topography of the site and sherd density in the surface collection units, which was lower on top of the areas of architecture (Figure 1.3). A room area of 20 m$^2$ was used in this estimate, based on average room size in the Black Mountain component (Locus 2) and contemporary sites (Creel 2006b; Ravesloot 1979). However, since there may be a Black Mountain phase component underneath at least a portion of the Cliff phase room block (Locus 1), the room count and population for this period could be higher.
wind-blown sediments that sit just above where the occupation surfaces should appear) indicates that they were present in all rooms and excavation units. OS 1 (upper floor in the room block) was located at 43 cmbd U8 (centimeters below datum) and was remodeled three times (OS 1a, b, and c). Trash fill was found between each remodeled surface. OS 2 (lower floor in the room block) sits at about 64 to 68 cmbd U8 and OS 3 (the floor in Pithouse A) is found at about 90 cmbd U8. The stratigraphy of Locus 2 and the radiocarbon samples found there are examined in more detail in Chapter Five. They provide resolution on the chronology of the site.

The third area of architecture (Locus 1) is a large, C-shaped adobe room block which dates to the Cliff phase (1300 to 1450) and sits about 50 m east of Locus 2 (Figure 1.5). The room block encloses a plaza that is about 500 m². Based on magnetometry and pedestrian survey of the plaza, which showed dark soils as well as small pieces of burnt bone, this area likely
indicates a significant burning event (Figure 1.6). Although no excavations were conducted in the Locus 1 plaza, this area could represent a large area of cremation similar to the cremations found in the plaza at Ormand Village (Wallace 1998:169-180). The area of Cliff phase architecture is about 3,500 m² with an estimated room count of 175 rooms.² Like Locus 2, the Cliff phase room block in Locus 1 suffered from heavy disturbance due to looting, mechanical grading, and rodents. Excavation in Units 2 and 17 of Locus 1 also provide evidence for several occupations (a Black Mountain phase room block and possible pit structures), which are further detailed in Chapter 5.

In Locus 1, BMAP excavated in four areas (Units 2 and 17, Unit 3, and Trenches A and B; Figure 1.5). Trench B represents an area of sheet trash. Although the soils on the surface were full of organic materials, excavation in Trench A revealed low artifact densities. Trench B appears to represent a shallow midden dating to the Cliff phase occupation because of the appearance of Roosevelt Red Wares and Chihuahuan polychromes. Excavation in Unit 3 was terminated (60 cmbd U2) before any occupation surfaces were encountered because we uncovered disarticulated human remains. Therefore, it is unclear if this portion of Locus 1 has multiple occupations. Units 2 and 17 contained the corner of a Cliff phase wall and an associated occupation surface (OS 1 East, 48 cmbd U2) that also appears to articulate with the Cliff phase room block. The second occupation surface (OS 2 East, 59 to 63 cmbd U2) may represent a

² Ravesloot and Minnis (1976) estimated the Black Mountain phase area (“Potted Area 2” on the 1976 sketch map) at 2,800 m². Putsavage and Lekson (2010) used a smaller room area (20 m²) based on average room size at Black Mountain phase sites (Nelson and LeBlanc 1986). BMAP estimated a smaller room block area (1,750 m²) based on likely areas of architecture from the GPS mapping of the topography of the site, magnetometry analysis of the Black Mountain phase room block, and ground truthing of the Black Mountain phase room block magnetometry (Figures 1.3, 1.6, and 1.7).
Black Mountain phase occupation. No walls were found in association with OS 2 East and pottery sherds found in the fill above this occupation surface, which spanned the Black Mountain and Cliff phases (Chupadero Black-on-white and Playas Red Wares), did not provide assistance for relative dating. Finally, there was a possible pit structure below OS 2 East in the southeastern corner of Unit 17. This structure was not well defined and may represent erosion in the caliche bedrock. Further research is needed to determine if this area represents a cultural structure.

During the 2011 season, BMAP also utilized geophysical mapping to better understand the complex occupational history, architectural layout, and stratigraphy of the site. Magnetometry was conducted over the entire area of the Cliff phase room block (Locus 1) and a portion of the Black Mountain phase component in Locus 2 that was not obscured by vegetation (Figures 1.6 and 1.7). Dr. Darrell Creel and Texas Archaeological Research Laboratory (TARL)
Figure 1.6 Magnetometry map of Locus 1. Dark areas show the outline of the room block.

carried out this work. Figure 1.7 shows where magnetometry was conducted in the Black Mountain phase component in Locus 2. Magnetometry on this portion of the site did not help to define the outline of the Locus 2 room block. However, the magnetometry did reveal a hearth (Feature 10.1), which was excavated in 2011 (Figure 1.7).

As shown in Figure 1.6, there is a relatively close correspondence between the southwestern edge of the Cliff phase pueblo and a linear, strong magnetic anomaly. This area is shown on the map as the dark areas right next to the white areas. The likely area of architecture in Figure 1.3 is superimposed on the magnetometry signature. During 2012, excavations showed that these anomalies align with the exterior wall of the Locus 1 Cliff phase component room.
Figure 1.7 Magnetometry map of Locus 2.
block (Appendix A: Trench B) and allow for a better estimate of the size of the Cliff phase pueblo.

In summary, LA 49 consists of three loci (Figure 1.3). Excavations were focused in Locus 2, with work also conducted in Locus 1. The Locus 2 area of architecture is about 1,750 m² and probably contains around 85 rooms. Locus 2 excavations revealed three occupation surfaces (OS 1, 2, and 3), which all appear to date to the Black Mountain phase. Locus 1 is a large C-shaped room block surrounding a plaza. The area of architecture is around 3,500 m² with an estimated room count of about 175 rooms. Excavations in Locus 1 uncovered three periods of occupation, discussed in more detail in Chapter Five. Based on the presence of Roosevelt Red Wares and Chihuahua polychromes, the upper (latest) occupation in Locus 1 (OS 1 East) represents a Cliff phase room block. There is a clear break between the upper and middle occupations. Because of this break and the types of pottery found in association with this occupation, I suggest this occupation may represent a Black Mountain phase occupation. Additional research is needed to confirm or refute this hypothesis. The lower (earliest) occupation is a pit structure. No diagnostic ceramics were found in association with the pit structure, therefore the BMAP could not provide a period of occupation.

Project Scope and Dissertation Outline

In this section, I outline the organization of this dissertation and provide brief summaries of the chapters that follow. Chapter Two reviews the history of research in the Mimbres region and describes archaeological characteristics and features for each period and phase (Late Pithouse period to Cliff phase). The chapter also describes the history of research and archaeological attributes of the Jornada Mogollon, southeastern Arizona (the Salado phenomenon), and the Casas Grandes regional system. Since exchange networks expanded
greatly during the transition from the Classic Mimbres to the Black Mountain phase, these regional summaries offer a broader context for the transition, showing that the reorganization of populations and social systems was common throughout the southern Southwest and northern Mexico during these periods.

Chapter Three presents the theoretical framework that guided this research project. Population reorganization is an enduring and multifaceted practice (e.g., Beekman and Christensen 2003; Clark 2001; Hill et al. 2010; Kohler et al. 2010; Lyons 2003; Sahlins 1995; Woolf 1998). Since there are numerous social, political, economic, historical, and environmental factors that frame the ways in which people express change during social reorganization (e.g., Clark 2001; Neuzil 2008; Hill et al. 2010; Sahlins 1995; Woolf 1998), it is key to utilize several lines of evidence to address questions surrounding the continuity and/or replacement of populations. These lines of evidence can be challenging to track, for example, in order to determine whether Black Mountain phase groups were shedding their previous cultural practices and were attracted to newly emerging practices (Eckert 2008; Lekson 2002; Shafer 1999). This study utilizes technological attributes, high visibility attributes, object life histories, and the history of practice of objects to distinguish among stable, newly emerging, and shifting social and economic practices. These theoretical perspectives provide a method to track whether resident populations, immigrant populations, or some combination of these groups inhabited the Black Mountain site.

Chapter Four provides a review of previous population estimates for the Mimbres region at the social transitions between Mimbres and Black Mountain phases, and Black Mountain and Cliff phases (e.g., Blake et al. 1986; Lekson 2006; Peeples 2010). Since this dissertation examines whether the transition represents a continued occupation from the Classic Mimbres to
the Black Mountain phase, or depopulation with immigration of new populations after about 50 years, or some combination of these scenarios, population estimates provide a necessary baseline for this study. Basing population estimates on room counts, previous research shows a population decrease between the Classic Mimbres and Black Mountain phases in the Mimbres region. However, as noted in Chapter Two, this makes it challenging to see immigrants who are simultaneously moving into the region.

Chapter Five discusses the stratigraphic data, construction sequence and techniques, geomorphology, and chronology of the Black Mountain site and phase. Relatively few chronometric dates have been excavated from sites with Black Mountain and Cliff phase components in the Mimbres region, though chronological resolution is more firmly established for contemporaneous periods in the Eastern Mimbres (Hegmon et al. 1999; Nelson 1999). Teasing apart the chronology of the Black Mountain phase occupations has been challenging, since few tree-ring dates exist for the phase and many samples that could be dated have not yet been linked to the local tree-ring chronology. (That is, they constitute a “floating” chronology [Anyon and LeBlanc 1980:515; Steven LeBlanc personal communication 2011]). Since the transition from the Classic/Terminal Classic to the Black Mountain phase spans a 50- to 75-year period, higher-resolution temporal data provide the best method for understanding the Postclassic chronology. Chronometric data from the Locus 2, Black Mountain, component of LA 49 provide evidence for multiple occupations during the Black Mountain phase. Appendix A presents detailed information on the units excavated during three seasons of research and complements the discussion of stratigraphy and dating in Chapter Five.

Chapter Six presents ceramic data (Instrumental Neutron Activation Analysis [NAA] and petrographic and macroscopic analysis) from the Mimbres region to explore whether social
connections remained stable or shifted during the reorganization. Most ceramics dating from the Classic Mimbres phase found at the Mimbres sites were produced in the region (Gilman et al. 1994; Creel et al. 2002). Although Mimbres pottery and other goods moved within the region, there was little introduction and circulation of goods to and from other regions (Nelson 1999:39). Through NAA and petrographic and macroscopic analysis, Chapter Six also examines the life history of ceramics from the Black Mountain site. These data are then compared to production, exchange, and use of Black Mountain phase pottery at the Old Town, Walsh, and Montoya sites (using data from Creel 1999, 2006b; Taliaferro 2014). Recent research has used NAA to source approximately 3,600 sherds, whole pots, and raw clay samples from about 300 sites in the Mimbres region (e.g., Creel et al. 2002; Speakman 2013; Taliaferro 2014). This database provides a rich basis for comparison and detailed analysis of the production location of sherds from the Black Mountain site. It offers a broad regional perspective on social connections at the Black Mountain site as evidenced by ceramic exchange. Appendices B, C, D, and E present, respectively, ceramic ware and type totals for LA 49, the NAA and petrographic sample context and attribute data, photos of ceramics before NAA and petrographic sampling, and statistical analyses for the chapter.

Chapter Seven uses obsidian data to examine social connections throughout the history of the Mimbres region. Obsidian exchange networks have not frequently been utilized to document changes seen around 1150 and 1300 (but see Taliaferro et al. 2010). Appendix F presents obsidian data from sites utilized in the sample for this project. Through excavation and survey, 233 obsidian samples were recovered from all temporal components at the Black Mountain site. I compared obsidian data from sites in the Mimbres region to the Black Mountain site. Obsidian data from 16 additional sites were used to compare the movement of obsidian through the region.
(Upper, Middle, and Lower Mimbres Valley) and over time (Late Pithouse period to Cliff phase) (Dolan and Ferguson 2012; Dolan and Putsavage 2012; Taliaferro et al. 2010; VanPool et al. 2011). Although the analysis of obsidian procurement and exchange networks cannot directly answer questions surrounding cultural continuity and change, it provides an additional line of evidence that suggests residents of the region were reorganizing their social connections and that they approached this dynamic period in a variety of ways. The examination of obsidian exchange networks provides evidence of emerging connections with the Salado phenomenon and the Casas Grandes regional system.

The research discussed in this dissertation is the first step in a longer research project. Ceramic and obsidian data from the Black Mountain site and comparisons with data from numerous other projects supply a regional perspective over a 450-year period. When the refined chronological data are paired with population estimates and ceramic and obsidian data, a clearer picture of the processes behind the transition begins to emerge. Therefore, the Black Mountain site lays the groundwork for future research and provides a baseline for understanding the population decline, shifts in material culture, and changing nature of social and economic systems at the end of the Classic Mimbres and Black Mountain phases. This dissertation provides new data concerning these important periods of change.

Examination of the Black Mountain site and phase, a critically important but understudied and highly debated time period, refines our understanding of people living in this region during the Postclassic periods. It also provides critical data for future analysis of Mimbres region population histories, and transforms current interpretations of this pivotal period in Southwestern prehistory. The picture that is emerging from research at Black Mountain highlights the complexity of the Postclassic periods (Putsavage et al. 2014). Tree-ring and
ceramic data from Black Mountain indicate multiple periods of architectural construction at LA 49. Although social and economic networks were reorganized, data from other sites in the region provide evidence that some residents (people who lived in the valley during the Classic) remained in the Mimbres Valley after the Classic Mimbres (Creel 1999, 2006b; Taliaferro 2014). The obsidian and ceramic data from LA 49 also suggest there was a continuation of previously established economic and social connections and that some people who lived in the valley during the Classic Mimbres remained. These data also provide evidence for the appearance of new social networks and the possibility of new populations moving into the area. Research at the Black Mountain site demonstrates dynamic social processes and highlights the diverse ways in which populations in the Mimbres region approached the population decrease and reorganization around A.D. 1150.
CHAPTER II

SOCIAL REORGANIZATION IN THE MOGOLLON REGION

Introduction

The Mogollon region, which contains numerous subregions including the Mimbres, has been an important focus in the archaeology of the American Southwest since Haury’s (1936a) description of the Mogollon as a distinct archaeological culture. His paper fueled a great deal of disagreement and debate, and spurred a great deal of research in the decades that followed (e.g., Bullard 1962; Haury 1958, 1988; Martin et al. 1952, 1954, 1956; Martin and Rinaldo 1943, 1950; Nesbit 1938; Reid and Whittlesey 2010; Wheat 1955). Some subregions and periods in the Mogollon, such as the Mimbres Valley during the Classic Mimbres phase (A.D. 1000 to 1150), have received more attention than others (e.g., Ackerly et al. 1988; Anyon and LeBlanc 1984; Bradfield 1931; Cosgrove and Cosgrove 1932; Creel 2006b; Hegmon et al. 1999; LeBlanc 1983; LeBlanc and Whalen 1980; Lekson 2006; Nelson 1984, 1999; Nelson and Hegmon 2001; Nesbitt 1931; Shafer 2003). While the Classic Mimbres phase represents a period of apparently inward-looking regional focus (apart from interaction with groups in Mexico, noted through the exchange of copper bells and scarlet macaws) (e.g., Hegmon 2002:339; Minnis 1985; but see Lekson 2011, many subsequent periods throughout the Mogollon show evidence of expansion of exchange networks, political and social reorganization, and dramatic changes in material culture. The major Postclassic phases of the Mimbres Valley were the Black Mountain and Cliff phases, but these phases have received less research attention (e.g., Anyon and LeBlanc 1984; Lekson 2006; Shafer 2003) than the much better known Late Pithouse period and Classic Mimbres phases.
This chapter provides a review of research in several regions in the southern Southwest, including southern New Mexico, southern Arizona, west Texas, and northern Mexico (Figure 2.1). I begin with an overview of the Mogollon concept. Since the Mimbres region and the Black Mountain site are located within the Mogollon, it is important to provide a brief history of research in the broader region. To provide historical context for the changes in material culture around 1150, I review the Late Pithouse period (A.D. 550 to 1000) and Classic Mimbres phase (A.D. 1000 to 1130). These are the periods in the Mimbres region before the dramatic changes around A.D. 1150. I then examine the Black Mountain phase (A.D. 1150 to 1300) as well as the contemporary Doña Ana (A.D. 1100 to 1250), El Paso (A.D. 1250/1300 to 1475), and Animas phases (A.D. 1200 to 1400/1450) (Tables 1.1 and 2.1). These phases, defined in the Jornada Mogollon region of eastern New Mexico and west Texas (see Figure 2.1), represent material culture traits and social organization similar to those of the Black Mountain phase, but differ in their geographic locations. The Doña Ana, El Paso, and Animas phases in the Jornada Mogollon provide regional context and show that social, economic, and political transformations were occurring throughout the southern Southwest coincident with the Classic-to-Black Mountain transition. This chapter also provides a review of the Cliff phase (A.D. 1250 to 1450) and the Salado phenomenon in the southern Southwest. Roosevelt Red Wares, associated with the Salado phenomenon, were found in both Locus 1 and 2 at the Black Mountain site. Finally, I review the rise of the Casas Grandes regional center in northern Mexico and its central and largest city Paquimé (ca. A.D. 1250 to 1450). The rise of Paquimé was contemporaneous with the end of the Black Mountain phase and the Cliff phase in the Mimbres Valley. The Black Mountain site contains Chihuahuan Wares (in both Locus 1 and 2) and a Cliff phase room block (Locus 1).
Figure 2.1 Map of American Southwest and Northern Mexico showing regions and “cultural areas” discussed in the study. The Black Mountain site (LA 49) is starred on the map.
### Table 2.1 Regional Chronologies

<table>
<thead>
<tr>
<th>Year</th>
<th>Hohokam</th>
<th>Ancestral Pueblo (Mimbres)</th>
<th>Jornada Mogollon</th>
<th>Salado</th>
<th>Casas Grandes (Paquimé)</th>
</tr>
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<tbody>
<tr>
<td>1500</td>
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<tr>
<td>1450</td>
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<td>Pueblo IV (1350-1600)</td>
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<tr>
<td>1400</td>
<td>Late Classic (1300-1450)</td>
<td>Cliff phase (1300-1450)</td>
<td>El Paso phase (1200-1400)</td>
<td>Postclassic (1300-1450)</td>
<td>Medio period (1200-1450)</td>
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<td>1350</td>
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<td>1300</td>
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</tr>
<tr>
<td>1250</td>
<td>Early Classic (1150-1300)</td>
<td>Black Mountain phase (1150/1200-1300)</td>
<td></td>
<td>Doña Anna phase</td>
<td></td>
</tr>
<tr>
<td>1200</td>
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<td>1150</td>
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<tr>
<td>1100</td>
<td>Sedentary period (900-1150)</td>
<td>Pueblo II (900-1150)</td>
<td>Terminal Classic (1130-1180)</td>
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<tr>
<td>1050</td>
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<td>1000</td>
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</table>

*Note:* Area outlined by dotted line represents periods/phases contemporaneous with the Black Mountain and Cliff phases.

Review of the Salado phenomenon and Paquimé provide a regional context for what we know about the people who occupied Locus 1 and 2 at the Black Mountain site. Table 1.1 summarizes the dates, region, and archaeological characteristics of each period and phase discussed in this chapter. Table 2.1 shows events occurring throughout the American Southwest and northern Mexico and provides a regional perspective on the context of change in the Mimbres around...
A.D. 1150. Previous research has suggested that the Mimbres region and the Black Mountain site and phase are closely linked to the Salado phenomenon and the Casas Grandes regional system (e.g., LeBlanc 1977, 1989; Lekson 1999b, 2002; Nelson and LeBlanc 1986), but the nature of those links and the degree of influence are still debated (e.g., Di Peso 1974; Lekson 1999a; Nelson and LeBlanc 1986; Whalen and Minnis 2003, 2009).

The Southern Southwest

The Mogollon culture is one of four major archaeological cultures that have been defined for the prehistoric American Southwest, the others being the Ancestral Pueblo (Anasazi), Hohokam, and Patayan (Cordell 1997:23). The Mogollon occupied the mountains of east-central Arizona, west-central and southwestern New Mexico, and portions of northern Mexico. Because the Mogollon region covers such a large area with diverse environmental settings, it includes numerous subgroups, each with its own distinguishing social and material culture characteristics (Wheat 1955). These subgroups generally correspond to geographic areas which include, but are not limited to, the Mimbres, Pine Lawn, Reserve, Point of Pines, San Simon, and Jornada regions (Cordell 1997:202-210).

Because of the variability evident within the region, when the Mogollon concept was first proposed by Haury (1936a), archaeologists did not readily accept the Mogollon as a separate cultural group. The concept of Mogollon was also clouded by the similarities in material culture, such as coil and scrape ceramics and pithouse and pueblo architecture, to the Ancestral Pueblo peoples. The debate was also complicated by Haury’s (1936a) suggestion that after A.D. 900/1000 the Mogollon culture was no longer a valid cultural entity and had been “swamped” or “submerged” by Ancestral Puebloan influences (Haury 1958 Reid 1986; Reid and Whittlesey 2010:55-56). Since most early fieldwork in the American Southwest focused on the Ancestral
Pueblo region, many researchers questioned whether the Mogollon groups were sufficiently distinct from the Ancestral Pueblos to be classified as a separate group (Reid and Whittlesey 2010:59-62). By the 1960s, controversy over the concept of the Mogollon had subsided due in part to the publication of Wheat’s (1955) dissertation, *Mogollon Culture Prior to A.D. 1000*, which was published jointly as a Memoir of the Society for American Archaeology and an American Anthropological Association Memoir (Reid and Whittlesey 2010; Whittlesey 1999).

While the Mogollon is now accepted as an archaeological cultural group distinct from the Hohokam and Ancestral Pueblo peoples (but see Lekson 1993, 1996a), this debate must be placed within the context of archaeological research of the time, which stressed description and classification. Some archaeologists still criticize the use of culture concepts such as “Mogollon,” noting that they limit meaningful discussion because they do not tell us how and why particular aspects of material culture correlate with prehistoric concepts of society, and because these cultural designations may not mark distinctions that were meaningful in the past (e.g., Dean 1988; Lekson 1996a, 2009:134-137; Speth 1988; Tainter and Plog 1994; Wilcox 1988). Others argue that these culture concepts provide archaeologists with a means to examine variability and may represent meaningful patterns of social interaction and identity (e.g., Reid and Whittlesey 2010; Riggs 2005). I believe that both of these arguments provide important perspectives on the culture concept. Although these designations may not have held meaning in the past, because they are rooted in long-term archaeological research they provide a way to communicate within the discipline and build upon previous research. Throughout this dissertation, I use the established cultural designations while recognizing that there is variability among the groups and regions within these categories and the boundaries between them may not always be clearly defined.
History of Research in the Mimbres Region

The Mogollon region has been the subject of numerous archaeological investigations. Some subregions, such as the Mimbres, have received more research attention than others. The Mimbres region of southern New Mexico, especially during the Classic Mimbres phase (A.D. 1000 to 1150), is renowned for its distinctive black-on-white pottery (Brody 2004). The period and region have been the focus of extensive archaeological research (e.g., Ackerly et al. 1988; Anyon and LeBlanc 1984; Bradfield 1931; Cosgrove and Cosgrove 1932; Creel 2006b; Hegmon et al. 1999; LeBlanc 1983; LeBlanc and Whalen 1980; Lekson 2006; Nelson 1984, 1999; Nelson and Hegmon 2001; Nesbitt 1931; Shafer 2003).

In the late nineteenth century and until the 1930s, skilled avocational and professional archaeologists conducted research at a number of large Mimbres and Mogollon sites (Bradfield 1931; Cosgrove and Cosgrove 1932; Haury 1936a, 1936b; Hough 1907; Nesbitt 1931). During this period, archaeological research in the Mimbres region focused on collection of artifacts for museum display, description of pottery, and refinement of chronology for the Mimbres Mogollon region (e.g., Fewkes 1914, 1923, 1924). Artifact collection required archaeological excavation, and through excavation archaeologists also recorded the complex history of the region. While excavating at Cameron Creek Village, Bradfield proposed a developmental sequence of ceramic and pithouse types. Unfortunately, the ceramic sequence was not linked to the pithouse sequence before his untimely death, and therefore is difficult to compare with current phase sequences. Nesbitt (1931) and Cosgrove and Cosgrove (1932) each developed their own sequence of pithouse types, but these sequences were not linked to the ceramic assemblages. Haury (1936a, 1936b) was the first to define the three phases of Late Pithouse period architecture and link the architectural sequence to changes in ceramics and artifacts. This sequence was based on his work at Mogollon Village and the Harris site, and was supplemented by Martin’s work in the Reserve
area (Martin 1943; Martin and Rinaldo 1940, 1947). Haury’s (1936a:123) original phase
definitions and periods have been refined over time (Anyon et al. 1981:211; Hegmon et al. 1999;
Hegmon 2002).

As LeBlanc (1983:11-12) notes, although numerous excavations were conducted in the
early part of the twentieth century, relatively little was known about the Classic Mimbres phase
(but see Fitting et al. 1982). This early work was generally conducted by avocational
archaeologists or museums seeking the beautiful Classic Mimbres pottery for their collections.
Because of the iconic pottery, the Mimbres region was impacted heavily by looting. In response
to this situation, Steven LeBlanc established the Mimbres Foundation at the University of New
Mexico. In 1974 the Mimbres Foundation began surveys (Blake et al. 1986) and excavations
(LeBlanc 1983) to answer questions concerning the seemingly abrupt disappearance of the
Mimbres people. While the Upper Gila Project began a couple of years earlier and provided
important research on the region (Fitting et al. 1982), it did not produce as large a data set or as
many publications as the Mimbres Foundation survey and excavations. Looting beginning in the
late 1800s and continuing through the twentieth century caused site destruction throughout the
Mimbres region. One aim of the Mimbres Foundation’s research in the region was to mitigate the
impact of looting through systematic excavation (Hegmon 2002:315; LeBlanc 1983). Mimbres
Black-on-white bowls were, and still are, a prized commodity on the art market. In the early
1900s, pick axes and shovels were used to collect the pottery (LeBlanc 1983:11-15). Although
these activities caused destruction, sites were not completely obliterated. In the 1960s, bulldozers
were used to uncover the valuable pottery, and site destruction accelerated rapidly (Brody
2004:5-10). Archaeologists at the Mimbres Foundation faced many challenges due to site
destruction but found that valuable information could still be obtained, such as intact architectural remains and datable material for reconstructing chronology (LeBlanc 1983:12-15).

Since the Mimbres Foundation excavations in the 1970s, the Mimbres region has been the focus of numerous archaeological excavations and publications. These studies focused on defining the Mimbres region through large-scale excavation and surveying (LeBlanc 1983; LeBlanc and Whalen 1980; Lekson 2006); excavation at specific sites (Anyon and LeBlanc 1984; Creel 2006b; Lekson 1990; Nelson 1984; Shafer 2003); measuring environmental carrying capacity (Ackerly et al. 1988; Minnis 1981, 1985; Nelson and Schollmeyer 2003; Sandor et al. 1990); estimating population (Blake et al. 1986; Gilman 1989; Peeples 2010; Lekson 2006); describing irrigation systems (Ackerly 1992; Nelson et al. 2010; Sandor et al. 1992); analyzing relationships among subsistence, mobility, and land use strategies (Ackerly et al. 1988; LeBlanc 1986; Diehl 1997; Diehl and Gilman 1996; Nelson 1999; Schollmeyer 2005); and testing hypotheses related to the apparent abandonment of the region and “collapse” of Mimbres society ca. A.D. 1150 (Anyon et al. 1981; Creel 1999; Hegmon et al. 1999; LeBlanc 1989; Nelson and Hegmon 2001; Shafer 1990; Taliaferro 2014). Although the Mimbres region suffered from heavy looting at the beginning of the nineteenth century, the Mimbres Foundation and later projects helped to make the Mimbres region a focus of research in the American Southwest. The investigations cited above helped to drive and frame research questions in the region.

Below, I review questions developed from these projects that relate to the focus on chronology, cultural continuity, and discontinuity. These include debates about the chronology of the Mimbres region and describe the archaeology of the Late Pithouse period (A.D. 550 to 1000) and the Classic Mimbres phase (A.D. 1000 to 1150). For these periods, I examine how research has evolved over the past 40 years and summarize its findings. While the timing of the Black
Mountain and Cliff phases in the Mimbres Valley is still being refined, these periods at least partially overlap with the Salado phenomenon and the Casas Grandes regional system. At the Black Mountain site there is evidence of social connections to these two events through the appearance of Roosevelt Red Wares (Salado) and Chihuahuan polychromes (Casas Grandes) in Loci 1 and 2. Therefore, previous research on the Salado phenomenon and the Casas Grandes regional system provide a regional context for the social reorganizations at the Black Mountain site.

Late Pithouse Period (A.D. 550 to 1000)

The Late Pithouse period has three phases: 1 Georgetown (A.D. 550 to 650), San Francisco (A.D. 650 to 750/800), and Three Circle (A.D. 750/800 to 1000) (Anyon 1980; Diehl and LeBlanc 2001; Haury 1936a; Swanson et al. 2012). For each phase, I examine changes in settlement location, population size, ritual and domestic architecture, ceramic styles, and burial practices. Although there is slight variation in the timing, the cultural developments seen in the Mimbres region from the Late Pithouse period through the Cliff phase reflect broad changes seen throughout the American Southwest between A.D. 550 and 1450. Over time, people became increasingly dependent on agriculture, aggregated into permanent to semi-permanent settlements, and transitioned from living in pit structures to aboveground masonry pueblos (Anyon et al., 1981; Hegmon et al., 1999; Lekson, 1992, 2006). Many of the dramatic social changes seen

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1 Haury (1936a) identified a fourth phase, San Lorenzo, based on the marked changes in material culture between the Georgetown and San Francisco phases. Bullard (1962:71-72) reviewed the evidence and concluded that the changes did not provide enough evidence to warrant classifying them as a distinct phase. Work in the region continues to support this conclusion (Anyon et al. 1981:216).
during the Black Mountain phase seem to have their roots in shifts that began during the late Three Circle phase (A.D. 750 to 1000) and continued through the transition from pithouse to pueblo architecture at the beginning of the Classic period (A.D. 1000–1150).

The presence of Boldface Black-on-white (Style I) and San Francisco Redwares suggests that the Three Circle phase (A.D. 750 to 1000) of the Late Pithouse period (A.D. 550 to 1000) is the earliest period of occupation at the Black Mountain site (Putsavage 2011) (Figure 1.3, Table 1.1). While the three phases of the Late Pithouse period are distinguished by variations in ceramic types and pithouse forms, it can be difficult to differentiate the three phases during survey and excavation (Anyon 1980:162; Lekson 2006:5, 41). Therefore, all three of these phases are briefly reviewed. The shifts in social organization, material culture, ritual, and agriculture through the Late Pithouse period are the first steps in long-term social reorganization that culminates during the Classic Mimbres period (A.D. 1000 to 1150) and then shifts during the subsequent Black Mountain phase (A.D. 1150 to 1300). Since the changes between the Classic Mimbres period and Black Mountain phase are a focus of this study, a review of the preceding periods provides context.

**Georgetown Phase (A.D. 550 to 650)**

Although there are numerous differences in material culture between the Early Pithouse period (A.D. 200 to 550) and the Georgetown phase, researchers suggest that the phase transition represents a continuous occupation of the Mimbres region (Anyon and LeBlanc 1984:22; Anyon 1980:148-149). The changes between the two phases do not occur uniformly throughout the region. These shifts include changes in settlement location, the appearance of new domestic and ritual architecture, and changes in ceramic design elements (Anyon 1980:148). Village site locations move down from hilltops and closer to stream and riverbanks (Anyon 1980:162-166;
Domestic architecture during the Georgetown phase is characterized by circular and D-shaped pithouses with lateral entrances (Anyon 1980).

Communal pit structures, distinguished from domestic architecture by their significantly larger size, are noted during the Early Pithouse period, but there seems to be an increase in their numbers during the Georgetown phase (Anyon and LeBlanc 1984:22; LeBlanc 1980b:138).

Unlike Great Kivas in the Ancestral Pueblo area, Mogollon communal pit structures generally lack specialized interior floor features (Anyon and LeBlanc 1980:256).

San Francisco Redwares are first noted during the Georgetown phase, but most ceramics from this period are unpainted. These unpainted types include Alma Plain, Alma Neckbanded, and Alma Scored. San Francisco Redwares, distinguished by the thick, highly polished, red slip and dimples on the exterior, appear to be a modification of redware ceramics made during the Early Pithouse period. LeBlanc (1983:72) suggests that the San Francisco Redwares evolved into the Mimbres Black-on-white types because both ceramic types appear in mortuary contexts. In general, burials are extramural and most commonly occur in abandoned pithouses (Anyon 1980:187). These burials do not have a favored orientation; individuals are flexed and lying on their backs or sides.

**San Francisco Phase (A.D. 650 to 750/800)**

During the San Francisco phase, there was a population increase and an increase in village size. Small groups settled in marginal areas, away from the river drainage (Anyon 1980:173-174). Pithouses became rectangular, with rounded sides and lateral, ramp entryways, while communal pit structures were round or oval. The D-shaped pithouses from the Georgetown phase gradually developed into the rectangular pithouses of the San Francisco phase (Anyon...
1980:173-174). There is a marked increase in the number and size of communal pit structures compared to domestic pithouses (Anyon 1980:180; Anyon and LeBlanc 1984:22).

Mogollon Red-on-brown is a distinctive pottery type of the phase and marks the appearance of white slipped ceramics with brown, geometric designs painted over the slip. This ceramic type has exterior characteristics similar to San Francisco Redware, with a dimpled exterior wall and highly polished, thick red slip. The type is an in situ ceramic development (LeBlanc 1983). Burials during the San Francisco phase are similar to burials from the Georgetown phase.

**Three Circle Phase (A.D. 750/800 to 1000)**

The Three Circle phase of the Late Pithouse period (A.D. 750/800 to 1000) is likely the earliest period of occupation at the Black Mountain site. This period marks the beginning of numerous ritual and social changes that culminate during the Classic Mimbres phase (Anyon and LeBlanc 1980; Creel and Anyon 2003). Population continued to expand during the Three Circle phase, probably a result of agricultural intensification, which included adoption of irrigation systems from the Hohokam region of southern Arizona ca. A.D. 800. Because of the population increase, people continued to move into marginal areas (Anyon 1980:164). During the Three Circle phase, pithouses are rectangular with squared corners and retain the lateral ramp entryways. A major change in this phase is that most of the pithouse walls are lined with masonry (Haury 1936a). Communal structures are rectangular and frequently contain cobblestone masonry walls. The size of communal pit structures is more varied than in earlier periods and seems to correlate with village size. Many of these structures were ritually retired and burned at abandonment (Anyon and LeBlanc 1980:263-265; Creel and Anyon 2003). Subfloor burials are first evident during the Three Circle phase (Anyon 1980:187-188).
Pottery design experienced major changes during this period. Ceramic types include Three Circle Red-on-white followed by Style I (Boldface Black-on-white) and Style II (Transitional Black-on-white) (Diehl and LeBlanc 2001:20-23; Lekson 2006:5-6, 111). Three Circle Red-on-white, which also has exterior dimpling, is a transitional type between Mogollon Red-on-brown and Style I (Boldface Black-on-white). Style I (Boldface Black-on-white) has a creamy white slip, but the exterior polishing and dimpling are abandoned (Anyon 1980:150). Style I contains new design elements, a wider range of decorative fields, and an increase in the unpainted zones. Figurative elements in bowl designs are first evident during this period (Anyon and LeBlanc 1984:22). Style I was the first pottery type made with a reduction firing atmosphere, which produced a Black-on-white design pattern as opposed to the Red-on-white of Three Circle. Three Circle Neck Corrugated also appears during the phase. As Creel and Anyon (2003:84) note, the pithouse-to-pueblo transition “must be understood as one of the many significant changes that occurred in the centuries beginning with the Three Circle phase and continuing through the end of the Classic Mimbres phase at about A.D. 1130.” The changes during the Three Circle phase suggest greater sedentism and more pronounced ties to place as well as an increase in the complexity of political and social organization.

**Classic Mimbres Phase (A.D. 1000 to 1150)**

Important changes in material culture and social organization occurred around A.D. 1000. These changes include continued population increase, intensification of agriculture, a shift from pithouses to aboveground pueblo architecture, and a slight change in ceramic styles (Anyon et al. 1981). It has been suggested that these changes were related to the expansion of the Chaco regional system to the north (Lekson 2009) or to the introduction of Mesoamerican cultural
practices (Gilman et al. 2014), but most researchers favor explanations that point toward local influences.

Below, I discuss these changes by focusing on shifts in settlement patterns, new types of architecture and community organization, the appearance of new burial practices, and changes in ceramic style and design. Finally, I examine how these new forms of material culture influenced changes in social organization through the period and review the research that investigates these social changes.

Population estimates for the Classic Mimbres suggest that around 7,000 people inhabited the Mimbres Valley, with nearly half of the people aggregated at about 20 large towns along the Mimbres River. Large sites are also found along the Upper Gila and Rio Grande drainages, the San Simon region, and southeastern Arizona (Nelson 1999:28-29). The Classic Mimbres phase is defined by the presence of masonry pueblos and Mimbres painted wares (Anyon et al. 1981; Haury 1936b; LeBlanc and Whalen 1980; Lekson 1989b; Nelson 1999). These material culture characteristics are found in their highest concentrations in the Mimbres Valley and Upper Gila River Valley (e.g., Fitting et al. 1982; LeBlanc and Whalen 1980; Shafer 2006). There are slight variations in features such as ceramic design between the Mimbres Valley and Upper Gila (Shafer 1999:96-97). The Mimbres Valley and Upper Gila River drainages are the “heartland” of the Mimbres region (Nelson 1999; Lekson 2006; Shafer 1999), although the architecture and ceramic styles are also found in the Rio Grande valley, southeastern Arizona, west Texas, and northern Mexico (Lekson 1986; Shafer 1999:96).

While these shifts in architectural style, material culture, and social organization mark a change from the earlier Three Circle phase of the Late Pithouse period, research suggests that there was not an accompanying shift in settlement locations (Anyon et al. 1981; LeBlanc 1983).
Whether the phase shift was gradual or rapid is still debated.\textsuperscript{2} During the period, populations began to aggregate into larger villages. Many of these large Classic Mimbres sites are in the same location as earlier Late Pithouse period sites (Gilman 1980). There was also a dramatic increase in the number of smaller villages and hamlets along the river drainages and in marginal areas. The construction of check dams and small-scale irrigation allowed for agricultural intensification (Creel and Adams 1991; Herrington 1979). This irrigation technology, which was first evident during the Three Circle phase ca. A.D. 800 and imported from the Hohokam region in southern Arizona (Creel and Anyon 2003; Shafer 2006), increased residential sedentism.

During the Classic Mimbres phase, numerous architectural shifts occurred. Domestic architecture changed from semi-subterranean pithouses to aboveground masonry pueblos. These masonry pueblos were usually constructed of river cobbles with adobe mortar. While Three Circle phase communal pit structures continued to be used, there was also a shift to the use of large unwalled plazas for community ceremonies (Anyon and LeBlanc 1980). While the construction technique of the communal pit structures is relatively stable over time (Creel and Anyon 2003:74), during the Classic Mimbres phase communal pit structures were not burned and were allowed to erode naturally (Creel and Anyon 2003:77-80).

\textsuperscript{2} The Mangas phase was regarded as a short-lived transition from pithouses to pueblos (Gladwin and Gladwin 1934). Archaeologists working in the Upper Gila and Mimbres Valleys have debated the existence of this phase, which represents the shift between the Three Circle phase and the Classic Mimbres phase (Anyon et al. 1981; Gilman 1980; LeBlanc 1986; Lekson 1988). Although there has been debate over the phase name and whether the transition from the Three Circle to the Classic Mimbres was rapid (Anyon et al. 1981) or gradual (Lekson 1988), researchers agree that the shift was not uniform throughout the Mimbres region (e.g., Lekson 2006:43-45; Roth and Baustian 2015).
Walled plazas and semi-subterranean kivas, distinguished from earlier pithouses by roof entrances, also appeared at this time. The kivas frequently appear in association with a room block, although they are occasionally isolated (Creel and Anyon 2003). Generally, there is only one kiva per room block, but not all room blocks contain kivas (Anyon and LeBlanc 1980). These “kivas” differ from kivas found in the Ancestral Pueblo area. They are square and do not contain many of the Ancestral Pueblo interior features such as sipapus, pilasters, deflectors, and benches. They frequently have roof supports that are partially or totally recessed into the wall and a vertical ventilator shaft at the floor near the hearth (Anyon and LeBlanc 1980:266-267; Gilman 1980:243-244). The Classic Mimbres phase large communal pit structures and unwalled plazas would likely have been accessible to the whole community, whereas the walled plazas and the semi-subterranean kivas were likely used only by families living in the room blocks (Anyon and LeBlanc 1980:266-272). These changes in architecture hint at other changes between the Three Circle phase and the Classic Mimbres phase due to increasing population: shifts in village organization, intensification of agriculture and ritual activity, and a greater focus on both public and room block-oriented ceremony (Creel and Anyon 2003).

During the Classic Mimbres phase, burials were placed in the fill of abandoned rooms and pithouses, below the floors of occupied rooms, and outside the room blocks. Individuals were placed in oval pits and were usually laid on their backs in a flexed or semi-flexed position. A Black-on-white bowl with a “kill” hole was often placed over the head of the interred individual. This pattern is distinct from the use of killed bowls during the Three Circle phase, in which the bowls were usually broken and placed in the burial. Jar cremations were also present, but less frequently noted (Shafer 1995).
There were also changes in ceramic style. Boldface Black-on-white (Style I), which was common during the Late Pithouse period, was replaced by Transitional Black-on-white (Style II) and Classic Black-on-white (Style III). Although the technology used to produce these three types is similar, at the end of the Late Pithouse and through the Classic Mimbres there are consistent stylistic changes in design form, layout, and execution (LeBlanc 1983; Nelson 1999:28-29; Shafer and Brewington 1995). Large, partially corrugated jars appear during the Classic Mimbres. There are a few indented corrugated, but most are clapboard corrugated (Gilman 1980). Plainwares are also common and some are incised. Pottery production may have been at the household level (Gilman 1989), although there is evidence that full-time specialists painted the finest Mimbres pottery (LeBlanc 1983:138-139; Shafer 1985:195).

Early research speculated that ceramic production of Mimbres Black-on-white bowls was centered in the Mimbres Valley and that people in the Mimbres Valley controlled production and distribution of the pottery. However, recent pottery sourcing analysis shows there were numerous ceramic production locations throughout the Mimbres region (Gilman et al. 1994; Powell 2000; Speakman 2013), and some intraregional exchange existed among these production locations (Creel and Speakman 2012; James et al. 1995; Speakman 2013). The complexity of painted designs on Mimbres Black-on-white pottery increased during the Classic Mimbres. At the same time, there was an increase in public ceremonies, agricultural intensification, and population growth (Shafer 1995). Some scholars suggest that the imagery on this pottery was an important representation of the Classic Mimbres peoples’ worldview, which communicated a cosmology and belief system that tied people to their ancestral lands in the Mimbres region (Moulard 1984; Shafer 1995; Thompson 1994). Overall, the changes in ceremonial organization, community
organization, material culture, and imagery on ceramics suggest an increase in social complexity throughout the Classic Mimbres, although they do not denote increasing social stratification.

Besides the changes in material culture, the Classic Mimbres is also marked by changes in social organization. Although the Mimbres region and the Classic Mimbres phase have been the focus of archaeological research since the early 1900s, there was relatively little investigation of social organization early on, as Hegmon notes (2002:333). This is not the case today, however, and the majority of recent archaeological research has focused on the organization of Mimbres society. Although there are multiple theories, discussed in more detail below, regarding the type of social changes that occurred during this period, archaeologists agree that social complexity increased (Anyon and LeBlanc 1980; Gilman 1990; Gilman and Powell-Marí 2006). For example, there is evidence of a shift from family-based households to kinship-based corporate groups during the Classic Mimbres that likely marks an increase in social complexity (Creel 2006a; Shafer 2006). Corporate groups are defined as co-residential groups, such as kinship-based residences, that have common economic interests (Shafer 2006; Wilshusen 1989). Hegmon and others (2006) suggest that household organization varied from site to site.

Gilman and Powell-Marí (2006) argue that social differences among individuals and family/corporate groups cannot be discerned through analysis of the material culture remains. Some of the larger sites in the Mimbres Valley have more exotic grave goods and ritual architecture than other sites. While these differences demonstrate some variation in wealth and power among individuals and corporate groups, the differences are not significant enough to suggest the presence of full-time elites (LeBlanc 1983:147-148; Shafer 2003:219-220). Gilman and others (1994) also suggest that Mimbres society was nonhierarchical. The local production and use of ceramics supports the conclusion that each village was relatively autonomous and that
there was not a centralized trade system controlled by elites. Shafer (2006) suggests that corporate households were not equal, while Creel (2006a) proposes that mortuary differences point to ritually specialized roles of some individuals. It appears that social and political roles varied among sites within the Mimbres Valley. For example, there is ceramic and architectural evidence that both Galaz and Old Town were centers of ceremonial and social importance (Creel 2006a, 2006b; Hegmon 2002; LeBlanc 1977, 1989).

Although economic and social networks were fairly insular during the Classic Mimbres phase (Hegmon 2002:339; Minnis 1985), research suggests that prehistoric people in the Mimbres region did have connections to networks that extended beyond the region (Gilman et al. 2014; Lekson 2011; Snow et al. 2011; Vokes and Gregory 2007). Recent mtDNA analysis by Snow and colleagues (Snow et al. 2011:3131) provides evidence that “haplotypes of the Mimbres cluster with the modern Zuni, Akimel O’odham, Tohono O’odham, and other Southwestern populations, suggesting population continuity in the Southwest.” There is also evidence of gene flow between Mesoamerican populations and Mimbres groups (Snow et al. 2011).

The Terminal Classic, Black Mountain, and Reorganization Phases (A.D. 1150 to 1250)

The Mimbres Foundation’s research indicated that changes seen after 1150 were not uniform throughout the Mimbres region. Mimbres Foundation researchers LeBlanc and Whalen suggested that only some parts of the region were completely depopulated and that resident populations re-aggregated in the Lower Mimbres Valley and southern portions of the region (LeBlanc 1977; LeBlanc and Whalen 1980). LeBlanc (1977:16) specifically notes that the populations inhabiting Black Mountain phase sites were “made up of an agglomeration of previously unrelated peoples… [and that] the presence of flexed inhumations with ‘killed’ bowls
represents a continuation of the Mimbres tradition.” However, because of the decreased population density and marked differences in material culture, settlement patterns, and architecture, research began to focus on the “abandonment” of the Mimbres region. Archaeologists found evidence of a nearly complete depopulation sometime after A.D. 1150, with population replacement thereafter in some regions (Anyon et al. 1981; see also Shafer 1999, 2003). Anyon and colleagues (1981:220), for example, proposed that “with the end of the Classic Mimbres phase, the long Mogollon-Mimbres sequence also terminates. The Classic Mimbres pueblos were virtually abandoned, and there was a substantial depopulation of the region.” The authors suggested that the Classic Mimbres phase ended suddenly, with new populations moving into the region as early as A.D. 1180. Thus, subsequent research focused on whether this 50- to 75-year period was characterized primarily by continuity or discontinuity.

A number of slightly different chronologies have been proposed for the Mimbres region (Table 1.1). The differences in chronology may represent varying rates of change in social organization and material culture in different parts of the region. For example, there appear to be differences in social organization and material culture among the Mimbres Valley, Upper Gila, and Eastern Mimbres. Important for this study is the debate surrounding the transition from the Classic Mimbres phase (ca. A.D. 1150) to the Terminal Classic, Black Mountain, and Reorganization phases (Table 1.1). Creel (2006b) suggests the Black Mountain phase began around A.D. 1180 and ended around A.D. 1300. Hegmon and colleagues (1999) and Nelson and Hegmon (2001) state that the Black Mountain phase began in the early 1200s and ended at A.D. 1300, but may have lasted until the 1400s in the Eastern Mimbres. Shafer (1999) suggests that the Black Mountain phase began in the early 1200s, but maintains that the Mimbres region was depopulated for about 50 years after the end of the Classic Mimbres.
Creel (1999, 2006b), Hegmon and colleagues (1999), and Nelson and Hegmon (2001) propose different beginning dates for the Black Mountain phase, but agree that the Mimbres region was not abandoned at the end of the Classic Mimbres. They use the phrase Terminal Classic (A.D. 1150 to late 1100s) to describe events after the Classic Mimbres. Although the beginning of the Black Mountain phase proposed by these scholars varies by less than 50 years, this difference has important implications for how they view the social reorganizations in the region after A.D. 1150. Below, I review the Terminal Classic, Black Mountain, and Reorganization phases (A.D. 1150 to 1250) to provide context for understanding the transition around 1150.

Around A.D. 1150, the Mimbres region underwent a dramatic change in settlement patterns, population size, and social organization (Creel 1999; Hegmon et al. 1999; LeBlanc 1977, 1980b; Nelson and Hegmon 2001; Shafer 1999; Taliaferro 2014). These shifts are evident in the appearance of new material culture, especially increased diversity of ceramic types and a change from masonry to adobe architecture. Areas outside the Mimbres Valley, such as the Upper Gila, also experienced changes around A.D. 1150, but these changes are not as well understood. Less research has been conducted on this period in the Upper Gila, which contains few Black Mountain phase sites. Most of our knowledge of the periods following the Classic Mimbres (Table 1.1) comes from research at sites in the Eastern Mimbres region (Hegmon et al. 1998; Nelson 1999; Nelson and Hegmon 2001).

Comparatively little research focuses on Black Mountain phase sites in the Mimbres Valley (but see Creel 1999, 2006b; Ravesloot 1979; Taliaferro 2014). Unlike most other Black Mountain phase sites in the valley (Anyon and LeBlanc 1984; Creel 2006b), the Black Mountain site (LA 49) does not appear to have a Classic Mimbres component. There are a few Transitional
and Classic Mimbres sherds (Styles II and III), but these sherds are rare, and there is no evidence of cobblestone masonry typical of pueblos constructed during the preceding period (Putsavage 2011, 2013; Putsavage and Lekson 2010; Putsavage et al. 2014). Although there is no evidence of occupation at the Black Mountain site during the Classic Mimbres phase, this period is important for the work at Black Mountain because of the shifts in population and social organization that occurred at the end of the Classic Mimbres phase.

The Terminal Classic (A.D. 1130 to late 1100s) is a short period marking the beginning of significant changes in social organization (Hegmon et al. 1999). Many Classic phase practices persisted during the Terminal Classic, but people began to explore new forms of social organization. This is evident in changes in community architecture and new ceramic styles. Production of the distinctive Mimbres pottery decreased sharply and, in some areas, ceased completely (Hegmon et al. 1998; Hegmon et al. 1999; Nelson 1999; Nelson et al. 2011).

Population reorganization and changes in social and economic organization continued into the Black Mountain phase. New material culture and new pottery types indicate reorganization of social and economic networks and may indicate the replacement, continuity, and/or reorganization of populations between the Classic Mimbres and Black Mountain phases (Creel 1999; LeBlanc 1989; Nelson and Hegmon 2001; Shafer 1999; Nelson et al. 2011). During the Classic Mimbres, most of the ceramic assemblage was locally produced (Gilman et al. 1994). Pottery and other goods moved within the region, but nonlocal ceramics were rare (Creel et al. 2002). There is evidence of some long-distance exchange with Mexico during the Late Pithouse and Classic Mimbres for goods such as macaws, copper bells, and marine shell, and some adoption of Mesoamerican iconography (Creel and McKusick 1994; Gilman et al. 2014; Vokes and Gregory 2007), but there was little circulation of goods to or from other regions (Nelson
On the other hand, ceramics made and used during the Black Mountain phase include a wide variety of imported and locally made types (Chapter Six; Creel et al. 2002; Taliaferro 2014). Some of the new, presumably imported, types are associated with various regions of the southern Southwest, including the Jornada and Casas Grandes areas. The Classic Mimbres phase stone masonry was replaced by adobe architecture, and ceremonial architecture was greatly reduced in scope (Anyon and LeBlanc 1984:24; Creel 1999). These data suggest reorganization of social networks or possible replacement of populations.

While there were numerous changes in material culture around A.D. 1150, which supports the view that a replacement and/or reorganization of population occurred, some evidence suggests continuity of populations. For example, burial practices during the Black Mountain phase are similar to the Classic Mimbres phase. Flexed inhumations with killed bowls over the heads and jar cremations were still common after A.D. 1150. The major difference between Classic Mimbres and Black Mountain phase burials is the type of vessels used (Anyon and LeBlanc 1984:25; Creel 1999:108-109; LeBlanc 1989:193-194). Hearth and posthole patterns show only minor changes, although a few new forms appear.

**The Doña Ana, El Paso, and Animas Phases in the Jornada Mogollon (A.D. 1100 to 1475)**

The Anasazi phase (A.D. 1200 to 1400/1450) of southwestern New Mexico and the Doña Ana (A.D. 1100 to 1250) and El Paso phases (A.D. 1250/1300 to 1475) of the Jornada area are also important periods in southern New Mexico. These phases have many similarities to the Black Mountain phase in both chronology and material culture (Douglas 1996; Railey and Holmes 2002:44-56). The main distinctions among the phases are geographic location and pottery types (Hegmon et al. 1999:158). The Doña Ana and El Paso phase sites are located in the Jornada branch of the Mogollon (Lehmer 1948), and Animas phase sites are located in the boot
heel of New Mexico, southeastern Arizona, and the adjacent regions of Mexico (Kidder et al. 1949; see also LeBlanc 1977) (Figure 2.1, Table 1.1). Some researchers suggest that the Black Mountain, Doña Ana, El Paso, and Animas phases are closely linked to the Casas Grandes region (LeBlanc 1989; Nelson and LeBlanc 1986; Schaafsma 1979) and, after A.D. 1300, to the Salado phenomenon (Douglas 1996; Lekson 1992). In fact, all three of these phases appear to be closely linked chronologically and through material culture, and they may represent regional variation during the Postclassic Mimbres period (Hegmon et al. 1999:158; LeBlanc 1977, 1989; Phillips 2009).

In the following sections, I examine the Doña Ana/El Paso phase and then the Animas phase. I describe the history of research in the region, the debates surrounding the chronology and designation of phase sequences, and the archaeological characteristics of each phase.

Doña Ana and El Paso Phases in the Jornada Mogollon (A.D. 1100 to 1475)

Doña Ana and El Paso phase sites are located in the Jornada Mogollon region of south-central and southeastern New Mexico, west Texas, and adjacent parts of Mexico (Figure 2.1). The archaeological remains of this “frontier” region were first noted in the late 1800s (Miller et al. 2010), but research was slow to develop because of the relative lack of large pueblos and low visibility of archaeological remains (Beckett and Wiseman 1979; Reed 1987). The Cosgroves conducted some early work during their excavation of Three Rivers Pueblo (Cosgrove and Cosgrove 1965). Lehmer (1948:87-88) was the first to develop a chronological sequence for the Jornada Mogollon utilizing stratigraphy, dendrochronology, and ceramic seriation (but see Sayles 1935 for the earliest description of the El Paso phase). Lehmer’s (1948) original phase designations have been updated over the years (e.g., LeBlanc and Whalen 1980; Lekson 1989b;
Miller 2005; Reed 1987; Whalen 1980; Wiseman 1985) and continue to be a debated topic. The specifics of this debate are discussed in more detail below.

The 1960s and 1970s saw an increase in research as federal agencies such as the Bureau of Land Management, US Forest Service, and US Army sought to comply with new federal legislation (Beckett and Wiseman 1979). Avocational groups such as the El Paso Archaeological Society also became more active (Miller et al. 2010). Because a large portion of the research conducted in the Jornada Mogollon was carried out under these federal laws, most of the publications are contained within the “gray” archaeological literature and are not easily accessible (Karl Laumbach, personal communication 2012). However, in 1979, the first biannual Jornada Mogollon conference was held in Las Cruces, New Mexico, and this conference continues to support presentation of results and publication by archaeologists from the professional, avocational, federal, state, and cultural resource management fields.

Miller (2005:62, 76-77) indicates that the phase designations in the Jornada Mogollon region have become increasingly complex because archaeologists propose numerous nomenclatures, material culture correlates, and adaptive changes to designate the various phases within the Jornada (Table 1.1 and 2.1). I suggest that complicated phase sequences and designations in the Mimbres region suffer from similar problems: numerous phase nomenclatures that refer to similar changes in material culture. The numerous phase sequences presented in the Jornada Mogollon make comparisons within the region and between adjacent regions challenging. Miller and Kenmotsu have noted that “[t]he use of phases and periods serves not only to obscure important patterns in the prehistory of the region but also may often accentuate the importance or apparent abruptness of certain cultural patterns that realistically can be viewed as part of a continuum” (Miller and Kenmotsu 2004:238). Miller (2005:61) lists, in
order of publication, 12 different phase sequences presented by archaeologists. In a similar summary, Lekson (1989b:29) notes that archaeological boundaries and traditional regional taxonomy of the Jornada and Mimbres regions “[obscure] patterns of real interest,” and he challenges archaeologists to think about the changes among and between the regions on a larger scale.

Reed (1987) suggests that two types of phase sequences are generally proposed for the Jornada Mogollon. The first type (e.g., Beckett and Wiseman 1979; Lehmer 1948; Whalen 1981a, 1981b, 1993, 1996) tracks changes in material culture and focuses on ceramic seriation. The second phase sequence (e.g., Miller and Kenmotsu 2004; Miller 2005) uses changes in subsistence strategies, settlement patterns, and social and economic networks to mark phase transitions.

The first type of phase sequence relates the Early El Paso phase (A.D. 1200 to 1300) and Late El Paso phase (A.D. 1300 to 1400) (Katz 1992; LeBlanc and Whalen 1980; Wiseman 1985) to changes in ceramic assemblages at Jornada sites. The authors suggest that the introduction of Salado and late Chihuahua polychromes marks the transition from the Early to Late El Paso phase. Although El Paso Polychromes and brownwares are used to define phases and are shown to be reliable indicators of relative temporal ordering of sites (Carmichael 1986:76-84; Miller 1995, 1996; Miller et al. 2009; Speth and LeDuc 2007; Whalen 1978:58-70), the changes in the El Paso ceramic sequence do not always track with changing settlement patterns and subsistence strategies (Miller and Kenmotsu 2004; Miller 2005).

The second type of phase sequence tracks changing settlement patterns, subsistence strategies, and shifts in social and economic networks to mark phase transitions. While the introduction of the polychromes relates to the beginning of the Salado phenomenon and the
height of the Casas Grandes regional center, and therefore is linked to important population reorganization and transitions, many researchers in the Jornada argue that changes in material culture do not always coincide with changes in settlement patterns, subsistence strategies, and economic and social networks (e.g., Carmichael 1983; Miller 2005; Upham 1984). These archaeologists suggest that the phase sequence in the Jornada Mogollon should not be explicitly linked to the El Paso brownware sequence or extraregional ceramic sequences (Miller 2005:73, 74-75).

I examine both types of phase sequences for the Jornada Mogollon. Miller’s (2005) Jornada Mogollon phase sequence captures important changes in settlement form and pattern, subsistence economy, technology, and social organization, and provides an important comparison to the Black Mountain (A.D. 1150 to 1250) phase. I also examine the phase sequence presented by Railey and Holmes (2002) because it offers a more detailed examination of material culture changes, which is useful for in-field comparisons between the Jornada Mogollon and the Black Mountain phase.

Miller (2005:74-77) identifies three important periods of transition in the Jornada Mogollon: (1) at A.D. 1150 (beginning of the Late Doña Ana phase); (2) at A.D. 1275/1300 (transition from Late Doña Ana [A.D. 1150 to 1275/1300] to the El Paso phase [A.D. 1275/1300 to 1450]; and (3) at A.D. 1450 (end of the El Paso phase and regional abandonment). The middle of the twelfth century is recognized as a major period of regional depopulation and reorganization throughout most of the American Southwest (e.g., Adler 1996; Judge 1989; Kidder 1924; Lekson and Cameron 1995; Nelson 1999). Interestingly, archaeological evidence from the Jornada ca. A.D. 1150 suggests that events were subdued in comparison to the collapse of the Chaco regional system (Judge 1989, 1991; Lekson 1991), the transition from the
Sedentary to Classic periods in the Hohokam (Doyle 1979 Fish et al. 1992), or the population reorganization and transition in the Mimbres region (Creel 1999; Hegmon et al. 1999; Nelson 1999) (Table 2.1). Although the Jornada people were likely aware of these major events, there is little evidence of major change during this period in the Jornada region.

The phase sequence presented by Railey and Holmes (2002) differs from Miller’s, but provides archaeological characteristics that can be used for comparison between the Black Mountain site and phase and the Jornada region. One source of disagreement is the timing of the Doña Ana phase (A.D. 1100 to 1250), for example, whether it represents a minor transitional period between the Mesilla (A.D. 250 to 1100) and El Paso phases (e.g., Foster 1993; Mauldin 1993) or a significant phase in its own right (Hard et al. 1994; Railey and Holmes 2002:26). Proponents of the Doña Ana phase argue that confusion arises from the difficulty of in-field identification of Doña Ana phase sites. However, they suggest that certain ceramic attributes can be used to distinguish the Doña Ana phase from the Mesilla and El Paso phases, and some of these ceramic attributes relate to changes in regional interaction.

Unlike Miller (2005), Railey and Holmes (2002) do not break the Doña Ana phase into Early and Late periods. Miller’s (2005) phase sequences suggest slight intensification of both non-domesticated and domesticated food resources, and this intensification corresponds to changes in architecture (increased appearance of roast ovens) and settlement patterns (movement of sites into areas better suited for agriculture). Although Railey and Holmes (2002:43-49) note changes in architecture and settlement patterns through the Doña Ana phase, they do not split the phase. The following phase description for the Doña Ana uses the distinguishing archaeological characteristics proposed by Railey and Holmes (2002:43-49). Doña Ana phase (A.D. 1100 to 1250) sites are characterized by “late brownwares, early polychromes, an increasing frequency of
Chupadero Black-on-White, and low frequencies [of] El Paso Bichrome, Three Rivers Red-on-
terracotta, Playas Red, and Mimbres Black-on-white sherds” (Railey and Holmes 2002:43).
These Doña Ana phase ceramic types correlate to types that first appear in the Mimbres region
during the Terminal Classic and Black Mountain phases.

Archaeologists working in the Jornada agree there was a social transition and
reorganization of populations ca. A.D. 1250 to 1300, and use a variety of phase names (Late El
Paso, El Paso, Pueblo) to identify the phase transition. Miller (2005), Railey and Holmes
(2002:49-64), Whalen (1981a), and Wiseman (1985) all note numerous changes in population
size, settlement patterns, architecture, and ceramics during the El Paso phase (A.D. 1250/1300 to
1475). The number and size of villages increased greatly during the El Paso phase (Railey and
Holmes 2002; Whalen 1981a). There was also a decrease in residential mobility and an increase
in agricultural intensification (Whalen 1981a). Although other regions in the southern Southwest
saw the construction of pueblos as early as A.D. 900 (Creel and Anyon 2003:69), in the Jornada
it was not until the beginning of the El Paso phase (ca. A.D. 1250) that people began to construct
aboveground pueblo room blocks (Miller and Kenmotsu 2004; Railey and Holmes 2002). These
room blocks are usually constructed with puddled adobe and are single-story. Although
ceremonial structures such as plazas occur at the sites, kivas are not present. Rooms are
frequently aligned in a linear east-west orientation although some plaza-oriented room blocks do
exist (Railey and Holmes 2002:50-56).

During the El Paso phase there is an increase in ceramic variability (Railey and Holmes
2002:61-62). El Paso brownwares and bichromes disappear at the beginning of the phase, but
there is an increase in El Paso Polychromes accompanied by changes in vessel size, shape, and
design elements. Chupadero Black-on-white becomes the most commonly imported type,
Chihuahua polychromes increase, and Northern Rio Grandes wares first appear. There is also an increase in use of turquoise, marine shells from the Gulf and Pacific coasts, and copper bells from Mexico. The increase in nonlocal ceramics and exchange goods also suggests an expansion of regional exchange and interaction (Railey and Holmes 2002:61-62). Few intramural burials are found at El Paso phase pueblos or in the Jornada region in general, and some archaeologists suggest that burials may have been placed in exterior cemeteries or middens (Lehmer 1948; Miller et al. 2010:38; O’Laughlin 2001).

Most El Paso phase pueblos had short occupations, reflected in the lack of burials or stratified middens and the limited evidence of architectural remodeling (Miller and Kenmotsu 2004). Around A.D. 1450/1475, the Jornada saw a dramatic population decrease and eventually a complete depopulation (e.g., Miller 2001). Similar patterns of depopulation were occurring throughout the southern Southwest in the fifteenth century (Dean and Ravesloot 1993). Some researchers propose that groups “abandoned” the pueblos because of changes in the environment (O’Laughlin 1980:26) and the fall of the Casas Grandes regional system (Schaafsma 1979:386; Wimberly 1979:88). Recent research shows that mobile hunter and gatherer groups continued to live in the region, although at greatly decreased population density (Wheaton and Reed 2009).

Although the phase sequence for the Jornada Mogollon is still debated, it offers an important comparison to the Black Mountain phase and Mimbres region. While there are some differences in material culture, both had a connection to the Salado phenomenon and the rise of the regional center of Casas Grandes.

Animas Phase (A.D. 1200 to 1400/1450)

Animas phase (A.D. 1200 to 1400/1450) sites are located in southeastern Arizona and the boot heel of New Mexico but are also found in northwestern Sonora and northern Chihuahua,
Mexico (DeAtley and Findlow 1982; Douglas 1987, 1996; Skibo et al. 2002:1). The phase was first defined by Kidder and colleagues (1949) during excavations at the Pendleton Ruin in southwestern New Mexico. This early research noted similarities with the Casas Grandes region in pottery types, but did not find important diagnostic architectural features, such as platform hearths and collared postholes, which suggest a close link to Casas Grandes (Kidder et al. 1949). The region has seen limited survey (DeAtley 1980; DeAtley and Findlow 1982; Findlow and DeAtley 1976) and excavation (Douglas 1996; McCluney 1965; Skibo et al. 2002) since the excavations at Pendleton Ruin in the 1930s. As a result, the chronology of occupations after A.D. 1200 is still poorly understood (Douglas 1995, 1996, 2004; Fish and Fish 1999, 2006; LeBlanc 1980a, 1980b; Lekson 1992; Nelson and Anyon 1996).

The transition from the Classic Mimbres to the Black Mountain phase was first defined through the Mimbres Foundation research in the 1970s (Anyon et al. 1981; Blake et al. 1986; LeBlanc 1977, 1980b, 1989). Early researchers designated this Postclassic period the Animas phase (e.g., Kidder et al. 1949), and this term was used until the 1976 field season (LeBlanc 1977:11-13; Ravesloot and Minnis 1976). In the summary of fieldwork for that season, LeBlanc noted that the term had not been used consistently and that it had “caused considerable difficulties because it [was] not clear what kinds of sites [had] been previously referred to as Animas” (1977:11). He recommended that Postclassic sites in the Mimbres region be designated as the Black Mountain phase. Nevertheless, these sites continued to be labeled Animas phase (Ravesloot 1979). This inconsistency can make it difficult to differentiate Animas and Black Mountain phase sites in old reports. Current research recognizes that a main difference between the Animas and Black Mountain phases relates to the geographic location of sites, but notes that there is a close connection to the Casas Grandes region during both phases (Douglas 1996;
Nelson and Anyon 1996; Skibo et al. 2002; Whalen and Minnis 2009). Some of the similarities and differences in archaeological features and social connections between the Animas and Black Mountain phases are discussed in more detail below.

Refinement of chronology is a key question for understanding the Animas phase (Douglas 1996). Early chronological work was based on cross-dating of nonlocal ceramics and a few radiocarbon dates (DeAtley 1980; Kidder et al. 1949; LeBlanc 1980a). Two key issues are central to the chronological debates about the Animas phase: Di Peso’s (1974) early dating of the Chihuahuan culture area and the revised dating of the Chihuahuan culture area (Dean and Ravesloot 1993; Whalen and Minnis 2009). Two additional areas of focus for the Animas phase are the diversity of archaeological characteristics found at Animas phase sites (Douglas 1996; Fish and Fish 1999, 2006; Kidder et al. 1949; Skibo et al. 2002) and the influence of the Salado horizon on Animas phase sites (Douglas 1996; Lekson 1992).

Di Peso’s (1974:2:778) original dating of the florescence of Paquimé at A.D. 1060 to 1340 placed Animas phase settlements, such as the Joyce Well site, near the end of the height of Chihuahuan culture. Based on the assumption that Paquimé collapsed around A.D. 1340, Di Peso suggested that invaders from the west destroyed the city in what has been termed the “Chichimecan revolt” (Di Peso 1974:2:320). Utilizing this chronology, Di Peso (1974:3:778) also suggested that Animas phase sites represented a refugee population who left Paquimé after the Chichimecan revolt. Subsequent work on the dating of Animas phase sites (DeAtley 1980; Skibo et al. 2002) and Casas Grandes (Dean and Ravesloot 1993; Whalen and Minnis 2009) (A.D. 1200 to 1450) shows that the Animas phase was contemporaneous with the height of the Casas Grandes culture.
The revised chronology for Casas Grandes from A.D. 1250 to 1450 (detailed below) provides new interpretations of the connection between Animas phase sites and the Casas Grandes regional center (Douglas 1995, 1996, 2004; McCluney 2002; Nelson and Anyon 1996; Skibo et al. 2002; Whalen and Minnis 2009). These authors argue that Animas phase sites were connected to Paquimé through exchange and agriculture. While some of the Animas sites shared public ceremonial features with Paquimé, such as ballcourts, there is no evidence to support the conclusion that Paquimé controlled ceremonial activities at frontier locations. Because of the high degree of variability of archaeological features among sites in the southern Southwest (Black Mountain, El Paso, and Animas phases), interaction between these sites and Paquimé is still poorly understood (Skibo et al. 2002:155-157). Variability among Animas phase sites is important for understanding their connections with both the rise of the Casas Grandes regional center and the Salado phenomenon (Douglas 1996; Fish and Fish 1999, 2006; Lekson 1992). This variability represents a “loose integration” among sites within the Paquimé regional system (Whalen and Minnis 1996:743) and suggests that Animas phase sites on the periphery were not economically or ceremonially dependent on Paquimé (Douglas 1995).

Animas phase sites exhibit geographic variation in their ceramic assemblages and architectural features (Douglas 1996; Fish and Fish 1999, 2006; Nelson and Anyon 1996). For example, excavations at the Pendleton Ruin noted the presence of Chihuahuan ceramic types, Maverick Mountain Polychrome, and Roosevelt Red Wares, with Chihuahuan Wares making up a larger portion of the total (Kidder et al. 1949:131-138). However, many of the architectural features that are indicative of Casas Grandes, such as T-shaped doors, ballcourts, platform hearths, and collared postholes, were not present at Pendleton. Excavations at other sites in southwestern New Mexico and northern Chihuahua show the presence of ballcourts, platform
hearth, and collared postholes (DeAtley 1980; Skibo et al. 2002; Whalen and Minnis 2009). Even though these sites show a degree of variability, there are some consistencies among Animas phase sites. Pueblos are constructed of puddled adobe and oriented around plazas, and do not contain kivas or ceremonial pit structures (Fish and Fish 2006). Ceramics consist of locally made corrugated wares, but there is variation among the local types at sites (Douglas 1995; Nelson and Anyon 1996). Playas Red Incised is another common type. Painted ceramic types include Chupadero Black-on-white, El Paso Polychromes, Roosevelt Red Wares, and Chihuahuan Polychromes that span the Medio period (A.D. 1250 to the 1400s). After A.D. 1300, Maverick Mountain Polychrome and Roosevelt Red Wares are found at Animas sites, although in varying amounts (Douglas 1995:243, 1996; Lekson 1992). These archaeological attributes could also suggest some connections to Black Mountain and Cliff phase sites in the Mimbres region.

It appears that some Chihuahuan-style ceramics were being imported from Paquimé to Animas phase sites (Di Peso et al. 1974:6), but there is also evidence that some Chihuahua polychromes were locally made at sites in the Animas (Skibo et al. 2002:35-45; Woosley and Olinger 1993). Finally, there is variability in the amount of Maverick Mountain Polychrome and Roosevelt Red Wares found at Animas phase sites. These differences appear to relate to the geographic distance of sites from the core areas of the Salado and Casas Grandes systems (Douglas 1996; Lekson 1992:19-20; Nelson and Anyon 1996). Sites closer to the Salado core in southwestern Arizona and the western portion of the boot heel tend to have more Maverick Mountain Polychrome and Roosevelt Red Wares, while sites closer to Casas Grandes, in the eastern part of the boot heel and northern Chihuahua, tend to have more Chihuahua polychromes.
Animas phase researchers suggest an “early Animas” (A.D. 1200 to 1300/1325) and “late Animas-Salado” (A.D. 1300/1325 to 1450) distinction (Douglas 1996; Nelson and Anyon 1996:282; Lekson 1992; Nelson and LeBlanc 1986). Animas phase sites show short occupations because of the limited number of intramural burials, lack of stratified middens, and limited architectural remodeling (Douglas 1996; Fish and Fish 2006; Kidder et al. 1949). Therefore, this splitting of the phase has been questioned (Douglas 1996). The splitting of the phase relates to the appearance of Maverick Mountain Polychrome and Roosevelt Red Wares ca. A.D. 1300/1325 and the influence of the Salado phenomenon throughout the southern Southwest.

Although archaeologists have always noted the connections between the Animas phase and Paquimé (e.g., Di Peso 1974; Kidder et al. 1949), the re-dating of Paquimé (Dean and Ravesloot 1993) suggests the site did not reach its height until ca. A.D. 1300 (Lekson 2011; Whalen and Minnis 2009). Thus, differences in ceramic assemblages, such as the appearance of Ramos Polychrome (a Chihuahuan type that dates to ca. A.D. 1300) between the early and late portions of the Animas phase could also relate to the expansion of the Casas Grandes regional center (Skibo et al. 2002:44-45).

The Black Mountain, El Paso, and Animas phases were connected through exchange of El Paso Polychromes and the adoption of Chihuahuan-style ceramics, but the Black Mountain and El Paso phases did not adopt all of the Chihuahuan characteristics that are found at some of the Animas phase sites (Skibo et al. 2002:160-165). The most notable differences are the absence of ballcourts and platform hearths at El Paso and Black Mountain phase sites (Skibo et al. 2002:162-163). The chronological debates and variability among sites in the southern Southwest make it difficult to determine the exact nature of the connections among Animas, Black Mountain, El Paso phase sites, and Paquimé. Though there is limited evidence for long-term
aggregation at large sites during the three phases (Douglas 1996; Miller and Kenmotsu 2004; Nelson and Anyon 1996), excavations at the Black Mountain site and Old Town Ruin provide evidence of multiple occupations and remolding of architecture (Chapter Five; Putsavage and Lekson 2011; Putsavage et al. 2014; Taliaferro 2014). Comparisons among the El Paso and Animas phases as well as the Salado phenomenon and rise of Casas Grandes provide an important backdrop for the pan-regional transformation occurring in the southern Southwest between the thirteenth and fifteenth centuries. The final two sections of the chapter describe the influence of the Salado phenomenon and the rise of the Casas Grandes regional center.

**The Salado Phenomenon (Cliff Phase A.D. 1250 to 1450) and Casas Grandes (Medio Period A.D. 1250 to 1450)**

The Cliff phase (A.D. 1250 to 1450) represents the period after the Black Mountain phase in the Mimbres and Upper Gila regions of southern New Mexico. During the Cliff phase in the southern Southwest, both the Salado phenomenon and the rise of Casas Grandes (Paquimé), specifically during the Medio period (A.D. 1250 to 1450), seem to have influenced social practices and material culture. However, Salado and Casas Grandes had different degrees of influence in different locations in the southern Southwest and southwestern New Mexico (Nelson and LeBlanc 1986). Because of the presence of pottery types from both events at the Black Mountain site, and therefore possible social connections to each event, an overview of each of these phases/periods is provided.

**The Salado Phenomenon and the Cliff Phase (A.D. 1250 to 1450)**

The term “Salado” means several different things to Southwestern archaeologists. For some, it is primarily a pottery type. For others, the term is archaic and has no true representation in the archaeological record (e.g., Clark 2001; Crown 1994; Dean 2000:3-4; Gladwin and
Gladwin 1930; Lekson 2002; Stark et al. 1995). Unlike the other “cultural groups” discussed in this dissertation, Salado cuts across numerous archaeological regions (Figure 2.2). Of special relevance for this research, it is now widely accepted that the Salado phenomenon was closely linked to a large-scale migration of people from the Kayenta region in the north (Figure 2.1) to areas in the southern Southwest that were already populated (Clark 2001; Crown 1994; Huntley et al. 2014; Lyons and Clark 2012).

Figure 2.2 Distribution of Salado polychromes by river valley and research area. (Adapted from Archaeological Research Institute 2009.)
Lekson (2002:1) states that “[t]he term ‘Salado’ refers to a fourteenth- and early fifteenth-century ceramic horizon, defined by archaeologists, that stretches across the Sonoran and Chihuahuan deserts of the southern Southwest.” Thus, the Salado phenomenon primarily refers to the manifestation and spread of a set of similar ceramic types known as the Salado polychromes (Maverick Mountain Polychrome and Roosevelt Red Wares). These polychromes were found across a vast region of the southern Southwest. The Maverick Mountain Polychrome and Roosevelt Red Wares span multiple “cultural areas,” including the Hohokam, Mogollon, and Ancestral Pueblo (e.g., Crown 1994; Dean 2000; Lange and Germick 1992; Nelson and LeBlanc 1986). The pottery type is distinguished from other ceramic wares of this period by the unique use of polychrome color schemes. Even though they represent a unique tradition across the southern Southwest, the wares vary in design style and painted treatment, which suggests local production (Crown 1994). Petrographic and chemical sourcing of these ceramics also provide evidence for local production by the mid-fourteenth century (Crown 1994). In the Mimbres region and along the Upper Gila, the introduction of Maverick Mountain Polychrome and Roosevelt Red Wares occurs during the Cliff phase (A.D. 1250 to 1450) (Nelson and LeBlanc 1986).

The wide distribution and non-concordance of the polychromes with a specific cultural group has been part of the reason for the confusion over the meaning of “Salado” (e.g., Crown 1994:20; Dean 2000:3). Definitions vary over time and have been influenced by theoretical shifts within the discipline. Originally, Salado was meant to describe a distinct people or cultural group (Clark 2001; Gladwin and Gladwin 1930). This definition implied a social group with a
collective cultural “template,” which produced a normative view of the “Salado” archaeological cultural pattern (Dean 2000:4-8).

Crown (1994:3-7) summarizes four prevalent explanations for the Salado phenomenon. One posits that Salado functioned as an economic alliance in which elites responded to violence by developing an interaction sphere (McGuire 1991). Another view, particularly associated with the earliest studies, suggests that the vessels represent a distinct cultural group, although these researchers debate the origin of this group because of the vast distribution of the pottery (Gladwin and Gladwin 1930). Other researchers suggest that the dramatic changes in social and political organization of the late 1200s led to production of the polychromes as elite exchange goods (Upham 1982; Wilcox and Sternberg 1983). Finally, Crown (1994:5; see also Young 1967:85) argues that Maverick Mountain Polychrome and Roosevelt Red Wares represent “the adoption by…disparate groups of a unified ideology.” All of these explanations suggest movement and exchange over shorter distances and/or the reorganization of social and political institutions as a result of migration at the end of the 1200s.

Maverick Mountain Polychrome and Roosevelt Red Wares first emerged in the southern Southwest around A.D. 1275, during a major population reorganization that included the social reorganization and migration of numerous groups throughout the greater region (Crown 1994). Numerous lines of evidence support the idea that groups from the northern Southwest migrated to southern areas during the late thirteenth and early fourteenth centuries. However, there is still disagreement over points such as the specific origins of Maverick Mountain Polychrome and Roosevelt Red Wares, whether all migrants originated in the northern Southwest, and the specific migration processes and social interactions encompassed in the migration and Salado phenomenon.
The migration of peoples from the north to the southern Southwest has long been a popular explanation for the Salado phenomenon (Dean 2000; Gladwin and Gladwin 1935; Haury 1945:204-208, 1958; Lincoln 2000; Reed 1950; Schroeder 1953; Stark et al. 1995, 1998). Until the 1970s, migration was the dominant explanation for the origins of the Salado. These migration theories shaped the perception of the Salado as a distinct cultural group and views of their cultural development and influence on other groups (Lincoln 2000:19-22). However, in the 1970s, theoretical perspectives within Southwest archaeology and in the discipline as a whole changed significantly. Influenced in part by New Archaeology, migration studies fell out of favor (e.g., Di Peso 1974; Hill 1971; Wood and McAllister 1982). Researchers during this time focused their analyses on concepts of in situ development, exchange, and political and/or territorial expansion (Lincoln 2000:21-22). Although population movement and interaction were implicit in the theoretical approaches proposed by Di Peso (1974), Hill (1971), and Wood and McAllister (1982), migration was rarely explicitly discussed. More recent research on the Salado has explicitly integrated migration into the discussion (e.g., Clark 2001; Lekson 2002; Stark et al. 1995, 1998).

Di Peso’s analysis of Salado provided a striking alternative to migration theories. Although Di Peso (1974) was not the first to suggest a connection between the Salado phenomenon and the polychromes of northern Chihuahua, he proposed that the Salado had originated in Casas Grandes. This assumption was based upon dates that placed Casas Grandes (which contains considerable quantities of Salado Polychromes) developing about 50 years before the Salado phenomenon in southern Arizona and New Mexico. The dates for Casas Grandes were later shown to be inaccurate (Dean and Ravesloot 1993; Whalen and Minnis 2009), and the idea that the Salado phenomenon originated in Casas Grandes has been rejected.
However, strong evidence remains of exchange and social connections between the Casas Grandes region and the Salado in Arizona and New Mexico (e.g., Nelson and LeBlanc 1986). For example, the Black Mountain site contains both of these types. Di Peso’s suggestion of a Casas Grandes origin was a valuable contribution to research that stimulated debate surrounding social movements, boundaries, and organization in the southern Southwest and northern Chihuahua (Clark 2001:25-26; Lekson 2002; Lincoln 2000:12).

Another important study, which supports the migration of groups into the Salado area, examines the biological evidence. Although there have been numerous studies of the biological relationships of prehistoric populations in the Southwest, and perhaps because of the number of such studies, little consensus exists regarding how groups are related or whether the links can be traced biologically. Dental morphology provides strong evidence that groups from the Tonto Basin represent outliers when compared to groups from other regions (e.g., the Rio Grande and Four Corners) (Ravesloot and Regan 2000:71-72). By using dental morphology, Turner (1993) found that the population of Salado groups in the Tonto Basin had even fewer similarities. He suggests that this represents a greatly mixed population representing groups from all over the Southwest.

The appearance of perforated plates at Salado sites has been taken as evidence of migrants participating in the Salado phenomenon. Lyons and Lindsay (2006) suggest that perforated plates, an unusual ceramic form used in the making of pottery, originated in the Kayenta region of northeastern Arizona. These plates were most often locally made pottery tools and were rarely exchanged between regions. Because of the local production of these objects, Lyons and Lindsay propose that they serve as a means to track the migration of prehistoric Kayenta migrants. The authors suggest that local production of perforated plates represents
enculturation rather than emulation and provides strong evidence of northern migrants in central and southern Arizona, western New Mexico, and northern Chihuahua (Lyons and Lindsay 2006:7). Since perforated plates are frequently linked to the local production of Maverick Mountain Polychrome and Roosevelt Red Wares, the authors suggest that “a strong connection can be made between groups of northern ancestry and the origin and spread of the ceramic component of the Salado phenomenon” (Lyons and Lindsay 2006:8).

Although the strongest connection between northern migrants and ceramic forms and styles such as perforated plates, Maverick Mountain Polychrome, and Roosevelt Red Wares is shown in the San Pedro Valley, the authors note that preliminary work in other regions also shows a connection between this suite of artifacts and the northern migrants. These regions include the Tonto Basin, the Globe Highlands, the Lower Salt River Valley, the Safford and Aravaipa Valleys, and the Upper Gila. Although early research suggested the in situ development of the Salado phenomenon, the distribution and depositional relationship of polychromes and perforated plates point to the origin and spread of the Maverick Mountain Polychrome and Roosevelt Red Wares as markers of northern migrants (Lindsay 1987; Neuzil 2008). Lyons and Lindsay (2006) suggest that the association of perforated plates and polychromes as well as the frequent appearance of plates at polychrome ceramic production sites further support Crown’s (1994) model of part-time production specialists.

In the Tonto Basin and San Pedro, Safford, and Aravaipa Valleys, northern migrants were moving into areas with existent populations. These migrant populations had to contend with established settlement patterns and social and ritual organization. Therefore, in some areas the first groups of migrants to reach these valleys did not initially integrate with local populations (Woodson 1995, 1999). Over time, the appearance of local and migrant forms of ceramics and

It appears that during the late twelfth and thirteenth centuries the Upper Gila was largely unpopulated (Hegmon et al. 1999; Lekson 1990, 2002; Nelson 2000). Therefore, a regional or local evolution cannot explain the development of Salado in the Upper Gila (Lekson 2002:70-71). This resulted in a migration process different from that of the other regions where Salado polychromes appear. Lekson (2002) suggests that a different model is needed for examining immigration and the Salado phenomenon in the Upper Gila (see also Nelson and LeBlanc 1986). Although the Salado phenomenon varied greatly among the regions where the polychrome pottery is found, evidence is accumulating that the ceramic horizon was linked to the larger social and political interactions occurring during the fourteenth and fifteenth centuries throughout the Southwest (Crown 1994; Lekson 2002).

Although the Upper Gila has been a major focus of research for the Salado phenomenon, early work was conducted by avocational archaeologists such as Jack and Vera Mills (1972) and Richard “Red” Ellison (Kwilleyleking) or as part of salvage operations (Hammack et al. 1966; see also Wallace 1998). As a result, some of the work has not been published, some excavations did not utilize modern archaeological techniques, and analysis did not always make use of the most current analytical techniques.

Recent excavations conducted by Archaeology Southwest (formerly the Center for Desert Archaeology) have greatly expanded our understanding of the Salado phenomenon in the Upper Gila. Archaeology Southwest proposes that the Salado phenomenon in the Upper Gila represents a new identity or religion that resulted from extended contact between ancestral Puebloan
immigrants from the Kayenta region of northeastern Arizona and local groups in the southern Southwest (Clark 2010; Clark et al. 2011; Clark et al. 2012; Huntley 2012; Huntley et al. 2010).

Lekson (2002:72) proposes that the ceramic data suggest a Mogollon Highlands origin for the Salado of the Upper Gila (see Mills et al. 2015). However, he notes “important similarities between the Upper Gila Salado and earlier Upper Gila and southwestern New Mexico phases” (see also Wilson 1998). These similarities “include cimiento construction, burial practices, and some limited but striking parallels between Mimbres Black-on-white and Gila Polychrome” (Lekson 2002:72). This type of architectural construction is not found in the Mogollon Highlands or Colorado Plateau (Cameron 1998). While the burial practices at Upper Gila sites are varied, many show similarities to early Mimbres phase site practices. Lekson (2002:73) also notes the striking similarities between the design styles of Mimbres Black-on-white and Gila Polychromes (see also Crown 1994:221-222; LeBlanc and Khalil 1976). Lekson notes that these design similarities are striking despite the 150-year hiatus between the Mimbres and Salado occupations of the Upper Gila. Lekson (2002:69-70) also acknowledges that the Salado phenomenon did not originate at Paquimé. He notes the strong ties to the Salado phenomenon in the Upper Gila and northern Chihuahua. Chihuahua polychromes were found at two or three late Salado sites in the Upper Gila. Serpentine and other minerals from the Upper Gila were found in large quantities at Paquimé.

Nelson and LeBlanc suggest (1986:10, 246-247) that during the Cliff phase (A.D. 1250 to 1450), populations from the Upper Gila Valley moved into the less densely populated Mimbres Valley (see also Blake et al. 1986; Peeples 2010; Lekson 2006). Settlements were smaller during the Cliff phase than during the Classic Mimbres (15 to 70 rooms), but were more aggregated and spaced farther apart. Although it appears that population density was low in the Mimbres Valley
during the Cliff phase, demographic reconstructions for this period do not take the Black Mountain site (LA 49) into account (e.g., Blake et al. 1986; Nelson and LeBlanc 1986). Work during the 2010 to 2012 seasons at the Black Mountain site suggests that the Cliff phase occupation (Locus 1) contained as many as 200 rooms (Putsavage 2011, 2013).

Nelson and LeBlanc posit an evolutionary development between the Black Mountain and Cliff phases based on similarities in site layout and adobe construction. They believe that the Cliff phase sites had a stronger connection to the Salado phenomenon than to Casas Grandes because of the rarity of Chihuahuan ceramics at Cliff phase sites. During the Cliff phase, the Black Mountain site seems to have a connection to the Casas Grandes region as well as the Salado phenomenon, since a few Chihuahuan and Salado polychromes have been found there. These similarities in ceramics and architecture prompted the authors to ask, “How does the Cliff phase, with its purposed links to the Salado phenomenon, fit into any such broad regional pattern of aggregation, dispersal, abandonment, and repopulation?” (Nelson and LeBlanc 1986:246). And, we might add, how do these patterns relate to the rise of the Casas Grandes regional system?

Minnis (1978) suggests that the depopulation of residential sites in the Mimbres Valley around A.D. 1150 was caused by population growth followed by drought and resource depletion. Nelson and LeBlanc (1986:241-244) propose that resources were abundant during the Cliff phase (A.D. 1250-1450) and agricultural practices continued because people also relied on a wide variety of wild plants and animals. Based on the evidence of short-term occupations of Cliff phase sites, they suggest that populations were semi-sedentary on a generational basis (Nelson and LeBlanc 1986:245-250). In other words, because of the lower population density in the Mimbres Valley during the Cliff phase, populations did not move seasonally or annually but
moved every generation or so to areas that were not inhabited. Recent research has shown, however, that large sites in the Upper Gila were occupied for long periods, shedding doubt on the idea of semi-sedentary movement (Clark 2010; Lekson 2002).

The question remains: What was Salado? Crown (1994) and Lyons (2003) provide similar but somewhat opposing viewpoints on the shared ideologies of the disparate groups inhabiting the Salado during and after the settlement of migrant populations in the southern Southwest. Both Crown (1994) and Lyons (2003) agree that the production of Maverick Mountain Polychrome and Roosevelt Red Wares can be traced to the movement of migrants from the Mogollon Mountains in northeastern Arizona and into areas of the southern Southwest. They also agree that vessel production of these ceramics was local at the sites where the pottery was found, though it appears there was some small-scale exchange.

Crown (1994) suggests that these ceramics served as a material marker for a Southwest regional cult. This cult functioned as a way for migrants and host populations from various communities, with different social and political organizations, to form a more cohesive social group (Crown 1994:213-217). Crown supports this argument through the examination of vessel context, the distinctive color combinations of polychrome designs, and the appearance of design motifs associated with ethnographic cult ideologies. She suggests that the ideology associated with these vessels was not restricted but open to all individuals who chose to participate (Crown 1994:214-218). Crown (1994:206, 213-219) argues that once migrants moved into the region and started producing these ceramic styles, local populations rapidly adopted these polychromes.

By contrast, Lyons (2003) argues that the spread of Maverick Mountain Polychrome and Roosevelt Red Wares relates to the movement and spread of migrant populations (see also Clark 2001; Lyons and Clark 2012; Neuzil 2008). The author suggests that “the production of
Roosevelt Red Ware [Salado polychromes] remained tightly bound to northern immigrants and their descendants throughout its history” (Lyons 2003:62). These descendants acted as specialist producers of pottery as these individuals spread throughout the southern Southwest. Throughout the appearance of these polychrome vessels in the southern Southwest, a span of nearly 150 years, Lyons and Clark (2012) propose that these ceramic wares served as an identity marker and material linkage between diasporic migrant groups.

Finally, there is strong evidence to suggest variation in the Salado phenomenon in the many regions where the polychrome pottery appears. For example, VanPool and colleagues provide evidence of different uses of the vessels at Paquimé than in the Tucson Basin (VanPool et al. 2006). On the other hand, Nelson and LeBlanc (1986: 241-250) note that we still do not fully understand how the Salado phenomenon influenced events in the Mimbres region during the Cliff phase. Although research over several decades has helped to further refine our understanding of this widespread polychrome vessel and how it relates to major events of population aggregation and social reorganization, it is clear that we are only beginning to understand what role the Mimbres region played in these events.

The Casas Grandes Regional System during the Medio Period (A.D. 1250 to 1450)

Casas Grandes represents another major political, social, and economic transformation and population reorganization in the southern Southwest around A.D. 1250. The final section of this chapter reviews the history of work in the Casas Grandes region and examines the archaeological characteristics of the Medio period (A.D. 1250 to 1450). The section also discusses the current archaeological debates surrounding the chronology of Paquimé and the Casas Grandes region, the origins of Casas Grandes, and the extent of its influence as an economic/ritual/political center. As is the case with the Salado phenomenon, archaeologists have
various opinions on the origins and influence of the Casas Grandes region and its central and largest city, Paquimé (Di Peso 1974; Di Peso et al. 1974; Foster 1986; Lekson 1999a, 1999b, 2009; VanPool 2003; VanPool et al. 2006; Whalen and Minnis 2003). Importantly for this research project and similar to the Black Mountain phase in the Mimbres region, the chronology of the Casas Grandes regional system and Paquimé is a highly debated topic (Dean and Ravesloot 1993; LeBlanc 1980a; Lekson 2011; Whalen and Minnis 2009).

Compared to other regions in the American Southwest and Mesoamerica, archaeological research in the Casas Grandes region of Mexico has been limited and sporadic (Whalen and Minnis 2001:25-58). Early surveys in the region focused on defining cultural boundaries, establishing chronology, and describing material culture; few of these projects included excavations (Brand 1933, 1935; Gladwin and Gladwin 1934, 1935; Kidder 1924, 1939; Sayles 1936). The Joint Casas Grandes Project (JCGP) from 1958 to 1961 carried out the most extensive archaeological work in the region. This three-year project was conducted by the Amerind Foundation and directed by Charles Di Peso. The project resulted in the publication of an eight-volume report (Di Peso 1974; Di Peso et al. 1974). Based on the excavations at Paquimé and three additional sites, Di Peso and his colleagues were the first to offer detailed interpretations of social organization. Di Peso (1974:1, 2) suggests that the origins of Casas Grandes lay in the large centers of Mesoamerica to the south. He notes cultural discontinuity between the Viejo (A.D. 700 to 1200) and Medio (A.D. 1250 to 1450) periods (also see Foster 1986). (Note that these are the currently accepted dates and not Di Peso’s original dates for the periods.) Even today, these volumes represent one of the largest collections of research on the region. Whalen and Minnis (2001:25-58) note that few research projects were conducted during
the advent of New Archaeology, from the late 1960s through the 1980s, and suggest that this has limited the number of ecological explanations for the importance of Casas Grandes.

Recent work in the Casas Grandes region focuses on refining chronology (Dean and Ravesloot 1993; Lekson 1984, 2002, 2015; Whalen and Minnis 2009), determining whether Paquimé was a local or nonlocal development (Pitezel and Searcy 2013; Lekson 1999a, 2009; Whalen and Minnis 2009), and determining if population density in the Viejo period can account for the large population increase during the Medio period (Pitezel and Searcy 2013; Lekson 1999a, 2000, 2009; Whalen and Minnis 1999, 2001, 2003, 2009). Lekson (1999a, 2009) notes that Casas Grandes arose after the fall of Chaco (A.D. 900 to 1125) and Aztec (A.D. 1110 to 1275), and believes that elites from these centers (and the Mimbres region) migrated southward to form Paquimé. Whalen and Minnis (2003, 2009) propose that the Casas Grandes regional system and Paquimé were local developments. Another research focus in recent years is the extent of Casas Grandes’s influence on northern Mexico and the southern Southwest. Researchers agree that Paquimé exerted substantial political and economic influence over other sites in the region (e.g., Lekson 1999a:72-73; Whalen and Minnis 2001:140), but the nature of this influence is still debated. Since there are Chihuahuan Wares at the Black Mountain site, ideas surrounding the local or nonlocal development of Paquimé are key for understanding the Black Mountain site.

Ceramic seriation, a tool that has been key to dating elsewhere in the Southwest, has been a challenge in Paquimé and the Casas Grandes region because of the lack of stratified middens. Therefore, Chihuahuan Wares found at the Black Mountain site are not easily linked to the chronology of the Casas Grandes regional system. Recent work by Whalen and Minnis (2009: 110-147) and Rakita and Raymond (2003) identifies ceramic types specific to the early (A.D.
1200 to 1300) and late Medio (A.D. 1300 to 1450) periods. They note that Babícora Polychromes are more frequent during the early Medio period, while Ramos, Carretas, and Escondida Polychromes and Playas Red Incised are more common during the late Medio. The appearance of higher quantities of Playas Red Wares during the Late Medio period is interesting because these wares first appear in the Mimbres region at the end of the Classic Mimbres (A.D. 1000 to 1150) and Terminal Classic (Creel et al. 2002).

Nonlocal ceramics, such as El Paso Polychromes imported from the Jornada Mogollon, are found at Paquimé (Di Peso 1974; Whalen and Minnis 2001). Ceramic assemblages from Paquimé also contain small amounts of Gila Polychromes (Lekson 2000; Rakita and Raymond 2003). The presence of the Gila Polychromes allows archaeologists to place the rise of Paquimé after A.D. 1300 (Lekson 1984, 1999a, 2011; Whalen and Minnis 2009). The Gila Polychromes appear to have had a different meaning for people at Paquimé than at other sites where they are found, since none of these polychromes were found in burial contexts (Lekson 2000:283-284; VanPool et al. 2006). In Crown’s study (1994:103), about two-thirds of the Maverick Mountain Polychrome and Roosevelt Red Wares from southern Arizona were found in mortuary contexts.

Previous research on the Black Mountain phase has suggested a social connection to the Casas Grandes regional system because of similarities in architectural features and ceramics, although there are significant differences between the two areas in burial practices (LeBlanc 1977:13). Burials at Paquimé typically were single interments in simple pits beneath room or plaza floors, with about half placed in a flexed position and the others in a flexed supine or sitting position (Di Peso 1974:2:643-652; Ravesloot 1988). Some burials were secondary burials. This practice was unique to the Medio period (Di Peso 1974:2:643-652). There were also a number of high-status burials at Paquimé, indicated by body positioning, quantity and quality of
grave goods, and location of the burials in ritual architecture. Sometimes these elite burials contain multiple individuals and secondary burials (Di Peso et al. 1974:8; Ravesloot 1988; Lekson 1999a:94-98). Elite status symbols were not limited to adult male burials. The burials of some women and children also contained elite status symbols (Ravesloot 1988). These burials indicate the presence of an elite population at the site and an ascribed status at Paquimé (Rakita 2009). Although few Black Mountain phase burials have been systematically excavated (n = 28), there is no evidence for status differences among people living in the Mimbres Valley during the Black Mountain phase (Taliaferro 2014:415-425).

The Casas Grandes regional system sites have high quantities of exotic and imported items, the majority concentrated at the center of Paquimé (Di Peso et al. 1974:2:620-633; Whalen and Minnis 2001, 2009). Exotic items include marine shell, such as pendants and conch-shell trumpets, macaws, and minerals such as turquoise and copper, frequently in the form of copper bells and ornaments (Di Peso et al. 1974:7:500-553, 8:131-232; Whalen and Minnis 2009:237-256). Although macaw remains have been found at several centers throughout the Southwest, such as Chaco, Wupatki, and Point of Pines, Paquimé is the only center that shows evidence of macaw husbandry and/or breeding (Di Peso et al. 1974:8:182-185). At Paquimé, macaws may have constituted a substantial economic/commercial enterprise. There is also evidence that macaws played an important role as a prestige good and ritual paraphernalia in the Southwest (Creel and McKusick 1994). Paquimé gained both economic stability and ritual prestige from the exchange, control, and use of these exotic items.

Exotic and imported items are not the only lines of evidence supporting the idea that Paquimé was an important ritual and economic center. Paquimé is the only site in the region that contains more than one ballcourt, which may have served as ritual architecture used to unify the
Casas Grandes community (Harmon 2006; Whalen and Minnis 2009:274). Effigy mounds, platform pyramids, and large roasting pits suggest large-scale public activities and feasting events (Di Peso 1974:2:470). Large-scale domestic and ritual architecture imply a centralized organizational system. While there are numerous interpretations of the mechanisms of economic and ritual power at Paquimé, archaeologists agree that it was a major center of influence, if not the major social and economic influence, for the southern Southwest during the 1300 and 1400s (Di Peso 1974; Di Peso et al. 1974; Lekson 1999a, 2009; Phillips 1989; Schaafsma and Riley 1999; VanPool 2003; VanPool et al. 2006; but see Cordell 2015). Although there is evidence for a connection between people at the Black Mountain site and Paquimé in the appearance of Chihuahuan ceramics wares and similarities in architectural construction (adobe room blocks), at this point there is no evidence that Paquimé exerted any type of social, political, or economic control over the people living at Black Mountain.

Di Peso’s (1974:1-3) dating of Paquimé is a highly debated topic, as is Paquimé chronology. The dating and influence of Paquimé are important context for the Black Mountain site because Chihuahuan polychromes occur in both Locus 1 and Locus 2. Di Peso (1974:1-3) defined three temporal periods (Viejo, Medio, and Tardio) for the Casas Grandes region. Di Peso’s chronology was based on tree-ring dates. He accepted non-cutting dendrochronological samples as construction dates. He assumed that few outer rings had been removed from the dendro samples and treated them as near cutting dates (Di Peso 1974:2:289-301). This created an inaccurate sequence for the Medio period (Dean and Ravesloot 1993). Di Peso was aware of these problems because the ceramics assemblage at Paquimé included well-dated (post-A.D. 1300) Gila Polychromes (Lindsay 1987; Lyons 2003), which did not fit his chronology (Di Peso et al. 1974:4:9-11). He argued that Gila Polychromes had originated at Paquimé and later
diffused north. Di Peso used this skewed chronology to argue that Paquimé and Chaco were contemporary.

Several archaeologists questioned Di Peso’s dating of Paquimé and suggested that the beginning of the Medio period should be pushed forward 100 to 300 years (Carlson 1982; Dean and Ravesloot 1993; Doyel and Haury 1976; LeBlanc 1980a; Lekson 1984). As noted by LeBlanc (1980a:799), “[i]n many areas of the world a difference of 100 years between chronologies would appear trivial. In this case, however, the different dates for Casas Grandes have major implications concerning exchange networks, interactions between groups, and the causes of cultural collapse or abandonment in several key areas in the southwestern United States.” LeBlanc (1980) suggests that dates from the Mimbres region for the Classic Mimbres phase and the Black Mountain phase, which he proposes are contemporaneous with Casas Grandes, provide evidence that the regional center at Casas Grandes arose between A.D. 1130 and 1170. He uses ceramic cross dating and his proposed end date of A.D. 1300 for the Black Mountain phase to suggest that the termination of the Casas Grandes regional system occurred around A.D. 1300. Of course, LeBlanc’s dating is also problematic because the Black Mountain phase is not well dated. New data on the chronology of the Black Mountain phase are presented in Chapter Five. Even though Gila Polychromes were dated to post-A.D. 1300, LeBlanc suggests that they appeared at Casas Grandes and in the Mimbres region in the 1200s (LeBlanc and Nelson 1976).

Lekson (1984, 2002) and Carlson (1982) reexamined the dating of Paquimé using ceramic cross dating of Gila Polychromes. Gila Polychromes are a well-dated ceramic type with the earliest date A.D. 1280, but they more likely date to at least A.D. 1300 (Dean and Ravesloot 1993; Lindsay 1987; Lyons 2004). Lekson (2000:285-286) also notes that all of the large
ceramic assemblages at Paquimé contain a few Gila Polychromes. Because of the presence of Gila Polychromes in nearly all ceramic assemblages at Paquimé, Lekson and Carlson suggest there is no reason to believe that Paquimé predated A.D. 1300 (see Whalen and Minnis 2009:259-261). Dean and Ravesloot (1993) reinterpreted the tree-ring chronology of Paquimé and developed a method to estimate the number of tree-rings that had been shaved off the Paquimé beams. Their reevaluation suggested that the estimated felling dates were at least 100 years later than the dates proposed by Di Peso. Any adjustment of the estimated dates should move them upward, making Paquimé even younger than Dean and Ravesloot (1993:92-96) estimated. Dean and Ravesloot (1993:97) suggested that the Medio period and the Buena Fe phase began between A.D. 1200 and 1250. The authors proposed that the Paquimé phase, which Di Peso suggested represented the height of Casas Grandes, “was a fourteenth century phenomenon whose inception can be placed very near A.D. 1300” (Dean and Ravesloot 1993:97).

Recent research by Whalen and Minnis (2009:44, 68) on four Medio period sites suggests that Di Peso’s three phases (Buena Fe, Paquimé, and Diablo) “should no longer be used, as they have no chronometric nor ceramic nor architectural definition, either within or outside of the primate center.” Instead, the authors propose an “early” and “late” Medio period based on ceramic differences between the beginning and end of the period. Whalen and Minnis (2009) were unable to recover tree-ring dates from these sites and relied on radiocarbon and archaeomagnetic dates to reconstruct the phase sequence for Casas Grandes. According to Whalen and Minnis (2009:68), “[t]he Medio period is clearly underway by A.D. 1200, although there are hints in the Casas Grandes area and elsewhere that it may begin a little before this date.”
Lekson (2011:4-7; 2015:Appendix B) raises concerns about the interpretation of the radiocarbon dates presented by Whalen and Minnis (2009) and “fear[s] Whalen and Minnis’s chronometry suffers from flaws almost as serious as Di Peso’s tree-rings” (Lekson 2011:4). Lekson notes that all but six of the radiocarbon dates were obtained from wood. Radiocarbon dates are not the ideal dating method to answer chronologically tight questions, such as the dating of the Medio period. There are also numerous chronological problems with the radiocarbon dating of wood. Because wood takes up carbon every year for the lifetime of the tree, radiocarbon dating of wood does not provide a single statistical estimate for one event as it does for annuals, which only collect carbon for one year. Therefore, radiocarbon dating of wood produces a date that is older than the cutting date (Dean 1978). Lekson (2011:4-5) notes that the two-standard-deviation calibrated date range of a radiocarbon date provides a possible span for a single event. In other words, the two-standard-deviation span is the likely range in which a single event occurred.

Whalen and Minnis (2009) propose that the ends of the statistical span represent the beginning and end date of the occupation period. Based on this analysis, they suggest the early Medio period began around A.D. 1160 and a more expansive late Medio period development began after A.D. 1250. Based on the probability distribution, Lekson (2011) suggests that the beginning of the early Medio period likely falls no earlier than A.D. 1220. Using the radiocarbon dates and ceramic cross dating, Lekson (2011) proposes that the beginning of the late Medio period falls between A.D. 1290 and 1375 and that the city of Paquimé reached its height after A.D. 1300.

Closely related to the problems surrounding the chronology of the Casas Grandes region is the debate over whether Paquimé was a local or nonlocal development. According to Di Peso
(1974) and Lekson (1999a:135-136, 1999b, 2009:172-177, 209-214, 2011), Paquimé was a nonlocal development, and these researchers suggest an occupation break between the Viejo and Medio periods. Population evidence suggests that although there were people inhabiting the Casas Grandes region during the Viejo period (A.D. 700 to 1200), the region saw a dramatic population increase at the beginning of the Medio period (A.D. 1250 to 1450). With this population increase, Paquimé arose as an important social, political, and economic center (Di Peso 1974:1:100; Lekson 1999a:135-136, 141). According to Di Peso (1974; 1974 et al.), the growth of Paquimé was attributed to the intrusion of pochteca, a hereditary merchant class who dealt mainly in exotic goods to elites, often collected tribute, and acted as “agents of expansion” (McGuire 1993:29-31). These merchants centralized macaw husbandry and the production and distribution of shell, ceramics, and copper, turning Paquimé into a center of exchange. They used coercive power and knowledge to order the construction of ballcourts, platform pyramids, and irrigation canals, and turned the small, egalitarian farming village into a socially stratified urban settlement.

J. Charles Kelley (1992, 1993) also argues for Casas Grandes as an exchange outpost of Mesoamerica. He suggests that Casas Grandes had ties to the Aztatlán tradition and exchange network of the lowlands and highlands of west Mexico. The Aztatlán tradition was connected to trading centers in the Mixtec-Puebla of central Mexico and provided prestige goods such as macaws to Paquimé. Around A.D. 1100, traders from these networks established themselves in northern Chihuahua and introduced new material culture and technologies, such as copper metallurgy and ceramic and architectural styles similar to those found in Mesoamerica. While it is clear that there are close ties between Casas Grandes and Mesoamerica because of the
presence of I-shaped ballcourts, platform mounds, and macaws, there are also clear influences from the “Puebloan” world and the American Southwest.

Lekson (1999a, 1999b, 2015) also proposes that the rise of Paquimé can be attributed to the migration of commoners from the Mimbres region and of nonlocal elites, with connections to Chaco and Aztec Ruin in New Mexico, into the Chihuahuan desert. These elites were the former leaders of Chaco and Aztec. According to Lekson, Paquimé should be considered a city of Pueblo origin. Although there are obvious connections to Mesoamerica (ballcourts, platform pyramids, and parrots), Lekson (1999b) argues that the architectural layout of room blocks and modern Pueblo origin stories suggest that Paquimé had strong ties to the American Southwest. Since there is little evidence for a large population at the site before the rise of Paquimé, he (2000, 2015) proposes there could be a gap in occupation between the Viejo and Medio periods. This gap and the presence of “Puebloan” characteristics also provide evidence that Paquimé developed from nonlocal populations.

Few Viejo period sites have been recorded (Pitezal and Seacry 2013), and Whalen and Minnis (2003:318-322) note that the lack of current evidence for a large population in the Casas Grandes region may be due to how little research has been conducted on this period. They suggest that the region was more densely populated during the Late Archaic because of the rich resources in the area and this dense population may suggest a continued occupation from Late Archaic through the Medio. The authors suggest that these rich environmental resources continued through the Viejo period. Further archaeological evaluation of the Viejo period could provide evidence for a larger population in the Casas Grandes region during this period.

Whalen and Minnis (1999) suggest cultural continuity between the Viejo and Medio periods and propose that Casas Grandes had three interaction zones during the Medio. These
conclusions are “[b]ased on the investigation of ceramic type distributions, styles of domestic architecture, patterns of occurrence of ritual architecture, and distributions of exotic and imported goods” (Whalen and Minnis 1999:60). Sites in the first zone, which encompasses a 30-km radius around Paquimé, show a close link in ritual activities, production of goods, and exchange of exotic materials. The second zone, which includes sites within a 60- to 90-km radius, has architectural and ceramic similarities to Paquimé, but ballcourts and macaw cage doors are less common in this zone. This second zone also extends about 120 km to the north and west, and includes sites in the boot heel of New Mexico that contain ballcourts. The third zone extends to the north and east of Paquimé. It is marked by ceramic assemblages like those at Paquimé, but the sites do not contain ballcourts or macaw cage doors. Whalen and Minnis conclude that “the Paquimé regional system existed at a geographic scale comparable to…Chaco and the Hohokam” (1999:60).

It is clear that Casas Grandes was linked to both Mesoamerica and the American Southwest through economic and ritual networks (Fish and Fish 1999; Foster 1999; Lekson 2009, 2015; Rakita 2009; VanPool 2003). The combination of material goods and knowledge from both locations resulted in a unique blend of Southwestern and Mesoamerican behaviors. Di Peso (1974) and Di Peso and colleagues (1974) suggest that Mesoamerican migrants controlled the economic and ritual systems at Paquimé. Recent research on the Casas Grandes regional system suggests institutionalized hereditary leadership at Paquimé was based on shamanistic practices (e.g., Rakita 2009; Ravesloot 1988; VanPool 2003). Researchers continue to debate whether the American Southwest or Mesoamerican ritual knowledge influenced these practices.

One problem for research in this area is the lack of diachronic perspectives on the cultural developments leading up to the rise and florescence of Paquimé (Rakita 2009:4-5). The lack of
consensus about the chronology of the Casas Grandes regional system (Di Peso 1974; Dean and Ravesloot 1993; Lekson 1984, 2011; Whalen and Minnis 2009) is due in part to the paucity of Viejo period excavations (and possibly the lack of Viejo period sites) (Whalen and Minnis 2001, 2009). The lack of data on the Viejo period has caused researchers to debate local vs. nonlocal development of Paquimé (Lekson 1999b, 2009; Whalen and Minnis 2003, 2009).

There are three main arguments concerning the extent of control that Paquimé exerted over the surrounding Casas Grandes region and the origins of its leadership. The first suggests that the leaders of Paquimé had economic control over the entire region (e.g., Di Peso 1974, 1983; Foster 1986). Di Peso and others suggest that this system was controlled by the pochteca, who set up an exchange outpost in the Casas Grandes region and built Paquimé. Since this economic system was based on the production and exchange of prestige goods, elites also provided ritual leadership through this economic system.

The second perspective suggests that Paquimé exerted strong influence over sites only within a 30-km radius of Paquimé (Whalen and Minnis 1999, 2001:161-167, 2009). Sites within this zone show a close connection to Paquimé through similarities in ritual activities (evidenced by a high number of ballcourts, large roasting ovens, and macaw cage door stones), production of goods (copper and polychrome ceramics), and exchange of exotic materials (higher amounts of copper and nonlocal minerals such as turquoise) (Whalen and Minnis 1996, 1999, 2001, 2009). Sites within a 60- to 90-km radius have architectural and ceramic assemblages similar to Paquimé, but ritual items such as ballcourts and macaw cage doors are less common. Whalen and Minnis (1999) conclude that the scale of political organization at Paquimé was similar to the Chaco and Hohokam regional systems. They propose that Paquimé had strong influence over sites within the 30-km radius, and interactions with these sites can be described as a peer polity.
competition (Whalen and Minnis 2001:161-167). Building on Whalen and Minnis’s work, Fish and Fish (1999:40) suggest that Paquimé “could have been the destination for regional pilgrimages, serving to ideologically reinforce and unite outlying populations without tribute or political control.”

The final set of theories suggests that Paquimé’s economic and ritual systems were greatly influenced by Mesoamerica and that Paquimé served as a ritual center, but these authors believe the influence was not as closely tied to Mesoamerica as Di Peso proposes (1974). The large quantity of shell ornaments, copper bells, and macaws from western Mexico, the construction of Mesoamerican (I-shaped) style ballcourts, and the importation of Mesoamerican iconography, such as the feathered serpent, have led researchers to argue for a cultural connection. However, these authors suggest that Mesoamerican traders did not exert control over the ritual center (McGuire 1980; Phillips 1989; Plog et al. 1982; Schaafsma and Riley 1999).

According to VanPool (2003), Paquimé had more in common with Mesoamerican patterns of ritual leadership than with Pueblo patterns. However, she does not go on to imply that Mesoamerican leaders were in charge at Paquimé (VanPool 2003; VanPool and VanPool 2006). This similarity in shamanistic leadership was investigated through a comparison of iconographic images on pottery. VanPool and VanPool (2006) suggest that men and women played important, but different, roles, in ritual and leadership at Paquimé.

During the thirteenth and fourteenth centuries, the southern Southwest and northern Mexico were dominated by two traditions, the Salado phenomenon and the Casas Grandes regional system. Although these phenomena were similar in many ways and included distinctive polychrome pottery, increased regional interaction, and population aggregation, recent research suggests that these two phenomena represent different and possibly competing political and
religious ideologies (Schaafsma 1999; VanPool et al. 2006). VanPool and colleagues (2006:236) list five similarities in material culture: polychrome pottery decorated in red, black, and white; an emphasis on serpent designs in ceramic iconography; copper bells; platform mounds; and shell ornaments. They use these artifacts to analyze similarities and differences between the Salado and Casas Grandes systems. The authors conclude that although all of the artifact types appear in both systems, they had different uses and meanings in each phenomenon (Dean 2000:15; VanPool et al. 2006). The Casas Grandes system was more closely aligned with Mesoamerican religious systems, while the Salado phenomenon was less structured and more focused on integrating the community.

Rakita (2009) provides a slightly different summary of ritual practices at Paquimé. Similar to Crown’s (1994) proposal that the Salado phenomenon functioned to unite disparate groups during a time of population reorganization, Rakita (2009:167) suggests that ritual practices at Paquimé functioned to “both promote community cohesion and to establish institutionalized authority structures.” Continued comparative research between the Salado phenomenon and the Casas Grandes regional center, with comparison to earlier periods such as the Black Mountain, Animas, and El Paso phases, will help to provide further insight into the broad-scale social dynamics and interactions occurring throughout the southern Southwest and northern Mexico after A.D. 1130. The southern Southwest and northern Mexico were largely depopulated by the end of the fifteenth century. Understanding the reasons for this regional collapse and the fate of individuals participating in these social processes remains an understudied problem (Douglas 1996; Phillips 1989:382-384; Miller 2005; Schollmeyer and Nelson 2010; Skibo et al. 2002:174).
Summary and Conclusion

Between A.D. 1150 and 1450 there were major changes in social, political, and economic networks throughout the Mogollon region. Within the Mogollon, the Mimbres region saw an expansion and reorganization of social, economic, and political networks around 1150. Previous research suggests this expansion included increased exchange of ceramics and greater connection to peoples living in Jornada Mogollon, southeast Arizona, and northern Mexico. As discussed in Chapter Six, work at the Black Mountain site also shows an expansion in exchange networks and provides the possibility that some pottery types, such as Chihuahuan polychromes, which are usually made outside the Mimbres Valley, may have been produced locally. Shifts in obsidian exchange networks suggest changing social connections within the Mimbres region (Chapter Seven; Taliaferro 2014). This expansion and increased regional interaction continued until the region was largely depopulated sometime after 1450/1500 A.D.

With the exception of the Late Pithouse and Classic Mimbres periods, there are still gaps in chronology for many of the regions, periods, and phases. Consequently, there is debate over how these areas interacted with each other. The chronology of these periods is slowly being refined. Because there is still work to be done in many areas, it is difficult to link events in the Mimbres Valley and the Black Mountain site to broader trends in the region. Although the culture areas described above provide a useful starting-point for examining regional history, relying too much on such categories can limit our ability to see broader trends within the Mogollon region and the American Southwest (Lekson 1996a:175). This study puts the research on the Black Mountain site into a regional framework and views the Mimbres Valley in the context of the large-scale regional changes that affected the southern Southwest between 1150 and 1450 A.D.
CHAPTER III

THE MATERIAL AND SOCIAL CONTEXTS OF REORGANIZATION

Introduction

Multiple factors are involved in or impacted by processes of cultural change such as those under consideration in this study. These include immigration, emigration, changes in economic networks, adaptation to new or changing environments, and reorganization of social networks (e.g., Clark 2001; Gosden 2005; Hill et al. 2010; Kohler et al. 2010; Lyons 2003; Neuzil 2008; Peeples 2011; Sahlins 1995; Woolf 1998). Archaeologists working in the Mimbres region suggest that changing environmental conditions were an underlying factor in the transition seen around A.D. 1150 (Minnis 1978, 1985; Nelson 1981; Nelson and Diehl 1999; Nelson and Schollmeyer 2003; Schollmeyer 2005). But so little work has been conducted on the Black Mountain phase in the Mimbres Valley (but see Creel 1999, 2006b; Ravesloot 1979; Taliaferro 2014) that it is unclear which social processes played a role in the transformation (Shafer 2006). As was discussed in Chapter One, researchers have proposed three social processes (population continuity, migration, or a combination of the two) to account for the changes seen around 1150 (e.g., Creel 1999; Nelson and Hegmon 2001; LeBlanc 1989; Shafer 1999; Taliaferro 2014). If some resident populations remained in the valley, the transition was likely driven by a reorganization of economic and social networks. In other words, continuity can be a major part of cultural change (see Cabana 2011).

Building on previous research, this dissertation addresses, insofar as data allow, how these three social processes informed the dramatic changes in material culture from the Classic/Terminal Classic phases to the Black Mountain and Cliff phases. This chapter develops method and theory for investigating the two main principles that provided a conceptual
framework for this research. First, the circulation of material goods is a dynamic process and one that serves as a proxy for social connections among individuals or comminutes (Abbott 1996; Graves 1994; Sahlins 1972; Zedeño 1998). Since exchange and migration have been proposed as the two main processes responsible for changes seen in material goods in the Mimbres region after 1150, one must distinguish between these two practices to understand social change. The second tenet is that high visibility and low visibility attributes, which highlight social connections, are embedded within material culture (Carr 1995a, b; Clark 2001; Costin 1998; Eckert 2008; Lemonnier 1992, 1993; Peeples 2011; Wallis 2011; Wiessner 1985). By tracking these attributes through time and during the production, use, exchange, and final deposition of an object (the object’s life history), one can begin to distinguish whether the transition in the Mimbres region represents the reorganization of exchange networks and/or migration (Dietler and Herbich 1998; Dobres and Hoffman 1994; Jones 2005; Gosden 2005; Wallis 2011).

I begin this chapter with a review of previous research on exchange and migration. Next, I examine how previous research has utilized technological style and object life histories to understand the difference between the reorganization of exchange networks and migration. I review these literatures. I conclude the chapter with an outline of the methods used to examine whether the transition represents a reorganization of exchange networks, migration, or some combination of the scenarios.

Exchange

The study of trade and exchange networks has a long history in anthropological and archaeological inquiry (e.g., Earle 1982; Lévi-Strauss 1969; Malinowski 1922; Mauss 1925; Sahlins 1972). Early studies noted that exchange is an inherently social activity. More recent research has attempted to understand the social processes behind exchange (Agbe-Davies and
Bauer 2010; Appadurai 1986; Dobres 2000; Wallis 2011). These studies have shown that the examination of exchange can be used to explore relationships between and among groups. This is therefore an important line of inquiry for this research project. In the American Southwest, the examination of how materials circulate has played a major role in understanding changing patterns of social organization and community interaction as well as the processes behind migration (Duff 2002; Eckert 2008; Peeples 2011; Schachner 2012; Zedeño 1998).

Archaeologists frequently use the terms trade and exchange interchangeably (Kohl 1975; Renfrew 1975). In this dissertation, I follow Agbe-Davies and Bauer (2010:15), who suggest that these two terms have somewhat different yet overlapping meanings. Specifically, *exchange* refers to the movement and transfer of goods from one individual or group to another through a variety of processes that include reciprocity, gift exchange, barter, and coercion. On the other hand, *trade* refers to a more specific category of exchange that is based in more formalized market economies.

In the archaeological record, markets are challenging to identify because they often do not leave a visible archaeological signature and they are closely tied to other forms of interaction such as gift-giving, tribute, household economies, reciprocity, and labor (Earle and Ericson 1977; Hirth 1998; Kohler et al. 2000; Polanyi 1944; Stark and Garraty 2010; Wilk 1998). Very few locations in the American Southwest provide evidence of formalized markets. Paquimé is an exception to this rule and shows evidence of surplus storage as well as markets and trade fairs (Di Peso et al. 1974:8:123-125, 141-145). In the Hohokam region, the appearance of periodic markets or trade fairs is inferred from the concentrated production of red-painted vessels along the Gila River. Because of this concentrated production, a distribution mechanism must have existed to spread pottery throughout the region. Several researchers have suggested that
exchange linked with ballgames facilitated the distribution of goods (Abbott et al. 2007; see also Doyel 1979; Haury 1976:78). These Hohokam markets are not visible in the archaeological record due to their lack of formalization (see also Kohler et al. 2000 for Rio Grande). Although informal markets and trade fairs likely existed in the American Southwest (Zedeño 1998), there is little to no evidence of formalized markets in the Mimbres region. For that reason, this dissertation draws on the literature that investigates the exchange of goods in middle-range societies.

**Formalist versus Substantivist Approaches to Exchange**

Economic anthropologists utilize two approaches to examine the structure and organization of exchange: formalism and substantivism (e.g., Claessen and Van de Velde 1991; Earle 2002:2-3; Muller 1997:9; Wilk 1996:6-11). Formalist approaches posit that rational decision-making is the main mechanism of economy in prehistoric non-capitalist economies and modern capitalist systems alike. Formalists assume that maximization and efficiency in the use of resources, such as settlement location and food supplies, are universal economic factors (Burling 1962; Cook 1968; Earle 2002:3). Substantivists, by contrast, argue that unlike modern Western economies where exchange is rooted in market systems, exchange in traditional, non-capitalist economies was shaped by historical, social, and political contexts (Dalton 1969;; Polanyi et al. 1957). This approach uses three categories of circulation to examine economies: reciprocity, barter, and redistribution. Whereas reciprocity and barter produce one-to-one obligations, redistribution is a centralized form of exchange specific to hierarchical societies (Dalton 1969; Mauss 1925; Polanyi et al. 1957; Sahlins 1972). Although the substantivist approach takes into consideration the historical, social, and political contexts of economic systems, there is an embedded assumption that different forms of exchange are indicative of
different types of social organization. It is, therefore, an intrinsically evolutionist view (Sahlins 1965).

**Examination of Exchange in the American Southwest**

Early work in the American Southwest employed mainly formalist approaches, viewing exchange primarily as a buffering mechanism to manage risk and as a way to manage scarce resources (e.g., Braun and Plog 1982; Cordell and Plog 1979; Lightfoot 1984; Upham 1982). Later work has taken into account historical, social, and political contexts based on a recognition that exchange represents a number of processes (Ericson and Baugh 1993; Mills and Crown 1995; Plog 1993; Zedeño 1998).

Although the formalist and substantivist approaches appear to provide two different theoretical perspectives, as Zedeño (1998:463) notes, “…in practice these approaches are no more than two different types of analysis: one of output and performance [formalists], the other of social context of exchange [substantivist].” She goes on to suggest that although there has been debate among proponents of each perspective, aspects of both approaches have been used in archaeological studies of exchange (e.g., Brumfiel and Earle 1987; Ericson 1982; Mathien and McGuire 1986; Renfrew 1975; Sabloff and Lamberg-Karlovsky 1975; Yengoyan 1972). Furthermore, an examination of exchange in prehistoric societies suggests there was always a mixture of economic approaches (Feinman and Nicholas 2004:2; see also Muller 1997:9; Smith 2004:92; Stark and Garraty 2010; Wilk 1998; Zedeño 1998). In other words, prehistoric peoples were guided by numerous factors, including risk and social, political, and historical contexts. Pauketat (2004:26) indicates that the “economy was lived from the ground up. It was generated by the cultural practices of past people, and thus the so-called economy of a particular chiefdom or state was never a thing that existed apart from those practices.” Although Pauketat’s (2004)
work focuses on Cahokia, which had a more developed system of hierarchy than the Mimbres region (see Powell-Marti and Gilman 2006), his observation is relevant to this investigation because it emphasizes that exchange is socially constituted. The details of how to examine the social contexts of exchange are discussed further below, but first I review some of the factors that may have been responsible for processes of exchange of material goods in the American Southwest.

Although exchange always involves the movement of material goods, it is important for archaeologists to keep in mind that it is always people who are moving these goods. Whether the goods were moved within a settlement or among settlements, the movement of objects inherently implies the movement of people. In middle-range societies, the processes of exchange are represented through a variety of circumstances, including face-to-face interactions and informal contact between acquaintances or relatives (Braun and Plog 1982; Plog 1980; Sahlins 1972). More formalized mechanisms of exchange could include feasts, public ceremonies, or trade fairs (Spielmann 2004; Zedeño 1998) as well as the creation of political and social alliances (Abbott 1996; Blinman 1989). Within this range of formal and informal processes, exchange may occur over either short or long distances (e.g., Crown 1994; Duff 2002).

In the study of Southwestern exchange networks, an important consideration is whether pottery, for example, moved as a commodity, as a container that carried goods, or both (Zedeño 1995, 1998). For instance, the exchange of jars may indicate that the vessels’ form was less important than what was being transported in them. On the other hand, the appearance of bowls as exchange items may signal the importance of the object as a ceramic vessel, because bowls are not as useful for transporting goods. In Chapter Six, I use Instrumental Neutron Activation Analysis (NAA) to track the frequency of exchange of vessel forms, the distance over which
these vessels traveled, and the types of social interactions likely represented by the exchanges. For obsidian, when possible, it is important to consider whether a finished point, preform, or raw material was exchanged. While this information was not readily available in the data set for this dissertation, it is important to consider that the movement of these different forms represents various steps in the production process and can help to determine the value of these objects (Lazzari 2010).

One final consideration is the fact that exchange is a dynamic process. Appadurai (1986:31) proposes that historical, social, political, and economic forces influence the consumption of materials, but at the same time, consumption can affect these forces. Therefore, the exchange of goods is influenced by both the needs of the consumer and the needs of the producer. The meaning and significance of the goods themselves may be transformed by the consumer. As highlighted by Woolf’s (1998) investigation of Roman Gaul, Roman materials were desired and slowly replaced local material culture. But consumers also continued to use local materials that held historical importance. Woolf’s study illustrates the importance of taking into account the possibility of social transformation while also considering the role of identity creation and renegotiation as new forms of material culture are adopted. The Roman Gaul example also utilizes a deep chronology and, therefore, provides an example of the examination of change through time (Woolf 1998). Understanding how exchanged objects fit into social, political, and economic dynamics over a 450-year period in the Mimbres region illuminates the connections between objects and people and allows for examination of why material culture changed around 1150 (Gosden 2005; Pauketat and Alt 2005).
Migration

The migration of populations also contributes to the movement of goods and ideas and the reorganization of social, economic, and political networks. Early prehistoric migration studies were closely related to the culture concept and the belief that material culture traits were representative of distinct cultures and ethnic groups (e.g., Childe 1925; Steward 1979). With the advent of New Archaeology and the search for a more scientific approach, migration studies fell out of favor (but see Lindsay 1987; Longacre 1976; Rouse 1986). In contrast to Culture Historians, New Archaeologists regarded migration as a historical event and not as a systematic explanation for processes of change. New Archaeologists emphasized adaptive and evolutionary explanations. Since migration was a historical explanation, it was ignored in many processual studies.

During the shift to postprocessual research, Anthony’s (1990) seminal paper on migration challenged the field to understand how migration works. The recent resurgence in migration studies has led archaeologists to consider the proper ways in which to study prehistoric migrations (Adams and Duff 2004; Anthony 1990; Beekman and Christensen 2003; Bernardini 2005; Burmeister 2000; Cabana and Clark 2011; Clark 2001; Kirch 2000; Ortman and Cameron 2008; Lekson and Cameron 1995). This is an especially important consideration for migration studies in the American Southwest, where movement is the rule, not the exception (e.g., Cameron 1999; Fowles 2011; Varien 1999; Zedeño 1998). Migration can be difficult to distinguish from other processes of movement such as exchange, short-term relocation, or seasonal rounds (Clark 2001; Fowles 2011; Ortman and Cameron 2008). Since the focus of this study is understanding the social processes behind the changes seen in material culture of the Mimbres region and whether this process represents immigration or continued occupation of
populations accompanied by reorganization (or some combination of these scenarios), migration studies provide an important avenue of inquiry.

For the purposes of this dissertation, migration is defined as “a long-term residential relocation by one or more social groups across community boundaries in response to spatially uneven changes in social and economic conditions,” (Clark 2011:84; see also Cabana and Clark 2011:5; Ortman and Cameron 2008:234-236). A community is defined as a group of people who live in close proximity and have a collective history. These groups interact regularly through interconnected social, economic, and political ties (Clark 2011:85). Although migration is defined as a long-term relocation, research has shown the migrants frequently have long-term social connections with resident populations that predate the migration (Anthony 1990; Cabana 2011; Cordell et al. 2007; Ortman and Cameron 2008; Varien 2010). In this study, resident populations are groups who continued to live in the Mimbres Valley after the population decline around 1150. Migrant populations are groups who moved into the Mimbres Valley after 1150 during the Black Mountain and Cliff phases. These populations were likely composed of small family or kinship groups. As introduced in Chapter One and discussed in Chapter Four, because of the overall population decrease at the end of the Classic Mimbres, movements of these small groups of migrants will be difficult to see in the archaeological record of the Mimbres Valley. Since there is evidence that the Black Mountain phase at the Black Mountain site represents an occupation of about 50 years (see Chapter Five), I also suggest that the possible migrant populations living at the Black Mountain site relocated for the long term (see Clark 2011:85 above).

There is evidence that the population density of the Mimbres Valley in the Black Mountain and Cliff phases was considerably reduced compared to the Classic Mimbres phase.
Therefore, I suggest that the remaining resident groups would have had to look outside the valley for economic exchange and continued social ties. Due to the smaller population in the Mimbres Valley and in order to maintain exchange and social relationship that were developed during the Classic Mimbres period, residents who remained in the Mimbres Valley as well as migrant populations who moved into the valley would have relied upon a social network that was more spatially extensive (see Duff 2002; Peeples 2011).

As noted by Cabana (2011), there is an underlying assumption in some studies that an abrupt change in material culture represents migration. Migration is therefore used as a catchall concept to explain cultural change. While migration is one possible explanation for such changes, there are numerous other social processes, such as changes in exchange networks, agricultural strategies, gender roles, and ideology, which can create an abrupt shift in material culture. By refocusing on the processes behind migration and acknowledging the variety of signatures it leaves in the archaeological record, archaeologists move away from viewing migration as a simple explanatory model.

Understanding the processes behind migration is a challenging endeavor for the Black Mountain phase, since so few Black Mountain phase sites have been excavated (Shafer 2006:31). The termination of Mimbres Black-on-white pottery around 1150 may indicate shifting ideology at the end of the Mimbres phase (Moulard 1984; Shafer 1995; Thompson 1994), and agricultural strategies may have been altered because of drought and resource depletion (Minnis 1985; Chapter One).

While it is important to keep Cabana’s (2011) critique in mind, the current debate surrounding the Classic to Black Mountain transition focuses on whether the transformation process was accompanied by population continuity or immigration. The BMAP, which provides
new data (chronometric, ceramic and obsidian sourcing, wall construction) from well-documented contexts and builds on previous research (Creel 1999; Hegmon et al. 1999; Taliaferro 2014; Shafer 1999; Nelson and Hegmon 2001), represents one of the early steps in detailing the transition. Thus, this project contributes to the field by providing a preliminary framework for examining whether migration occurred. It establishes a baseline from which we can further explore the processes behind migration during the Black Mountain phase and in other regions where population estimates are underdeveloped.

Clark (2001), Ortman (2012), and Ortman and Cameron (2008) note some important points to bear in mind when examining migration. First, while changes in the material record are a key component of detecting migration, archaeologists must also be able to demonstrate demographic shifts. As Clark (2001:2) notes, this “can be difficult in even the most obvious examples because alternative explanations often exist for observed patterns that require little or no population movement.” Not all archaeological regions have detailed population estimates or demographic records, and this is a concern for the Mimbres region. While population estimates and chronological data are refined for periods before A.D. 1150, we lack detailed information for the periods after the transformation (Blake et al. 1986; Hegmon 2002; Hegmon et al. 1999; Lekson 2006; Peeples 2010; Taliaferro 2014). We know there was a large population decline in the Mimbres Valley around A.D. 1150, and that between 4,500 and 6,000 people left (Blake et al. 1986; Creel 1999; Lekson 2006; Peeples 2010; Shafer 1999; Taliaferro 2014). In Chapter Four, I show that because of this large population decrease, regional population estimates can easily miss small groups of migrants who were moving into the region as overall population declined. Thus, even though a population increase is not apparent in the Mimbres region, migration may still lie behind the transformation.
In studying migration, it is also important to consider the motivations, causes, organization, and effects of movement on both migrant and resident populations (Clark 2001; Ortman 2012; Ortman and Cameron 2008). Following Anthony (1990), these authors note the importance of push and pull factors. Push and pull factors include environmental influences such as drought or resource depletion and social and political factors such as violence. The size of the migrant group, distance of migration, and the gender, age, and social status of migrants all provide important contextual information, as do the social organization of the homeland and the receiving community. These factors affect whether or not migrants are archaeologically visible after they move. Even if a population increase is easily recognizable, migrants sometimes blend in once they have moved (Bernardini 2005; Stone and Lipe 2008). For example, migrants at Point of Pines are very apparent and serve as the classic example of a “site unit intrusion.” Populations who moved from the Kayenta region to the Tonto Basin also represent easily visible migrants (Clark 2001; Haury 1958; Stark et al. 1995: Stark et al. 1998). On the other hand, the movement of populations from the Northern San Juan to the Northern Rio Grande is difficult to see archaeologically even though there is demographic information that confirms the migration occurred (Stone and Lipe 2008; Lipe 2010; but see Boyer et al. 2010).

One obvious push factor for groups that left the Mimbres Valley and moved to the Eastern Mimbres was environmental decline (Minnis 1978, 1985; Nelson 1981; Nelson and Diehl 1999; Nelson and Schollmeyer 2003; Schollmeyer 2005). I suggest that the social ties resulting from this migration may have continued to be a pull factor in Postclassic times. Since the valley saw a dramatic depopulation, there was now “room” for new groups to move in. As noted by Creel (2006a:212), “areas north, west, and south of the Mimbres [V]alley experienced dry years in the A.D. 1130s, as did the Rio Grande basin and the Southwest as a whole.” He goes
on to suggest that the Mimbres Valley may have been less impacted by the environmental crisis of the 1130s and observes that it saw above average rainfall in the 1140s. As a result, populations from areas more negatively impacted by drought may have seen the Mimbres Valley, with its lower population density, as an opportune location for migration during the late 1100s and early 1200s. Ortman (2012:251-263) notes that push and pull factors are not always easily identified.

The mid-1100s are recognized as a major period of regional reorganization. Two influential regional systems experience collapse and reorganization (Adler 1996; Judge 1989; Kidder 1924; Lekson 2009:105-142; Lekson and Cameron 1995; Nelson 1999). The Chaco regional system was declining (Judge 1989, 1991; Lekson 1991) and Hohokam was experiencing a major reorganization from the Sedentary to Classic periods (Doyel 1979; Fish et al. 1992). There is evidence that people in the Mimbres had connections to these two systems (Creel 2014; LeBlanc 1983; Lekson 1999, 2009:105-142; Hegmon and Nelson 2007; Wallace 2014). Therefore, these reorganizations likely affected the already unstable worldview of the Mimbres (Nelson et al. 2011).

Clark (2001, 2011) suggests that traits that represent enculturation processes provide the best tools to examine migration (see also Carr 1995a; Stark et al. 1995). These traits, which he calls low visibility or technological attributes, represent choices made during the production of material culture. They do not intentionally send a social message (e.g., Carr 1995a; Clark 2001). Clark (2001) suggests that archaeologists should use low visibility traits and habitual practices such as food preferences, household configuration, and ceramic production to investigate migration. These traits are not as easily emulated as high visibility traits or discursive practices such as public architecture, mortuary practices, decorative styles and techniques, and ritual practices (see also Bourdieu 1977; Giddens 1979, 1984).
While Clark’s (2001) model is a useful starting point for examining migration, Ortman and Cameron (2008) note that perceptions of low and high visibility traits can change in a migration setting because human practices are malleable (see also Beekman and Christensen 2003; Giddens 1979, 1984; Ortman 2012; Stone 2003). Ortman and Cameron (2008:238-239) deliver a modern analogy to unpack the flexibility of low and high visibility traits. They note that while the untrained eye may not be able to identify archaeological remains, trained archaeologists have been taught how to recognize the traits and can sometimes distinguish the age, size, and role of a site through survey alone. This modern example highlights how social context and learned behaviors influence the recognition of low and high visibility material culture traits.

Moreover, in a migration setting—and, I would suggest, during periods of social reorganization--lack of continuity in low visibility attributes does not mean that migration did not occur (Ortman 2012:252-256). Since “the visibility of material culture attributes is influenced by the social context of use as well as their physical characteristics,” migrants and resident populations may question their habitual and discursive practices during times of social instability (Ortman 2012:255). Because this study investigates a period of social instability, both low and high visibility attributes are examined.

Cameron (2008, 2011, 2014) brings up an additional consideration. In her recent publications and edited volumes on captives in the prehistoric world, she argues that captives, who were usually obtained through raids or warfare, had lasting impacts on the groups of which they were forced to become a part. Captives were present in almost every level of society and in non-hierarchical groups such as those in the American Southwest. Although captives were treated as commodities or capital, it is important to acknowledge “the active role that subordinate
individuals play[ed] in cultural construction and transformation” (Cameron 2011:169). While I am not suggesting that captives were a part of the transition (although they certainly may have been), the point here is to underscore how easily archaeology may fail to recognize groups and individuals who play important roles in society.

Ortman and Cameron (2008) also argue that archaeologists must consider the various scales of individual and group identities and the fluid nature of identity (see also Barth 1969; Beekman and Christensen 2003; Dobres and Hoffman 1994; Moreman 1965; Naroll 1964; Wiessner 1983; Wobst 1977). This view, which employs terms such as nested identity, situated identity, or situated knowledge, suggests that identity is not a stable entity and that it is informed by an individual’s social status, race, gender, age, and larger group identity (e.g., Hakenbeck 2007; Jones 1997; see also Haraway 1991:111; Harrison 1991). Individuals have multiple identities and these become more or less salient depending on the social context in which individuals are practicing their multiple social positions. As Barth (1969:14) notes, “[o]ne cannot predict from first principles which [social] features will be emphasized and made organizationally relevant by the actors” when groups and individuals are demarcating identity and social boundaries. Importantly for this study, the concept of nested identity draws our attention to the ways in which perceptions of low and high visibility attributes may change in different social situations. This is particularly relevant in migration settings, when social groups are attempting to shed their previous identities, or when groups interact as a result of exchange (Ortman and Cameron 2008; Sackett 1990; Neuzil 2008). As is discussed below and elaborated in subsequent chapters, when high and low visibility attributes are examined over the longue durée they can help to elucidate the formation, re-creation, and transformation of identities.
Differentiating Migration from the Reorganization of Exchange

It is difficult to distinguish archaeologically between changes in exchange networks and migration (Clark 2001; Ortman and Cameron 2008; Zedeño 1998). It is interesting, then, that the two fields of research have used similar methods and theoretical approaches to investigate the changes seen in material culture in each context. These methods include the examination of style and life history approaches. The investigation of technological style allows archaeologists to see choices made in the techniques and materials of production. Since these choices are framed by the historical and social contexts of the people creating material culture, an examination and comparison of technological choices can provide information on the social contexts of the people who use and create the objects. Furthermore, by examining material culture through an object life history approach, archaeologists can track the use and meaning of objects during production, exchange, consumption and use, and final deposition. Since the meaning and use of objects can change through these stages (e.g., Appadurai 1986; Gosden and Marshall 1999; Kopytoff 1986; Jones 2002), this perspective allows for a more detailed understanding of the relationship between people and things. For example, while it is obvious that there was some kind of social reorganization in the Mimbres region around 1150, the dramatic material changes that we can see tell us little about the societal mechanisms that produced this shift. Arakawa and colleagues (2011) and Duff (2002) suggest that long-distance exchange highlights social connections constructed through migration histories. Therefore, exchange networks and migration are not necessarily antithetical and are, at times, complementary. Below, I provide an examination of the concept of style, focusing on technological style, the object life history approach, and how previous research in this area can inform this study.
Archaeological Perspectives on Style

Archaeologists have long debated the definition of style and its use in determining “the social significance of material culture,” (Dietler and Herbich 1998:237). Style is a broad term that has been appraised from a variety of theoretical perspectives. Early research perceived style as unidimensional and suggested the function of style was to signal ethnic or group boundaries (e.g., Binford 1962; Childe 1925; Hill 1966; Kroeber 1916; Longacre 1963, 1970; Wobst 1977). Later research acknowledged that different “kinds of style…may co-occur in the same object,” and that style has multiple dimensions (Hegmon 1992:522; see also Dietler and Herbich 1998; Hodder 1991; Sackett 1990; Lechtman 1977; Lemonnier 1992; Wiessner 1983, 1984). Several archaeologists have suggested that since style is linked to historical contexts, an overarching theoretical approach to examining this concept would be impossible (Conkey and Hastorf 1990; Hodder 1982; Sackett 1986; Wiessner 1983). Certainly, the wide array of views on the definition of style and how to study it seem to support this notion.

Many reviews of the style literature suggest a dichotomy between passive (or normative) and active (or communicative) views of style. From this perspective, “active” style deliberately signals ethnic or social identity, whereas “passive” style serves to reflect a stable social identity or cultural pattern (Hegmon 1992; Lightfoot et al. 1998). As Carr (1995a) suggests, the production process of material culture can be both passive and active, and many artifacts have both active and passive stages in their production. In other words, whether choices made during the production process intentionally signal social identity depends upon the context in which they are made and viewed. Moreover, neither category always applies to any one attribute of style, and many artifacts or artifact attributes can be categorized as both passive and active at different points in their life history. For example, during migration some attributes that were previously low visibility (passive) may become high visibility (active) in a new social context.
Since the categories of passive and active style assume a consistency that does not exist, I feel it is more useful to approach the study of style with an awareness that it is defined by multiple artifact traits. The concept of style has been widely debated, but the important point for this study is that a focus on technological style can help us understand the difference between migration and the reorganization of exchange.

**Technological Style and Chaîne Opératoire**

Archaeologists have become increasingly aware that material culture plays a significant and active role in the creation of social identity, that the use of style to signal social or ethnic boundaries is largely situational, and that style cannot be separated from form, function, or technology (Hegmon 1992:522; see also Dietler and Herbich 1998; Hodder 1991; Sackett 1990; Lechtman 1977; Lemonnier 1992; Wiessner 1983, 1984). Wiessner (1983, 1984, 1990) was one of the first to suggest that style could have multiple uses or meanings. For example in her ethnarchaeological study of Kalahari San groups, Wiessner (1983, 1984) proposed that group and personal identity was communicated through the style of arrow points and headbands. These messages evoked by decorative symbols varied among social groups. While there are numerous examples of approaches that recognize the multiple dimensions of style, in this section I focus specifically on technological style, also known as *chaîne opératoire*. Technological style approaches, which focus on the techniques of formation and processes of production, provide a “way of illuminating the series of choices involved at all stages of production, of revealing the cultural and physico-technical context of those choices, and of characterizing differences in technical systems” (Dietler and Herbich 1998:262). Ideally, technological style approaches allow the researcher to investigate several artifact classes. Analysis is then focused on technology or technological systems of a social group or groups. For example, through the investigation of the
techniques of ceramic vessel production, through a technological style approach researchers also focus on clay procurement, clay preparation, and firing technology. Thus, technological style approaches provide a baseline for investigating the social relationships between people and groups, acknowledge the possibility of culture change through small-scale processes, and provide a theoretical baseline from which to investigate migration and the reorganization of exchange networks.

Numerous studies have argued for the value of technological characterizations of material culture as a basis for assessing transformation processes (e.g., Carr 1995a; Clark 2001; Cordell and Habicht-Mauche 2012; Dietler and Herbich 1998; Dobres and Hoffman 1994; Eckert 2008; Gosselain 1998; Lyons 2003; Stark et al. 1998). Unlike the Western tendency to view technology as a unilinear process (Pfaffenberger 1992), the premise of these studies is that technical choices made during the production of material culture are dynamic and socially negotiated practices. Choices made during production are also linked to broader social structures such as the organization of production, gender roles, and the historical context of individuals and groups (Costin 1998; Dobres and Hoffman 1994; Dietler and Herbich 1998; Jones 2005; Gosden 2005). Through these technical choices, individuals consciously and unconsciously construct their identities. Technological style integrates practical knowledge of specific production techniques and embeds socially specific worldviews into material culture (Dobres and Hoffman 1994:215). Proponents of the technological style approach maintain that since many of the attributes and production techniques can only be learned during the production process, first-hand knowledge is required in order to replicate the object(s). In other words, attributes such as ceramic tempers or the procurement location of clay represent learned behaviors that are difficult to emulate.
without close interaction or shared learning frameworks (e.g., Carr 1995a; Clark 2001:6-22; McBrinn 2008).

Technological attributes can highlight learned social behaviors, and can therefore provide evidence for new or previously existing social networks at the Black Mountain site and throughout the Mimbres region. I examine the procurement locations of clays (Chapter Six) before, during, and after the Classic to Black Mountain transition in order to evaluate replacement, reorganization, and/or continuity of populations. I am specifically interested in the social relationships embodied in the technological style of material culture (Lechtman 1977). Following Rice (1987:201; see also Lechtman 1977), technological style highlights that “experience and custom combine to establish a body of information and practice governing the manufacture of pottery vessels, from choice of resources to procedures of shaping and firing, resulting in a characteristic final product with a unique range of properties.” Although Rice (1987) is specifically referring to the technological style of pottery, this idea is easily applicable to any type of material culture where numerous choices are available during the production process. An examination of these production choices for pottery at the Black Mountain site can provide insight into the social connections of individuals making these choices.

Technological style is a recursive practice because it is not simply a passive replication of custom, but rather allows for both the reaffirmation and transformation of social practices, values, and worldviews (Lechtman 1977, 1984, 1993; Dobres and Hoffman 1994:217-218). Through an investigation of Andean metallurgical technology, Lechtman (1977) revealed that since gold and silver were symbolically connected to the sun and the moon in Andean cosmology, instead of simply coating objects with these alloys, metallurgists took extra and more laborious steps to incorporate the metals into the body of finished objects. Both techniques
(surface application and incorporation) would have given the objects a silver or gold appearance; however, the incorporation method allowed the essential ingredient to be embedded “into the very body of the object” (Lechtman 1984:30). The concept of technological style acknowledges that individuals “act strategically within historically specific contexts and within culturally defined boundary conditions” or social structures (Dobres and Hoffman 1994:223). Since the creation of material culture is socially constituted and is informed by the social structure, individuals act within and upon these social structures through the creation of material culture and in their daily behaviors, or practice (Bourdieu 1977; Giddens 1984; Rapoport 1982). Therefore, the production of material culture allows for the reproduction as well as the modification of social structures. As such, the technological style approach is beneficial because it recognizes that individuals play an active role in culture change.

One additional benefit of the technological style approach is that it highlights the importance and usefulness of investigating numerous artifact classes (pottery, flaked stone, architecture) and examining these objects throughout their life history (production, consumption, and deposition) (e.g., Appadurai 1986; Dietler and Herbich 1998; Dobres and Hoffman 1994; Jones 2005; Kopytoff 1986; Lemonnier 1984; Wallis 2011). Lemonnier (1984) surveyed several artifact classes among the Anga of New Guinea, including barbed arrows, houses, and hearths, and found that each artifact class provided different insights into the identity of individuals and groups. Since group and individual identity is nested and context-specific (Barth 1969), each artifact class may provide additional insight into the complex makeup of groups and individuals. In this study, both pottery from the Black Mountain site provide evidence that can be used to track transition.
Dietler and Herbich (1998:235) provide an important critique of earlier studies and suggest that techniques, defined as “human actions that result in the production or utilization of things,” should be used to understand the relationship between things (or physical entities that occupy space) and society. They suggest that approaches focusing solely on the symbolic expressions of style emphasize use and consumption while often ignoring the production processes and technological style of artifacts (cf. Hodder 1982). However, since Dietler and Herbich (1998) only stress the technological aspects, or *chaîne opératoire*, of material culture during the production phase of artifacts, their study provides a limited view of the changing meaning of objects over time. Since some technological style studies do not consider pre- and post-production processes, they can tell us little about the multiple and malleable uses of artifacts at different points in their life histories. In the following section, I discuss how life history approaches can complement investigations of technological style and help to differentiate between changes in exchange networks and migration processes in the Mimbres region around 1150.

**Object Life History Approaches**

For the past three decades, archaeologists have acknowledged that material culture is inextricably entangled in the social lives of people (e.g., Appadurai 1986; Gosden and Marshall 1999; Jones 2002; Kopytoff 1986; Wallis 2011). Methods utilizing an object life history or object biography approach focus on human and object histories to examine how they inform one another. This concept moves away from the “use-life” approach in which “analyses do not address the way social interactions involving people and objects create meaning” (Gosden and Marshall 1999:169). Life history approaches also acknowledge the flexible use and meaning of objects. This perspective is useful for examining the dynamic relationship of people and objects
over time and how the expression of social identity is manifested in objects (Jones 2002; Wallis 2011).

Gosden and Marshall (1999:174) observe that “objects do not have to be physically modified to acquire new meanings, nor do they have to be exchanged. Contexts other than exchange create meanings and produce object biographies.” Although this dissertation focuses on the social and material processes behind exchange and migration, numerous artifacts and artifact classes within the study represent items that were made locally. These artifacts provide important detail on social, political, and economic connections that remained consistent during a period of overarching change. They also help us grasp the dynamic and nested process of identity creation, formation, and renegotiation.

Since the life history approach examines the “status of pots [or objects] in relation to people…in order to fully understand how this relationship is brought about, it is essential to examine the way in which pots [or objects] are produced, used, and deposited by people” (Jones 2002:106 emphasis in original). In other words, objects also have a dynamic history through their creation (production), use (consumption/exchange/reuse), and discard (final deposition). While these are not the only steps in the life of an object (archaeology and museum display are examples of how an object’s meaning may continue to change hundreds of years after its creation), these stages provide a method to examine pottery at the Black Mountain site. By investigating the use and meaning of objects through these stages, the object life history approach provides a history of human practice through the use of objects. Thus, it allows archaeologists to see changes and/or continuity in human practice and behaviors. Examining object life histories at both site and regional levels allows for an understanding of broader social relations associated with production, use, exchange, and deposition. Although this is not a
completely new concept in archaeological research (e.g., Schiffer 1972, 1985), the life history method emphasizes that production, function, and symbolic value of objects are linked (Jones 2002; Wallis 2011). By considering all of these aspects, the archaeologist can gain greater insight into the relationship between objects and human practice.

Life histories can be traced for both individual objects (from creation to discard) and for artifact classes (e.g., pottery, obsidian, households) (e.g., Gosden and Marshal 1999; Jones 2002; Lemonnier 1984; Wallis 2011). Tracking groups of artifacts or artifact classes is an important method when considering the transformation in the Mimbres region. Wallis (2011:20) urges archaeologists to complement object biographies with a history of practice, or as he calls it a genealogy of objects (see Gosden 2005; Pauketat 2001; Pauketat and Alt 2005; Woolf 1998). This history of practice “refers to a historical concern with descent lines of material forms and their modification through time and space, paying particular attention to how things of different origins and histories are put together in coherent ways” (Wallis 2011:20). By tracking classes of objects, such as the use, exchange, and discard of various pottery types during the Classic and Postclassic periods, we can start to unpack the specific ways social structure stayed the same or changed. At the Black Mountain site, clay sources (one aspect of production), exchange, use, and final deposition of pottery are compared to the Classic Mimbres phase. This approach examines the technological choices represented by utilization of clay and obsidian sources and the object life history of the pottery from creation to final deposition. These attributes are tracked over several periods to examine the history of practice of this object class. Varied use of obsidian sources and exchange are tracked from the Late Pithouse period to Cliff phase. While these processes are not explicitly technological attributes, they provide valuable information for understanding the transition.
Pauketat and Alt (2005) show that by tracking the technological style and the history of practice of a class of objects (post molds and wall construction), archaeologists can observe changes in social organization and see how people reference the past. Near Cahokia, early wall construction methods necessitated help from numerous individuals and required the excavation of individual post molds. After the introduction of wall trenching techniques from the political center of Cahokia, a single individual could construct a household, thereby lessening the reliance on familial or communal labor. During this period, Cahokia’s influence was increasing and the identities of surrounding communities were being renegotiated. Although the new technique from the political center was more efficient, some people continued to dig individual post molds beneath the wall trenches.

Pauketat and Alt (2005) suggest that the combination of the new (less laborious) and old (now unnecessary) techniques highlights the increasing influence of Cahokia as a political center and marks the importance of the communal effort in the creation of households and community identity formation. Around the same period, ceremonial centers erected large marker posts in the center of plazas. Since the setting of these large posts was labor intensive and a communal event, the authors suggest this practice also referenced the importance of communal construction efforts. By tacking this artifact class over a long period of time and in various contexts, we can see changes in social structure and practice as well as the historical context of the people who created these objects. This example highlights how at times continuity is imbedded in change.

In the Mimbres, the dramatic change in material culture almost certainly implies some type of social reorganization. By situating technological style and object life histories in historical contexts (object genealogies), we can move beyond the observation that material culture has changed and refocus our gaze on the specific processes behind the change. As the
examples from Cahokia illustrate, these methods allow us to begin to define nested identities, view the shedding of previous identities, and examine the recreation of identity in a historical context. Since I am interested in developing a diachronic perspective on the changes seen in the Mimbres region between A.D. 1150 and 1450, technological style analysis, life history methodologies, and object genealogies are important methods for this research. The obsidian data from the Black Mountain site and the Mimbres region provide a diachronic perspective, but the dataset does not allow for a detailed an investigation of object life history or technological style.

Although Jones (2002:85-87) notes that the life history approach is useful for examining the dynamic relationship of people and objects over time and how the expression of social identity is manifested in objects, he suggests that there are material/environmental constraints that should be considered in analysis (contra Gosselain 1998; but also see Arnold 1985; Costin 2000). In other words, the physicality of things can enable or constrain aspects of social life. Therefore, the materials used in the production of objects must be socially informed and culturally appropriate as well as physically appropriate for the creation of that object.

While the materials available to people are at times limited by the environment, because the environment is not necessarily external to social processes, the landscape also has a life history which is involved in the creation of the subjectivity of the people that use these places (e.g., Basso 1996; Bradley 2000; Joyce 2006, 2009, 2010). Joyce (2006:83) argues that a life history perspective is also important for analyzing landscape because “the way in which people organize space, including how they conceptualize and alter landscapes, are important aspects of structure that both shape and are shaped by social action.” In the case of the Black Mountain site,
procurement of clay and obsidian is also influenced by both social and environmental factors, a point that I develop further in Chapters Six and Seven.

**Bringing Together Technological Style, Object Life Histories, and History of Practice**

Several archaeologists have suggested that because “style” has such a wide range of definitions and carries so much conceptual baggage, it impedes, rather than helps, examination of the diverse meanings and uses of material culture (e.g., Dietler and Herbich 1988; Dobres and Hoffman 1994; Jones 2002). Use of the term “style” tends to blur the important questions researchers are trying to answer in their investigations. However, since many studies utilizing *technological style* recognize that techniques of production are socially informed, this term is still useful if linked with the concept of *object life history*. When analysis of technological style is coupled with object life history approaches, it can be used to unpack the practical knowledge of groups, uncover socially specific worldviews embodied in material culture, and acknowledge the malleable relationship between people and objects. When coupled with population estimates and chronological refinement of the periods after A.D. 1150, technological style, the examination of numerous artifacts classes and their history of practice, and object life history approaches provide a useful line of inquiry to investigate social processes in the Mimbres Valley. Since numerous social mechanisms are responsible for the appearance of new material culture and material culture is socially constituted, this dissertation draws on technological style studies (Dietler and Herbich 1998; Dobres and Hoffman 1994; Lechtman 1977; Lemonnier 1984, 1992) and the object life history approach (Appadurai 1986; Gosden and Marshall 1999; Jones 2002; Kopytoff 1986; Wallis 2011) to investigate the social processes behind exchange and migration. Below, I outline how these methods are applied in the Black Mountain site study.
Applying Perspectives on the Multiple Dimensions of Style at the Black Mountain Site and in the Mimbres Region

High and low visibility attributes provide useful lines of inquiry when investigating migration and the reorganization of exchange (Cabana and Clark 2011; Clark 2001, 2011; Stark et al. 1998; Zedeño 1998). Such analyses have been critiqued because high and low visibility attributes are context-dependent (Ortman and Cameron 2008). Artifact attributes are unstable because their meaning can change with migration or changes in exchange patterns. High visibility attributes, or attributes that are easily emulated, can provide information on broad-scale and regional connections (Beekman and Christensen 2003; Eckert 2008; Peeples 2011; Wiessner 1984). I suggest that tracking how objects are emulated in a region plays an important role when trying to distinguish whether a dramatic change in material culture represents shifts in exchange networks, migration, or some combination of these social processes. More importantly, by examining both regional (interactions that occur less frequently) and local (face-to-face/frequent interactions and shared learning networks) ties among and between groups through space and time, archaeologist can begin to unpack both local and regional changes, thereby providing a broad scale analysis of change (see Wallis 2011).

In order to understand the social relationships behind exchange and migration, this dissertation focuses on the examination of: 1) classes of material culture (including its distribution, source, and variation across time and space); 2) the life history of object classes (how they were made and used through time and the sociality associated with the creator and user); and 3) how various classes of objects are connected to each other and human social life. By focusing on these elements, we can view the social practices responsible for changes in material culture, such as exchange and migration (Dietler and Herbich 1998; Gosden 2005; Jones
In the Mimbres Valley, I propose, provisionally, that if attributes are consistent through time, especially in production zones, this suggests continuity of population from the Classic to Postclassic periods. If attributes such as clay sources are not consistent over time, this provides evidence for the immigration of new populations. Finally, if there is a diversity of production zones between the Classic and Postclassic, this provides evidence for both migration and the continuity of populations (Table 3.1). The reorganization of exchange networks could signal migration and/or the continuity of populations. Here it is important to consider the history of practice of the object classes. For example, in the Mimbres region, burials during the Classic Mimbres were frequently flexed inhumations with a killed bowl placed over the head of the deceased. This signature continues during the Black Mountain phase and is an uncommon practice in other regions (Creel 1999; Taliaferro 2014). The pottery types used in this practice change, but many were locally produced with clays from sources that were used during the Classic Mimbres. Since this practice relates to the ideology of the people in the region, it provides evidence for the continuity of populations, even though burials are considered a high visibility attribute (Clark 2001; Table 3.2).

**Methods for Examining Social Reorganization**

The preceding review of the anthropological and archaeological literature on exchange, migration, technological style, and object life histories provides the theoretical groundwork for the exploration of social reorganization in the Mimbres region from A.D. 1150 to 1450. In order to explore the processes behind the transition and reorganization, four principal data sets are utilized.
### Table 3.1 Expected Compositional and Technological Attributes of Ceramics and Obsidian

<table>
<thead>
<tr>
<th>Attributes</th>
<th>Evidence</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Correspondence</td>
<td>Shared learning frameworks, close interaction</td>
<td>Continuity of populations</td>
</tr>
<tr>
<td>Non-correspondence</td>
<td>Appearance of new learning frameworks, new economic/social networks</td>
<td>Replacement of populations (Migration)</td>
</tr>
<tr>
<td>Diversity</td>
<td>Shared and appearance of new learning frameworks, new and old economic/social networks</td>
<td>Reorganization of social networks, with continuity of some populations as well as possible immigration</td>
</tr>
</tbody>
</table>

### Table 3.2 Summary of Scale of Social Relationships

<table>
<thead>
<tr>
<th>Analytical Goal and Technique</th>
<th>Type of Data</th>
<th>Life History Phase</th>
<th>Scale of Social Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identification of production zones using NAA</td>
<td>Ceramics (Utility/Plain wares)</td>
<td>Production and Exchange</td>
<td>Local</td>
</tr>
<tr>
<td>Identification of production zones using NAA</td>
<td>Ceramics (Decorated wares)</td>
<td>Production and Exchange</td>
<td>Regional</td>
</tr>
<tr>
<td>Identification of production zones using Petrography</td>
<td>Ceramics (All wares)</td>
<td>Production and Exchange</td>
<td>Local and Regional</td>
</tr>
<tr>
<td>Identification of production zones using XRF</td>
<td>Obsidian</td>
<td>Production and Exchange</td>
<td>Local and Regional</td>
</tr>
<tr>
<td>Tracing use of ceramics through time</td>
<td>Whole vessels from Classic and Postclassic sites</td>
<td>Use</td>
<td>Local and Regional</td>
</tr>
<tr>
<td>Comparing final deposition of ceramics through time</td>
<td>Whole vessels from Classic and Postclassic sites</td>
<td>Final Deposition</td>
<td>Local and Regional</td>
</tr>
</tbody>
</table>
Population data are critical for understanding the Mimbres region before, during, and after the transition, and these are reviewed and developed in Chapter Four (Blake et al. 1986; Hegmon 2002; Hegmon et al. 1999; Peeples 2010; Taliaferro 2014). Population estimates provide a baseline for exploring whether the transformation is a result of exchange and/or migration. Although there are not detailed population estimates for the periods after 1150, this baseline estimate still provides important data for the questions at hand and for comparison to earlier periods. The next step is to reexamine chronology data for the Black Mountain and Cliff phases (Taliaferro 2014). These data are then compared and compiled with data from the BMAP excavations (Putsavage 2013). These data sets, population estimates, and chronology are presented in Chapters Four and Five.

In order to examine the nature of the transformation, ceramics are analyzed from a technological style and life history perspective. Investigation of both regional and local social interactions provides important data for understanding the processes behind the transformation. Chapter Six examines the technological style and life histories of ceramics from the Black Mountain site and the region to shed light on the changes seen around 1150. Chapter Seven analyzes local and regional exchange of obsidian over a 450-year period to gain insight into the nature of the transformation to provide a diachronic perspective of the transition.

To examine local interactions, I investigate the production/source locations of ceramics through NAA and obsidian through XRF at the Black Mountain site (LA 49). For the Mimbres region, a data set compiled and analyzed by Speakman (2013) includes around 3,600 NAA samples from sherds, whole pots, and raw clay, representing the entire regional chronology (see Speakman 2013). These samples come from around 165 sites. XRF analyses of obsidian provide data from the entire sequence and contain around 1,000 obsidian samples from over 80 sites.
These rich NAA and XRF datasets allow me to trace the movement of ceramic vessels and obsidian found at the Black Mountain site to determine how the site fits into regional social networks over time. Since NAA and XRF track choices of clay, temper, and obsidian source utilized during the production phase of pottery and obsidian flakes and tools, when compared to other source data for the region these analyses provide information on the social connections of people at the Black Mountain site. Similarities in choices of clay, temper, and obsidian source locations may show connections between the Black Mountain site and other sites within the region. I also use petrographic and macroscopic analysis of ceramic tempers as well as source location of obsidian to track interactions at a site and regional level. These technological attributes of ceramics provide information for assessing face-to-face interactions of people at the Black Mountain site (Carr 1995a; Clark 2001; Dietler and Herbich 1998; Dobres and Hoffman 1994; Eckert 2008; Lechtman 1977; Lemonnier 1984). Since these technological features often vary in relation to the degree of interaction among producers, evidence of shared technological practices suggests common historical contexts and frequent interaction (e.g., Carr 1995a; Cordell and Habicht-Mauche 2012; Clark 2001; Dobres and Hoffman 1994; Peeples 2011).

To examine regional interactions, I extend the sourcing analyses of ceramics and obsidian to other sites in the region. I argue that settlements or groups of settlements involved in common spheres of exchange likely represent groups that were interacting on a regular basis. By utilizing two data classes and investigating these classes through time, I can trace how networks may have changed and if ceramic and obsidian exchange networks were linked in any way. I also suggest that exchange of various ceramic wares (Playas Red Wares, Salado Polychromes, Chihuahuan polychromes, corrugated, plain ware, etc.) may represent another type of social connection and/or exchange network among the inhabitants of the Mimbres region. Research has shown that
different ceramic wares held varied values and these values were often related to how the objects moved within and between regions (e.g., Arnold 1985; Clark 2001; Eckert 2008; Peeples 2011; Stark et al. 1998). Thus, a comparison of these various ware types provides additional information on the creation and renegotiation of social connections through time.

For this analysis, pottery types are grouped by ware because the distinction between utilitarian and decorated ceramics sets up a possibly false dichotomy and one that may not have been recognized by or meaningful to prehistoric peoples in the American Southwest. Carbon and mineral paints are not the only “decorations” seen on Southwestern ceramics (see Hegmon et al. 2000:224). Many “utilitarian” wares, such as Playas Red Incised or corrugated wares, have visible alterations on the exterior of the vessel. With the Playas series ceramics especially, it seems very likely that these decorations held meaning. While pottery typologies have also been critiqued for applying modern categories in the analysis of prehistoric goods (e.g., Ford 1938, 1952, 1954a, 1954b, 1954c; Spaulding 1953a, 1953b, 1954a, 1954b), these categories probably approximate how prehistoric peoples would have viewed these goods, since they are based on similarities among wares in paint design, temper types, paint colors, clay types, and so forth.

Although ceramic types changed dramatically around A.D. 1150, examination of the use, consumption, and final deposition of ceramics at sites throughout the region provides information on whether ceramics were being used in similar ways during earlier periods. For example, since pottery types changed (production of Mimbres Black-on-white ceased and new types such as Playas Red Wares and a variety of polychromes appeared), if production techniques, clay and temper sources, consumption, and final deposition remained the same for these new types, this may suggest people were turning their back on the old ways. On the other
hand, if the new ceramic types were created with new clays and tempers or used in different ways this could suggest an influx of new populations.

Chapter Five also provides a brief examination of the construction techniques of walls of the eastern and western pueblos at the Black Mountain site. Wall construction represents a technological choice made during the creation of the pueblos. Walls excavated during the 2012 season are compared to wall construction techniques from earlier Classic Mimbres phase sites. This investigation provides preliminary evidence on the technological style of wall construction.

**Additional Methodological Considerations**

Many attributes and features that would be useful for addressing the questions posed in this study are unavailable because of the heavy impact of looting at the site. Although stratified deposits were intact at some portions of LA 49, allowing collection of material for radiocarbon analysis, portions of all rooms excavated were disturbed. Comparisons of room layout and features between sites provide an additional line of technological style data important for understanding close social interactions (Peeples 2011; Nelson et al. 2006). While BMAP was able to collect some preliminary data on room layout and room features, the impact from looting and road grading limited the data available for these attributes at the Black Mountain site. Thus these data do not permit a productive comparison with other Black Mountain and Cliff phase sites in the Mimbres. BMAP was able to excavation a portion of five rooms in the Black Mountain component and portions of two rooms in the Cliff phase component. These data are an ongoing focus of excavations at Black Mountain.

Since a majority of the pottery sherds were 3 x 3 cm or less (n = 4,030 (85%)), the sample did not lend itself to detailed analysis of design layout or forming techniques. Whole pots work best for analyzing design layout, but it is generally accepted that sherds 3 x 3 cm or larger
are needed for a detailed design layout analysis (see Eckert 2008; Orton and Hughes 2013; Peeples 2011; Rice 1987). Although corrugation type is known to be a useful tool for tracking technological style and forming techniques, only 17 (n = .003%) sherds were large enough to examine corrugation type. A statistically robust analysis cannot be conducted on a sample this small, so corrugation was not considered. Recent work in archaeology suggests that design analysis (a high visibility attribute) can provide important information on regional and broad-scale connections, and such an analysis would have been useful for this study (e.g., Eckert 2008; Huntley 2004; Peeples 2011; Wallis 2011; see also Ortman 2012; Ortman and Cameron 2008 for complementary discussion of instability of attributes). Unfortunately, no whole vessels were recovered and most sherds were too small for this type of examination. Since these missing data limit parts of the analysis, investigation of the choices made during production (clay/temper sources used and the social and environmental constraints on these sources) play an important role in this study. Additional data on whole pottery from other sites that reflect the use and final deposition of Black Mountain phase ceramics supplement the Black Mountain site data.

Because this study utilizes ceramic sherds and obsidian from surface collections and midden and room fill, information about the use and consumption of these objects is not always complete. Ceramics found in different stratigraphic levels are analyzed to see if there are similarities or differences in type and ware through time. These stratigraphic data provide a baseline interpretation of the use of ceramic types. To supplement data on the consumption of ceramics, I utilize previous research for what it can tell us about the similar and/or changing uses of ceramic vessels in the Mimbres region through time (e.g., Creel 1999; Shafer 1999; Taliaferro 2014). Even though the data do not allow detailed interpretations of the consumption of material
culture, they provide a deeper understanding of the malleable life history of objects by investigating several stages in the life of these objects.

Since there is little direct evidence in the Mimbres region of specific production locations of pottery, such as kilns, firing pits, and production workshops (Cosgrove and Cosgrove 1932; Shafer and Drollinger 1998), chemical characterization techniques constitute the main method for examining production locations and exchange (Bishop et al. 1982; Burton and Simon 1993; Glowacki and Neff 2002). For the investigation of ceramic exchange networks, researchers rely on the principle of criterion of abundance, which suggests that the most frequent compositional groups are found closest to their production loci (Bishop et al. 1982; Neff and Glowacki 2002). In other words, the most common chemical signature present in pottery from a specific site can be assumed to be local. The geology of the Mimbres region provides enough diversity that clays and ceramics can usually be traced to production regions (Creel et al. 2002). Since the region has a rich NAA dataset, comparison to previous studies also strengthens arguments for production locations (Brewington et al. 1996; Creel et al. 2002; Brewington and Shafer 1999; Gilman et al. 1994; James et al. 1995; Schriever 2008; Speakman 2013; Taliaferro 2014). Although this convention is not ideal, it is a standard for NAA studies (Bishop et al. 1982; Neff and Glowacki 2002).

While the most common NAA group at a site may not be made locally, when NAA data are examined at a regional level this method can allow for comparisons of similarities in exchange networks and social connections within the region and among sites. Although this method has some limitations (raw clay sources do not always have the same chemical signature as fired pottery due to the addition of tempering materials), this model provides a baseline method for estimating local pottery types when local clay sources are unknown. Sourcing
analysis for ceramics also relies on the comparison of compositional groups among numerous projects. These studies can provide detailed information about regional exchange and source locations. Once the chemical signatures of pottery from different source locations have been determined, exchange between production loci can be inferred.

Summary

How can archaeologists distinguish between evidence of changes in exchange patterns and the appearance of new migrants? Detailed population estimates and a refined chronological scale are key to understanding these different social processes, but few sites and regions have the level of detail necessary to differentiate and define these processes (Cabana 2011; Cabana and Clark 2011; Clark 2001, 2011; Ortman and Cameron 2008). Therefore, this dissertation incorporates methods such as object biography and analysis of technological style. Several artifact classes covering a 450-year period are used to investigate and differentiate between exchange and migration. Utilizing this suite of approaches, I develop a framework that begins to distinguish changes in exchange patterns from migration of new populations when refined population estimates and chronological data are unavailable. This method provides details on the social, political, economic, and historical contexts of transformation and, therefore, steps away from viewing migration and exchange as simple explanatory models.
CHAPTER IV

POPULATION ESTIMATES FOR THE MIMBRES REGION,
CLASSIC MIMBRES TO CLIFF PHASE (A.D. 1000 TO 1450)

Introduction

As reviewed in Chapters One and Two, debate surrounding the Classic to Black Mountain transition concerns whether the changes seen in material culture represent the immigration of new populations, internal social changes, or some combination of these scenarios. As proposed in Chapter Three, shifts in exchange and migration are both socially constituted processes (Anthony 1990; Sahlins 1972, 1995) and reflect exposure to new material culture and ideas. Therefore, both processes could be responsible for the changes seen around A.D. 1150. Previous research (reviewed in Chapter Three; Cabana 2011; Cabana and Clark 2011; Clark 2001, 2011; but see also Abbott 2003; Cameron 2008, 2011, 2014) advocates that archaeologists must demonstrate a population increase in order to propose that migration is responsible for cultural change. However, in this chapter, I suggest that because people started to leave the Mimbres region as early as A.D. 1130, it will be difficult to determine through population estimates alone if small groups of migrants were moving in at the same time. How can archaeologists distinguish among the reorganization of exchange, the appearance of migrants, and some other scenario, especially during a period when population is declining overall?

Below, I examine the link between environmental change and population reorganization. Previous research has shown that both environmental and social factors influenced the population decline around 1150 (Creel 2006c; Minnis 1978, 1985; Hegmon et al. 1999; Nelson and Hegmon 2001; Nelson et al. 2011; Nelson and Schollmeyer 2003; Schollmeyer 2005). Next, I briefly review archaeological approaches to population estimation. Few regions
around the world have the data (preservation, survey coverage, and precise chronological controls) necessary for precise population estimates (Chamberlain 2006; Hassan 1978; Peterson 1975). This is also the case for the Mimbres region. Through the review of previous population reconstructions for the Mimbres region (Blake et al. 1986; Lekson 2006; and Peeples 2010), I highlight how archaeologists have considered these issues in the Mimbres. The Mimbres region population estimates for the periods before and after A.D. 1150 provide a baseline for evaluating whether the transition represents the immigration of new groups, the continued occupation of previous populations with the reorganization of economic and social networks, or some combination of these events.

Environmental Change and Population Reorganization

Environmental change and population reorganization are closely linked, but several scholars have noted that environmental factors, such as drought or flooding, are not the only factors that influence people to reorganize, migrate, or shift settlement patterns (Gutiérrez 2011; Kohler et al. 2010; Nelson et al. 2011). Environmental changes rarely directly correlate with population reorganization and social shifts because people respond in a variety of ways (Crumley 1994; Gutiérrez 2011; Kohler et al. 2010; Schollmeyer 2011; Wilkinson 2003). In other words, there is usually a delay before the social and political impacts of environmental change become evident. These are important considerations for the Mimbres region because there is strong evidence that population reorganization seen at the end of the Classic Mimbres (ca. 1150) was in part a response to deteriorating environment conditions and drought that began in the 1130s (Creel 2006c; Minnis 1978, 1985; Nelson 1981; Nelson and Diehl 1999; Nelson and Schollmeyer 2003; Schollmeyer 2005). While the environmental factors in the Mimbres were an underlying cause for the shifts around 1150 (e.g., Minnis 1978, 1985), social factors may also
influence the reorganization of economic and social networks (Hegmon et al. 1999; Nelson and Hegmon 2001; Nelson et al. 2011). Nelson and Schachner (2002:186) suggest that if “movement is viewed as strategic in a long-term pattern of land use rather than as the result of a failed attempt to live in a particular settlement arrangement” then we can consider the social processes that lead to phases of “aggregation” and “dispersion.” Since other regions in the southern Southwest were experiencing more severe drought conditions (Creel 2006c; Chapter Three), some groups may have seen the population decline as an opportunity to move into the Mimbres Valley.

**Archaeological Population Estimates**

Population estimates for archaeological regions and sites provide an important baseline for any archaeological study (Chamberlain 2006; Hassan 1978; Peterson 1975; Schacht 1980; 1981; Shennan and Edinborough 2007). For the present study, population estimates are key because numerous researchers (Anthony 1990; Duff 2002; Clark 2001; Cabana and Clark 2011; Ortman and Cameron 2008) have noted that it is difficult to evaluate whether migration or shifts in exchange patterns were driving processes behind the transition if a demographic increase cannot be demonstrated. Although these researchers make an important point regarding the difference between migration and exchange, the accuracy and comparability of prehistoric population estimates has been questioned (e.g., Hassan 1978; O’Brien and Lewarch 1992; Peterson 1975; see also Lekson 2006:48-49). Numerous methods have been established to approximate population size and track shifts in settlement locations. These include, but are not limited to, estimating population on the basis of floor/living area (Brown 1987; Dohm 1990; Kolb 1985; LeBlanc 1971; Naroll 1962; Wiessner 1974), number of artifacts (Cook 1972; Hassan 1981), site area (Ortman et al. 2014; Schlanger 1987), counts or sizes of specific
architectural features or arrangements (Bernardini 1999; Ciolek-Torrello and Reid 1974; Lightfoot 1994), amount of food refuse (Cook 1972), and number of burials (Anyon and LeBlanc 1984:190; Cook 1972; Hassan 1981). Even when these data are available, they are frequently inaccurate, incomplete, unreliable, or not easily compared with data collected by different methods (Blake et al. 1986; Chamberlain 2006; Hassan 1978; Lekson 2006). Still, population data are essential, and I review population estimates for the Mimbres Valley while keeping in mind their possible shortcomings. I then examine the link between environmental change and population reorganization, and suggest that this was one of many factors that influenced the transition (e.g., Minnis 1985; Nelson and Schollmeyer 2003; Schollmeyer 2005, 2011).

**Population Estimates for the Mimbres Region**

During the 1970s, the Mimbres Foundation proposed the Black Mountain phase (A.D. 1175 to 1300) and the Cliff phase (ca. A.D. 1425) as two new phase designations for the Postclassic (LeBlanc 1977:1). Researchers noted similarities between the Black Mountain phase and the Casas Grandes cultural system, while the Cliff phase represented “an occupation of the valley…by people believed to be related to the Salado culture of Arizona” (LeBlanc 1977:11, 13). Based on material correlates such as adobe room blocks, burials practices, and Chihuahuan polychromes, Mimbres Foundation researchers suggested the people living in the Mimbres Valley during the Black Mountain phase had social ties to the Casas Grandes regional system (LeBlanc 1977, 1980b). Mimbres Foundation scholars also noted possible social connections between people living in the Mimbres Valley during the Cliff phase and the “Salado culture of Arizona” (LeBlanc 1977:13, 1980b; LeBlanc and Nelson 1976). This connection was hypothesized because of the presence of Roosevelt Red Wares at Cliff phase sites in the Mimbres Valley.
The Mimbres Foundation suggested that only some parts of the region were completely depopulated and that resident populations re-aggregated in the Lower Mimbres Valley and southern portions of the region (LeBlanc 1977; LeBlanc and Whalen 1980; see Chapter One and Two). Initially, LeBlanc (1977:16) suggested that the populations of the Black Mountain phase represented groups of unrelated people—in other words, the populations inhabiting the Black Mountain phase were both resident and migrant groups.

As detailed in Chapter Two, Anyon and colleagues (1981) suggested a rapid end to the Mimbres-Mogollon sequence and proposed that populations living in the Mimbres Valley were not socially connected to people from the Classic Mimbres phase. This “abandonment” perspective was advocated because of the obvious shifts in material culture. Subsequent research coming out of the Mimbres Foundation survey and excavations focused on questions surrounding cultural continuity and discontinuity. Debate focused on whether the region was depopulated around 1150 and then re-inhabited about 50 to 75 years later by groups from other regions or whether people remained in the region and reorganized social, economic, and political systems.

Several researchers have reconstructed populations in the Mimbres region (e.g., Ackerly et al. 1988; Blake et al. 1986; Lekson 1989a, 2006; Peeples 2010; Minnis 1985). Below, I review the population estimates provide by Blake and colleagues (1986). I then examine the critiques provided by Peeples (2010), Lekson (1989a, 2006), and Taliaferro (2014). Next, I summarize the most recent data provided by Peeples (2010) and Taliaferro (2014). Although more recent research has included the Black Mountain site in estimates (see Peeples 2010), the BMAP has further refined the room counts for LA 49 and provided additional insight into population
estimates for the Lower Mimbres Valley during the Postclassic. These were presented in Chapter One and are briefly review below.

As noted by Blake and colleagues (1986:443), the population reconstructions conducted by the Mimbres Foundation faced some challenges because “it was not until the survey was well underway that there emerged an idea of the spatial and temporal patterns of site distribution, and it was only then that boundaries for the sampling universe could be reasonably established.” The survey crews also had limited access to sites on private land. Wide-scale looting impacted many sites on private land. Looting had a severe impact on site preservation, but because of local “interest” in archaeology, landowner knowledge of site locations was an efficient way to document sites even though this strategy was not systematic. Even with these challenges, the Mimbres Foundation survey provides an important baseline for understanding shifts in settlement location and changes in the size and number of settlements in the Mimbres region.

The survey conducted by the Mimbres Foundation covered over 10,000 hectares with greater coverage in the Upper and Middle Mimbres Valley (Blake et al. 1986). The survey located more than 400 sites and excavated 30 of these sites. The survey area was then divided into 12 environmental strata. These strata were used as a basis for evaluating settlement patterns. Following Hassan (1978), the authors use number of rooms and room area at each settlement as a proxy for population. Blake and colleagues (1986:449) note that “the estimates of sites, rooms, and area of rooms are obtained by dividing the observed number for each stratum by the sampling fraction for the stratum.” In other words, the number of sites, rooms, and room area were divided by the portion of the land area survey for each stratum (shown in Blake et al. 1986:Table 3) to create estimates of the actual number of sites, rooms, and room areas. The authors then standardized the variation in total room counts for each period based on the length
of the period. If population estimates were the same for two phases, Blake and colleagues (1986) suggest that there would be more room construction during the longer phase. Therefore, they eliminated the variation in the total floor area for each period and were then able to compare among periods consistently. Using the estimate of sites, rooms, and room areas the authors then calculated use-life of rooms, the number of rooms simultaneously inhabited during the beginning and end of each phase/period. Actual population was calculated by using an estimated household size of four to seven people. The authors note that these actual population estimates are less accurate than the room or room area estimates because an assumption is made about the number of people living in a room at any given time.

Based on these data, Blake and colleagues (1986:439) estimated that the “population grew about 16-fold during the first 950 years of occupation [from A.D. 200 to 1150] and then rapidly declined to its original size by 1450.” Seventeen sites dating to the Black Mountain phase were recorded. Only 12 of these sites were used in the population reconstruction because it was not possible to gauge room sizes for five of the sites. Three Cliff phase sites were recorded. Because LA 49 was only briefly recorded by the Mimbres Foundation survey (the researchers had only a couple of hours at the site), it was not included in the final estimates by Blake and colleagues (Steven A. LeBlanc, personal communication 2010). They suggest that during the Black Mountain phase, the Lower Mimbres Valley was more heavily populated than the Upper and Middle portions of the valley. During the Cliff phase, they propose, “people confined their residences to the Upper and Middle Mimbres” (Blake et al. 1986:461). Since there were only three sites in the Cliff phase sample and there was less coverage in the Lower Mimbres Valley than other strata surveyed, this suggestion may over interpret the data.
The data collected by the Mimbres Foundation suggest a considerable population shift from the Upper and Middle Mimbres Valley to the Lower Mimbres Valley and Deming plain sometime around 1150 (Blake et al. 1986: Tables 7-10). Populations numbered just over 5,050 during the Classic phase and dropped to around 1,150 in the Black Mountain phase (Figure 4.1). The Foundation estimates a population of around 240 for the Cliff phase, but as noted above, this estimate likely underrepresents Cliff phase population. Here it is important to remember that the Mimbres Foundation survey focused on sites around the Mimbres Valley, so groups that moved to the Eastern Mimbres around 1150 are not represented in the sample. Although the Mimbres Foundation survey has since been reexamined (e.g., Peeples 2010; Lekson 2006; Taliaferro 2014), it provided an important first look at settlement patterns and population organization in the Mimbres region over a 1,200-year period.

Lekson (2006) also provides populations estimates for the Mimbres region. He uses ceramic assemblages from sites in six subregions of the southern Southwest to provide time resolution to the survey area. Lekson then provides a summary of room counts for these subregions through time. He acknowledges that he did not “partition total site counts between the various phases at sites with multiple assemblages” (Lekson 2006:55). While this adds some coarseness to the data, it provides an important overall estimate for these regions. The estimates provided by Lekson (2006) also show an overall decrease in population from the Classic Mimbres to Black Mountain phase.

Peeples’s (2010) recent reevaluation of population estimates in the Mimbres Valley utilizes five steps to calculate cumulative population (Figure 4.1). The author defines cumulative population as an “estimate of the total population over the entire course of a site’s use life.”
Figure 4.1 Population estimates for the Mimbres region from Classic Mimbres phase to Cliff phase, by region and subregions. Estimates for the Mimbres region, Mimbres Valley, Eastern Mimbres, and Upper Gila were adapted from Peeples (2010:Figure 3). Estimates from Blake and colleagues (1986) for the Mimbres Valley are also shown.

(Peeples 2010:8). Using detailed site-level data, Peeples first created five site size classes. This scale was then utilized to approximate site size for sites with less detailed site-level information. Then, using the average number of houses (rooms) at sites in each size class, site population was estimated. These results were then used to estimate house counts for other sites in the database “by assigning house counts to the remaining sites by size class” (Peeples 2010:5). Next, the author “developed a range of momentary population estimates for the sites included in the database by considering varying assumptions of site and room use life” (Peeples 2010:5).
Finally, the author used the results from the thoroughly surveyed portions of the study area to estimate populations in unsurveyed areas of the region.

Peeples focused on room counts as the basis for population estimates because room count data were available for a majority of sites in the study area. The five classes of counts (Peeples 2010:Figure 2) reasonably parallel the site size classes created by Blake and colleagues (1986:table 14). Following Nelson and Schollmeyer (2003), these room count estimates were divided into household estimates (see also Gilman 1989; Schollmeyer 2009). Previous research has shown that aboveground rooms vary significantly in size and types of features present (Anyon and LeBlanc 1984; Hegmon et al. 2006; Shafer 1982; Nelson et al. 2006). This suggests that rooms not only functioned as habitation spaces but were also used for a variety of other functions such as storage and food processing. Taking into consideration the varied uses of rooms beyond serving as habitation spaces, Nelson and Schollmeyer (2003) suggest that population estimates must calculate the number of houses--discrete residential units that likely represent the habitation use of a family unit--represented within a structure. This provides a more detailed baseline for estimating population than relying on room count alone. Nelson and Schollmeyer (2003:note 7) go on to suggest that four individuals constitute a reasonable number of people inhabiting one house (see also Schollmeyer 2009:54-55). Peeples uses these data to calculate population estimates, presented in Figure 4.1 (see Peeples 2010:Figures 2 and 3).

Even though Peeples (2010) examined a larger total area in the Mimbres Valley and a larger number of small sites in the Mimbres Valley, his estimates are considerably lower than Blake and colleagues (1986) (Figure 4.1). Peeples’s estimates for the entire Mimbres region, which included the Mimbres Valley, Eastern Mimbres, and Upper Gila, are only slightly higher than Blake’s estimates for just the Mimbres Valley. Minnis (1985) suggests that the high
population in the Mimbres Valley at the end of the Classic may have been a major factor that drove the shift in agricultural strategies and environmental degradation. Eventually, the high population caused increased vulnerability during the drought that began around A.D. 1130, and drove more than half the people living in the Mimbres Valley during the Classic to leave. As noted by Peeples (2010:11), comparing his population estimates with the Mimbres Foundation’s (Blake et al. 1986) indicates that archaeologists need to reevaluate the assumption that overpopulation and resource depletion were the driving factors behind the reorganization of populations around A.D. 1150. Since Peeples’ s (2010) estimates for the Mimbres Valley are considerably lower, it appears that population carrying capacity may not have been reached. Several scholars have noted that social factors also influenced the movement and reorganization of groups around 1150 (Hegmon et al. 1998; Nelson and Hegmon 2001; Nelson 1999; Nelson et al. 2011). Specifically, as highlighted in Figure 4.1 and as shown by work in the Eastern Mimbres (e.g., Hegmon et al. 1998; Nelson and Hegmon 2001; Nelson 1999; Nelson et al. 2011), this region was not as greatly impacted by the 1130 drought. Although it had a lower population at the end of the Classic, fewer people left the Eastern Mimbres than left the Mimbres Valley. However, it is important to note that since the data in all of these estimates are of variable quality, it is impossible to assume a high degree of precision for the population estimates.

Peeples (2010) points out that there are two main reasons that early research (Blake et al. 1986; Minnis 1985) provides inaccurate population reconstructions in the Mimbres region, and he suggests that these original estimates should be placed in a broader regional context. First, research conducted after the Mimbres Foundation survey suggests that population estimates may be higher than expected for some of the periods and phases (e.g., Cameron 1990, 1999:103-105;

Second, as acknowledged by the Mimbres Foundation (Blake et al. 1986; LeBlanc 1977, 1980b), continued research in the region has shown great variability in how populations participated in the transition (e.g., Creel 1999; Hegmon et al. 1999; Hegmon et al. 2006; Lekson 2006; Nelson 1999; Shafer 1999). Lekson (1989a, 2006) highlights one additional concern. Mimbres Foundation research focused on the Mimbres Valley and its immediate tributaries, and did not include the heavily populated Gila and Rio Grande valleys. More recent archaeological investigations suggest that population fluctuations may be attributed to regional relocation rather than complete abandonment of the region (Lekson 2002, 2006; Nelson 1999; Nelson and Anyon 1996; Nelson and Hegmon 2001; Nelson and Schollmeyer 2003).

There are at least three additional reasons why population reconstructions for the Postclassic periods may be too low for some phases and locations (Nelson and LeBlanc 1986; Lekson 2006; Taliaferro 2014). First, Taliaferro (2014:113-114) notes that many of the Classic Mimbres sites also contain Terminal Classic or Black Mountain phase components. The Mimbres Foundation research was a pioneering, large-scale, systemic survey. Since this was one of the first large-scale surveys in the region, the Mimbres-Mogollon sequence and the site attributes of each period (the difference between Classic Mimbres, Black Mountain, and Cliff phases) were not fully understood. Therefore, the survey may not have captured the full chronological range at individual sites. This is particularly true for later Black Mountain and Cliff phases, which both have adobe architecture and similar diagnostic pottery types (see Lekson 2006; Taliaferro 2014). Differentiating these occupations during survey is often challenging because the Terminal Classic and Black Mountain components are often built next to the Classic components (Creel 1999; Taliaferro 2014). Second, Black Mountain and Cliff phase
sites are not as easily visible during survey because the adobe construction does not preserve as well as the cobblestone masonry of earlier Classic phase sites (Nelson and LeBlanc 1986; Taliaferro 2014; see also Ackerly et al. 1988). Third, there is a clear trend through time of locating sites closer and closer to live water (LeBlanc and Whalen 1980; Lekson 2006). Due to this trend in settlement patterns, it is likely that more post-Mimbres sites are obscured by alluvial deposition than sites from earlier periods and phases. For example, the Black Mountain component (Agape Acres) at the NAN Ranch sits under nearly a meter of river sediments and is mainly visible because of the arroyo that cuts through part of the site.

For regional data, I use Peeples (2010) as the basis for my discussion, since his work has the largest coverage and collates the most recent data. His subregional assessment of populations highlights the movement and resettlement in the Eastern Mimbres and shows an increase in the Upper Gila during the Cliff phase (see also Blake et al. 1986; Taliaferro 2014). Peeples’s (2010) regional estimate tracks with Blake and colleagues (1986), except for the shift from the Black Mountain to Cliff phase. Peeples (2010) suggests there were around 900 people in the Mimbres region, while Blake and colleagues (1986) estimate there were around 240 people in the region. Peeples’s projection is higher because he includes the Upper Gila Valley, whereas the Mimbres Foundation did not. Both scholars show a substantial population decrease in the Mimbres Valley from the Black Mountain to Cliff phase. Recent research by Taliaferro (2014:111-119) suggests there are 87 sites surveyed by the Mimbres Foundation which represent Terminal Classic and Black Mountain phase occupations. Of these 87 sites, 51 are inferred to contain structures or artifact scatters that date exclusively to the Black Mountain phase. Taliaferro suggests his estimates are higher because the Mimbres Foundation did not always distinguish sites that had multiple phase occupations. For example, if a site was noted on survey as containing Classic
Mimbres and Black Mountain phase components, it was included in the Classic Mimbres population estimate but not necessarily the Black Mountain phase estimate.

For the Black Mountain site, I follow Peeples (2010) and Nelson and Schollmeyer (2003). As noted in Chapter One, based on the area of Locus 1 (3,500 m²) and assuming an average room size of about 20 m², I estimated that the room count for Locus 1 was about 175. Using the population estimate methods described above, this would suggest a cumulative population of 280 people during the Cliff phase in Locus 1. However, the population estimate could be considerably higher for the Black Mountain phase. As noted in Chapter One, since there may be a large Black Mountain phase component beneath the Cliff phase room block in Locus 1. Figure 1.7 clearly shows two occupations in Locus 1, but BMAP was unable to determine the phase of the earlier occupation due to the lack of diagnostic sherds (Appendix B; Chapters Five and Six). Since the extent of the possible Black Mountain phase room block in Locus 1 is unknown, I do not provide an estimate for the Black Mountain phase populations of Locus 1. This places Locus 2 in the largest site size class for Peeples’s (2010) population estimates. The assessment of the Cliff phase architecture (Locus 1) at the Black Mountain site nearly doubles the previous estimate provided by Blake and colleagues (1986:Table 8). These authors suggest a total of 114 rooms and an estimated 285 rooms in the Upper and Middle Valley during the Cliff phase. They do not note any sites in the Lower Mimbres Valley.

Using this same method, the room block in Locus 2 was estimated to have about 85 rooms (total area was 1,750 m²). This total area does not include the pit structures (pithouses A and B). Pithouse A sits beneath the room block and pithouse B was just north of the room block (Figure 1.4). Therefore, the estimated population for Locus 2 is about 136 people. This also puts Locus 2 in the largest site size class used by Peeples (2010). I feel that for the Black Mountain
site (Locus 1 and 2) it is important to consider that these estimates are very preliminary. At this point, we have little idea of how room use was structured. Therefore, the methods put forth by Nelson and Schollmeyer (2003) may require further refinement once we have a better idea of room use for the Black Mountain phase. Blake and colleagues note 229 rooms for the Black Mountain phase, with an estimated total of 560. While the data from the Black Mountain site can be compared with the estimates made by Blake and others (1986) as well as Peeples (2010), all population reconstructions provide only rough estimates of actual population. The Black Mountain data would also be further helped, especially in Locus 1, by tighter chronometric control of the construction sequence for the pueblo.

Mimbres population estimates, like almost all archaeological population reconstructions, are works in progress. The reconstructions provided by Blake and colleagues (1986), Lekson (2006), and Peeples (2010) provide an important baseline for examining broad trends of regional and subregional settlement location through time, changes in overall population, and changes in the size and number of settlements. Although the estimates by Blake and colleagues (1986) and Peeples (2010) differ for the Mimbres Valley, both studies show a decreased population density during the transition from the Classic and Terminal Classic phases to the Black Mountain and Cliff phases (see Lekson 2006) (Figure 4.1).

In summary, Blake and colleagues (1986) suggest the Lower Mimbres had a lower population than the Upper and Middle Mimbres during the Classic phase. The Upper Mimbres saw a slight increase during the Black Mountain phase (see also Taliaferro 2014:124-127). Although the survey conducted by Blake and colleagues (1986) does not provide full coverage for the Lower Mimbres, it offers preliminary evidence for populations moving into the Lower Mimbres after 1150. But were these residents, migrants, or both? Work conducted at Old Town
Ruin provides evidence that some populations remained in the region (Creel 1999, 2006b; Taliaferro 2014). Old Town Ruin also offers evidence of a second, and not necessarily continuous, occupation sometime after 1150 (Putsavage et al. 2014; Taliaferro 2014). Population data must be examined at both regional and subregional levels. These broader scale analyses need to be complemented by site-level data from numerous sites within a region (see Lekson 2002, 2006; Ortman 2012). As highlighted in the subsequent investigations of ceramics and obsidian, tacking back and forth among regional, subregional, and site-level data provides a richer and more accurate picture of the processes behind the transition.

**Discussion and Summary**

This chapter reviewed population estimates for the periods before and after the transformation to evaluate whether Black Mountain phase populations were composed of groups who continued to live in the Mimbres region or groups who immigrated. While the reconstruction of populations indicates a significant decrease in population in the Upper and Middle Mimbres, and indeed throughout the region, after 1150, the situation in the Lower Mimbres Valley may be different (Blake et al. 1986; Peeples 2010; Taliaferro 2014). The number of people in the Lower Mimbres Valley was lower than the Upper and Middle Mimbres Valley during the Classic. The Lower Mimbres Valley, where the Black Mountain site is located, saw a slight population increase during the Black Mountain phase (compared to the overall decrease in the region) (Blake et al. 1986; Peeples 2010; Figure 4.1). Whether this increase represents residents or migrants is yet to be determined, but this example indicates the importance of using site, subregional, and regional data. The increase in the Lower Mimbres Valley may be larger than previously projected by Blake and colleagues (1986), because most population reconstructions do not consider the Black Mountain site and it is one of the largest.
Postclassic sites in the region (but see Peeples 2010 and Lekson 2002 for inclusion of LA 49). As summarized in Chapter One, the Black Mountain site has a large population for both Black Mountain (at least 85 rooms and a Black Mountain phase pithouse occupation) and Cliff phase (about 175 rooms) occupations and is therefore key for population reconstruction of the Mimbres region. When examined on a regional and subregional scale, population reconstructions and archaeological evidence suggest a significantly reduced population in the Mimbres Valley overall during the Black Mountain and Cliff phases (Blake et al. 1986; Creel 1999, 2006b; Peeples 2010; Taliaferro 2014).

Although the population estimates for the Mimbres region provide only a coarse overview of settlement patterns and their reorganization, at first look, the reconstruction of population seems to eliminate the possibility of migrants moving in. But as discussed in Chapter Three, if small groups were moving into the Mimbres Valley as large groups were simultaneously moving out, it would be difficult to see this process through regional and even subregional reconstructions. It is also important to consider the relative visibility of migrant populations. As discussed in Chapter Three, during some migration events, migrants may blend in with resident populations, such as in the Northern Rio Grande (Lipe 2010; Ortman 2012; Stone and Lipe 2008). During other migration events they may clearly stand out, such as in the Tonto Basin, Point of Pines, or Cañada Alamosa and Pinnacle Ruin (Clark 2001; Haury 1958; Lekson et al. 2002; Stone 2003). Migrants may be especially difficult to see because, during a social reorganization, as in the case of the Mimbres region, resident populations were also renegotiating their identity through the reorganization of exchange, political, and social networks (e.g., Creel 1999; Nelson 1999; Nelson et al. 2011; Ortman 2012; Taliaferro 2014; Woolf 1998).
While the regional population reconstructions also show an overall decrease in population, some populations evidently stayed in the Mimbres Valley. As discussed in Chapter Three and above, there is a possibility that small numbers of migrants were simultaneously moving into the Mimbres Valley, a possibility that is evaluated in following chapters. As discussed in Chapter Five, the construction of pithouse at LA 49 before the construction of the room block provides evidence of migrants. Chapters Six (ceramics) and Seven (obsidian) also suggest shifts in exchange networks and possible connections between people at the Black Mountain site and groups in the Upper Gila (Figure 1.1). The appearance of Roosevelt Red Ware sherds at both Old Town and the Black Mountain site may also suggest migrants (Taliaferro 2014:141-187). Although there is no “smoking gun” to confirm the appearance of migrant populations, several lines of evidence hint at this possibility. The remaining chapters in this dissertation present evidence that resident and migrant groups cohabited at the Black Mountain site.

Small groups of immigrants during periods of social disruption, reorganization, and transformation are an important possibility, even if regional population reconstructions do not show an overall increase. In liminal times, population movements need not have always been large, or unidirectional. Here it is important to acknowledge Cabana’s (2011) critique of earlier studies that use large-scale migration as a catchall to explain cultural change. More complex migrations and small-scale movements should be considered. This moves us away from viewing mass migration as a simple explanatory model.
CHAPTER V
ARCHITECTURE, STRATIGRAPHY, AND CHRONOLOGY
OF THE BLACK MOUNTAIN SITE

Introduction

Chronometric refinement is fundamental to archaeological research, particularly for short-duration events such as the Mimbres social transformations (Bayliss et al. 2007; Dean 1978; Nash 2000; Taylor and Aitken 1997; Whittle et al. 2011). While many regions in the Southwest have a tight chronometric control (Cordell and McBrinn 2012), the Postclassic periods in the Mimbres region are less well defined (Hegmon et al. 1999; LeBlanc 1977, 1980b; LeBlanc and Whalen 1980). As was discussed in Chapter Four, it is clear that there was a decrease in population in the Upper and Middle Mimbres Valley after A.D. 1150, but there is strong evidence that some populations stayed in the valley (Creel 1999, 2006b; Taliaferro 2014). The Black Mountain site has a large population during the Black Mountain (Locus 2, at least 85 rooms and pit structures) and Cliff phase (Locus 1, about 175 rooms) occupations. Understanding how periods of construction and occupation fit with the regional chronology is key for understanding when and how changes in material culture affected the Mimbres region after 1150.

This chapter summarizes the stratigraphic data, construction sequence, and construction techniques of the Black Mountain phase occupation in Locus 2, which is the Black Mountain phase room block. This synopsis provides evidence that some of the construction methods of Locus 2 were technologically similar to Classic Mimbres phase construction. This summary of architecture and stratigraphy contextualizes the new radiocarbon and dendrochronology data collected by BMAP from 2010 to 2012 (see Table 5.1). The summary of Locus 1 (Cliff phase)
architecture is also further detailed. There was only one radiocarbon date (Beta-281631) from Locus 1. This is not included in the Bayesian analysis because it came from disturbed fill.

However, since there is a possible Black Mountain phase occupation below the Cliff phase room block, more details are provided. Bayesian analysis of the Locus 2 dates refines the timing of the Locus 2 Black Mountain phase at the Black Mountain site. These data are then compared to additional relative and chronometric dates from other sites in the region in order to refine the Black Mountain phase chronology. In this chapter, I also examine the seriation of ceramics from the Black Mountain site (see Table 5.2). In the final section of the chapter, I compare the occupation sequences at the Black Mountain site and Old Town Ruin (Creel 2006c; Taliaferro 2014) and suggest that the Black Mountain phase was not uniform across the Mimbres region.

### Table 5.1. List of Structures Found in Each Unit in Locus 2

<table>
<thead>
<tr>
<th>Structure</th>
<th>Units/Trenches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pithouse A</td>
<td>8, 9, 12, 13, 14, 18, and 21</td>
</tr>
<tr>
<td>Pithouse B</td>
<td>10, 16, 19, and 20</td>
</tr>
<tr>
<td>Room A</td>
<td>8, 9, 12, 13, 14, 18, 21, 22, 23, 25, and F</td>
</tr>
<tr>
<td>Room B</td>
<td>12, 13, 18, and 22</td>
</tr>
<tr>
<td>Room C</td>
<td>12, 14, and C</td>
</tr>
<tr>
<td>Room D</td>
<td>8, 9, 15, and 21</td>
</tr>
</tbody>
</table>

*Note:* Pithouse A is beneath room A. Excavations were terminated in Units 22, 23, 25, and Trench F before the pithouse was encountered.

### Chronology of the Black Mountain and Cliff Phases

Because so few absolute dates were available for the Black Mountain and Cliff phases (LeBlanc and Whalen 1980; Hegmon et al. 1999; Putsavage et al. 2014; Taliaferro 2014), a major goal of the BMAP was to collect samples with good context to submit for radiocarbon, dendrochronological, and archaeomagnetic analyses. For radiocarbon dating, we collected
Table 5.2. Pottery Types Found at Black Mountain Site, with Date Ranges and References

<table>
<thead>
<tr>
<th>Type</th>
<th>Date Range (A.D.)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chupadero B/w</td>
<td>1150-1550</td>
<td>Mera 1931</td>
</tr>
<tr>
<td>Wingate B/r</td>
<td>1150-1225</td>
<td>Carlson 1970</td>
</tr>
<tr>
<td>St Johns B/r</td>
<td>1200-1300</td>
<td>Carlson 1970</td>
</tr>
<tr>
<td>St Johns Polychrome</td>
<td>1200-1300</td>
<td>Carlson 1970</td>
</tr>
<tr>
<td>Playas series</td>
<td>1100/1150-1400</td>
<td>Mills 1986</td>
</tr>
<tr>
<td>Mogollon R/b</td>
<td>650-750</td>
<td>Shafer and Brewington 1995</td>
</tr>
<tr>
<td>Three Circle R/w</td>
<td>750-950</td>
<td>Shafer and Brewington 1995</td>
</tr>
<tr>
<td>Mimbres Style I</td>
<td>750-900</td>
<td>Shafer and Brewington 1995</td>
</tr>
<tr>
<td>Mimbres Style II</td>
<td>880-1020</td>
<td>Shafer and Brewington 1995</td>
</tr>
<tr>
<td>Mimbres Style III</td>
<td>1010-1130/50</td>
<td>Shafer and Brewington 1995</td>
</tr>
<tr>
<td>Maverick Mountain Polychrome</td>
<td>1275-1450</td>
<td>Neuzil and Lyons 2006</td>
</tr>
<tr>
<td>Gila Polychrome</td>
<td>1300-1450</td>
<td>Neuzil and Lyons 2006</td>
</tr>
<tr>
<td>Cliff Polychrome</td>
<td>1350-1450</td>
<td>Neuzil and Lyons 2006</td>
</tr>
<tr>
<td>Cliff W/r</td>
<td>1275-1450</td>
<td>Neuzil and Lyons 2006</td>
</tr>
<tr>
<td>Tonto B/r</td>
<td>1275-1450</td>
<td>Neuzil and Lyons 2006</td>
</tr>
<tr>
<td>Babícora Polychrome</td>
<td>1250/1300-1450</td>
<td>Laumbach 2009; Neuzil and Lyons 2006</td>
</tr>
<tr>
<td>Carretas Polychrome</td>
<td>1250/1300-1450</td>
<td>Laumbach 2009; Neuzil and Lyons 2006</td>
</tr>
<tr>
<td>Dublan Polychrome</td>
<td>1250/1300-1450</td>
<td>Laumbach 2009; Neuzil and Lyons 2006</td>
</tr>
<tr>
<td>Villa Ahumada Polychrome</td>
<td>1250/1300-1450</td>
<td>Laumbach 2009; Neuzil and Lyons 2006</td>
</tr>
<tr>
<td>Ramos Polychrome</td>
<td>1250/1300-1450</td>
<td>Laumbach 2009; Neuzil and Lyons 2006</td>
</tr>
<tr>
<td>Ramos Black</td>
<td>1300-1450</td>
<td>Sayles 1936</td>
</tr>
<tr>
<td>Madera Black-on-red</td>
<td>1300-1450</td>
<td>Laumbach 2009</td>
</tr>
<tr>
<td>El Paso Bichrome</td>
<td>1100-1200</td>
<td>Laumbach 2009</td>
</tr>
<tr>
<td>El Paso Polychrome</td>
<td>1150-1600</td>
<td>Miller 1995; Miller and Graves 2009</td>
</tr>
<tr>
<td>Three Rivers R/t</td>
<td>1150-1350</td>
<td>Kelley 1984</td>
</tr>
<tr>
<td>Lincoln B/r</td>
<td>1300-1400</td>
<td>Laumbach and Laumbach 1989</td>
</tr>
<tr>
<td>Tularosa Fillet Rim</td>
<td>1100-1300</td>
<td>Rinaldo and Bluhm 1956</td>
</tr>
<tr>
<td>Smudged wares</td>
<td>1050-1250</td>
<td>Rinaldo and Bluhm 1956</td>
</tr>
</tbody>
</table>

*Note: See Appendix B for ceramic totals for each locus and arbitrary level.*
numerous soil samples from burnt areas, pit features, hearths, and hearth dumps. These contained burnt annuals such as *Zea mays* (see Table 5.3). But since the questions surrounding the chronology of the Black Mountain site and phase deal with a 50- to 75-year period, radiocarbon dates alone will not answer them. Therefore, the project also focused on the collection of wood specimens (roof beams and burnt material in the fill) to obtain tree-ring dates (see Table 5.4). Only one hearth (Feature 12.2) was suitable for archaeomagnetic dating. The sample, carefully collected by Gray Hines and submitted to the New Mexico Office of Archaeological Studies, unfortunately did not return a date, likely due to the low firing temperature of hearths (Eric Blinman, personal communication 2014; see also Nelson and LeBlanc 1986:105-114). While obsidian hydration has been utilized in other regions, there have been critiques of its reliability (Anovitz et al. 1999), especially in the American Southwest (Riddings 1996). Therefore, although BMAP collected a large sample of obsidian, due to the uncertainty of obsidian hydration this technique was not used for this project.

*Previous Chronometric Data for the Black Mountain Phase*

Before presenting the chronometric data collected from the Black Mountain site (LA 49), I review the chronometric data previously collected for the Black Mountain and Cliff phases. As noted above, few chronometric dates have been collected from sites with Black Mountain phase components (LeBlanc and Whalen 1980; Hegmon et al. 1999; Putsavage et al. 2014; Taliaferro 2014). The dating of the Black Mountain phase is also complicated by the fact that archaeologists have used the same lines of evidence to suggest a continued occupation and a depopulation of the region around A.D. 1150 (Creel 1999, 2006b; Hegmon et al. 1999; Nelson 1999; Nelson and Anyon 1996; Shafer 1999, 2003).
Table 5.3. Calibrated Radiocarbon Dates from the Black Mountain Site

<table>
<thead>
<tr>
<th>Site Name</th>
<th>14C Lab No.</th>
<th>14C Yrs. ± σ B.P.</th>
<th>Cal A.D. Yrs. ± 1σ</th>
<th>Cal A.D. Yrs. ± 2σ</th>
<th>Context/ Sample type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black Mountain</td>
<td>Beta-281631</td>
<td>700 ± 40</td>
<td>1267-1300</td>
<td>1249-1320</td>
<td>Fill in Unit 2 (Locus 1), <em>Zea mays</em></td>
</tr>
<tr>
<td>Black Mountain</td>
<td>AA104758</td>
<td>837 ± 27</td>
<td>1169-1224</td>
<td>1160-1260</td>
<td>Room fill above OS 3 (Locus 2, Pithouse A), <em>Zea mays</em></td>
</tr>
<tr>
<td>Black Mountain</td>
<td>AA104759</td>
<td>873 ± 27</td>
<td>1155-1216</td>
<td>1117-1224</td>
<td>Room fill above OS 2 (Locus 2, Room A), <em>Zea mays</em></td>
</tr>
<tr>
<td>Black Mountain</td>
<td>AA104760</td>
<td>766 ± 27</td>
<td>1246-1277</td>
<td>1220-1281</td>
<td>Heart (Locus 2, Room B, OS 2, Feature 12.2), <em>Zea mays</em></td>
</tr>
<tr>
<td>Black Mountain</td>
<td>AA104761</td>
<td>891 ± 27</td>
<td>1050-1083</td>
<td>1043-1105</td>
<td>Pit feature in Pithouse A (Locus 2, Feature 9.6), <em>Zea mays</em></td>
</tr>
<tr>
<td>Black Mountain</td>
<td>AA104762</td>
<td>766 ± 27</td>
<td>1246-1277</td>
<td>1220-1281</td>
<td>Heart (Locus 2, Room B, OS 2, Feature 12.2), <em>Zea mays</em></td>
</tr>
<tr>
<td>Black Mountain</td>
<td>AA104763</td>
<td>731 ± 26</td>
<td>1264-1284</td>
<td>1228-1232</td>
<td>Fill between OS 1A and OS 1B (Locus 2, Room C), <em>Zea mays</em></td>
</tr>
<tr>
<td>Black Mountain</td>
<td>AA104764</td>
<td>936 ± 27</td>
<td>1039-1052</td>
<td>1029-1159</td>
<td>Heart in Locus 2, Pithouse B (Feature 10.1), <em>Zea mays</em></td>
</tr>
</tbody>
</table>
Table 5.4. Dendrochronology Dates from Black Mountain Site

<table>
<thead>
<tr>
<th>LTRR #</th>
<th>FN</th>
<th>Species</th>
<th>Inside Date (A.D.)</th>
<th>Outside Date (A.D.)</th>
<th>Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAN-189</td>
<td>592</td>
<td>Ponderosa Pine</td>
<td>1225</td>
<td>1261vv</td>
<td>Locus 2, Room A, OS 2 (64 cmbd)</td>
</tr>
<tr>
<td>NAN-191</td>
<td>588a-c</td>
<td>Ponderosa Pine</td>
<td>1230</td>
<td>1259vv</td>
<td>Locus 2, Room A, OS 2 (64 cmbd)</td>
</tr>
<tr>
<td>NAN-193</td>
<td>204a-c</td>
<td>Ponderosa Pine</td>
<td>1220</td>
<td>1266B comp</td>
<td>Locus 2, Room A, Room fill between OS 1 and OS 2</td>
</tr>
</tbody>
</table>

The Mimbres Foundation excavations, as well as later archaeological projects such as research at the NAN Ranch and Old Town, recovered about 20 chronometric dates from Terminal Classic and Black Mountain phase structures at Mattocks, Swarts, Old Town, and NAN Ranch (Figure 1.2) (Anyon and LeBlanc 1984:143, 147-148, 316; Creel 2006b; LeBlanc and Whalen 1980; Shafer 2003). These archaeomagnetic and radiocarbon dates along with one tree-ring date cluster in the 1120s led Hegmon and colleagues (1999:154-155) to place the beginning of the Terminal Classic at A.D. 1130 (see also Creel 2006b; LeBlanc and Whalen 1980; Shafer 2003).

Archaeomagnetic samples recovered from the Walsh site returned a series of dates ranging from A.D. 1160 to 1325, which spans most of the Black Mountain phase (Lekson 2011; Taliaferro 2014) (Figure 5.1). Two radiocarbon dates were collected from hearths at the Walsh site (Figure 5.1; LeBlanc and Whalen 1980:515). There were also 17 “tentative” tree-rings dates from the Montoya site that cluster in the 1180s (Hegmon et al. 1999:161; LeBlanc and Whalen 2003).
Even though some of these samples were cutting dates, they could not be linked to the master chronology for the region (Hegmon et al. 1999:161; LeBlanc and Whalen 1980:532; personal communication Steven A. LeBlanc, 2010). Based on these dates, LeBlanc (1977) suggested a start date of A.D. 1180 for the Black Mountain phase (see Hegmon et al. 1999), but with uncertain context and lacking firm connection with the master chronology, these dates may best be understood as indicating the 1180s were included in the span of the Black Mountain phase. Archaeomagnetic dates obtained from Old Town also span the entirety of the Black Mountain phase (Taliaferro 2014:138) (Figure 5.1).

While chronometric data are available for the Black Mountain phase, most samples have not allowed for the chronological refinement necessary to answer questions surrounding the 50-to 75-year period of the social transformation. Moreover, as discussed below, many of the ceramics common in Black Mountain phase (and Cliff phase) assemblages, such as the Playas series, Chupadero Black-on-white, and El Paso Polychromes, span long time periods and are therefore not useful for refining the phase chronology (Nelson and LeBlanc 1986:105).

**Previous Chronometric Data for the Cliff Phase**

Few chronometric dates have been recovered from Cliff phase sites. A majority of the evidence for site and regional occupation during the Cliff phase comes from the cross-dating of non-local ceramics, and particularly the occurrence of late Roosevelt Red Ware ceramic types (Lyons 2004 Lyons and Clark 2012). Excavations at Kwilleylekia, Ormand Village, and Duck Creek Ruin in the Cliff Valley have provided a few tree-ring samples that date to the late 1200s and mid- to late 1300s (Bannister et al. 1970; Robinson and Cameron 1991:23; Wallace 1998:412) (Figure 5.1). The Mimbres Foundation also collected numerous tree-ring, radiocarbon,
Figure 5.1 Chronometric dates by site for Black Mountain and Cliff phase sites. (Adapted from Taliaferro 2014:Figure 5.10.) Archaeomagnetic dates collected by the Mimbres Foundation from the Stailey, Disert, Janss, and Walsh sites (LeBlanc and Whalen 1980) were calculated based on an older curve.
and archaeomagnetic dates, though they were unable to link the tree-ring dates to the local chronology because of the floating late chronology in the region (Nelson and LeBlanc 1986:106-108). Chronometric dates from Cliff phase (A.D. 1300 to 1450) sites in the Mimbres Valley span most of the period (Figure 5.1).

Two important conclusions can be drawn from work conducted at three Cliff phase sites (Janss, Stailey, and Disert sites) (Nelson and LeBlanc 1986:105-114). First, the Cliff phase in the Mimbres Valley likely starts around A.D. 1300 to 1350. Since we do not have a solid end date for the Black Mountain phase, the Cliff phase and Black Mountain phase may overlap. This calculation is based on several archaeomagnetic and radiocarbon dates from the three sites (Figure 5.1). Second, the Disert site, which is the largest of the three sites, was the first to be settled and likely had the longest occupation. Stailey and Janss had shorter occupations. Nelson and LeBlanc (1986:105-114) suggest a relatively short occupation for the Cliff phase in general based on the short occupation length of these sites. While it is clear there was a large immigration of Kayenta groups into the Upper Gila Valley around A.D. 1300, archaeologists still do not fully understand the relationship between the populations who were living in the Mimbres region during the Black Mountain and Cliff phases and Kayenta immigrants (Hegmon et al. 1999:161; Lekson 2002:68-76; Nelson and LeBlanc 1986:245-247; Clark 2011). Sites in the Upper Gila suggest Kayenta migrants encountered resident groups in the Upper Gila (Clark 2011; Dungan et al. 2012; Huntley et al. 2010). The picture for the Mimbres Valley is less clear. As discussed in Chapter Four, several population reconstructions suggest there was a population decline around A.D. 1300, which in archaeological reconstruction is the transition from the Black Mountain to Cliff phase (Blake et al. 1986; Peeples 2010). At this point, the makeup of the
populations living in the Mimbres valley around 1300 is unclear due to the lack of radiocarbon dates for Cliff phase sites and because few excavations have been conducted at Cliff phase sites.

The Black Mountain Site Stratigraphy and Architecture

To provide a baseline for the absolute and relative dates that resulted from analysis, as well as the Bayesian analysis, in this section I review the stratigraphic sequence at the Black Mountain site (see Appendix A). Locus 2 is summarized in more detail because seven of the eight samples submitted for radiocarbon analysis were from this area, which was comprised of all the units shown in Figure 5.2. (The eighth was from Locus 1; see below.) The stratigraphic location of the radiocarbon and dendrochronology sample is also described. All samples submitted for radiocarbon analysis were *Zea mays*, an annual that provided a finer resolution (lower error margin) than non-annuals. Since radiocarbon analysis often yields dates that are significantly earlier than targeted events, the BMAP focused on the submission of annuals (Dean 1978; Schiffer 1986). LA 49 has three areas of architecture (Figure 1.3): the Late Pithouse period occupation in the far western area of the site (Locus 3) (see Chapter One); the Black Mountain phase occupation (Locus 2), which contains pithouses A and B (apparently dating to the Black Mountain phase) and an adobe room block (see Figure 5.2); and the Locus 1 Cliff phase occupation, which consists of a large C-shaped adobe room block. Locus 1 has adobe architecture beneath the Cliff phase occupation that likely dates to the Black Mountain phase and pit structures below at least a portion of the Cliff phase room block.
Figure 5.2  Locus 2, Black Mountain phase room block and excavation units and trenches. Units are numbered and trenches are lettered. Pithouse A is beneath Units 9, 13, 15, and 21. Pithouse B is encompassed by Units 10, 16, 19, and 20.
Stratigraphic Sequence of the Cliff Phase Component (Locus 1)

Locus 1 has three possible periods of occupation (Figures 5.3, 5.4, 5.5, 5.6, and 5.7). Note that all the occupation surfaces (OS) in Locus 1 are termed OS East to distinguish them from the occupation surfaces in the Locus 2 Black Mountain component. Units were excavated on the western and eastern portions of the C-shaped room block (Figures 1.3 and 1.5). As shown in Figure 5.3, the units (2 and 17) on the east side of the plaza revealed the corner of an adobe wall and adobe wall fall. This corner was encountered immediately below (less than 1 cm) modern ground surface and extends to a depth of only about 10 to 15 cm below modern ground surface. The adobe wall fall (26 to 37 cmbd U2) sits above about 10 cm of natural fill and OS 1 East (48 cmbd U2; Figures 5.3 and 5.4). OS 1 East was not easily recognized during excavation but is clearly shown to be in association with OS 1 East in the eastern profile of unit 17 (Figure 5.4).

About 10 to 15 cm below the base of the upper wall, we found a plastered floor that was directly on top of the sterile caliche (OS 2 East, 59 to 63 cmbd U2; Figure 5.4, 5.5, and 5.6). This surface does not articulate with the upper Cliff phase walls. In fact, OS 2 East does not articulate with any walls in units 2 or 17 and could represent an earlier, possibly Black Mountain phase occupation (Figures 5.3 and 5.4). Few ceramics were recovered from the fill between OS 1 East and OS 2 East, and those ceramic types could date to either or both the Black Mountain and Cliff phases (Appendix A and B). As shown in Figures 5.5 and 5.6, the 10 to 15 cm of fill between the upper Cliff phase wall and OS 2 East also suggests a break in occupation between these two periods of construction.
Figure 5.3 Adobe wall fall in Cliff phase room block showing stratigraphic location of OS 1 East (Units 2 and 17).

Figure 5.4 East stratigraphic profile of Unit 17 showing OS 1 East and wall fall from Cliff phase occupation.
Figure 5.5  Base of Cliff phase walls and possible Black Mountain phase floor (Locus 1, Unit 2). Shows stratigraphic location of OS 2 East.

Figure 5.6  Location of possible pit feature (Feature 2.2) in stratigraphy (left). Pit feature in plan view of Unit 2 along west profile (right).
In the fill between OS 1 East and OS 2 East (Figure 5.5), we recovered a burnt corn cob, which produced a conventional corrected $^{14}$C determination of $700 \pm 40$ B.P. (Beta-281631). The two possible calibrated age calendar ranges are of cal A.D. 1267-1300 and 1369-1381 ($p = 69.7$) and cal A.D. 1249-1320 and 1349-1392 ($p = 95.7$) (calibrated at 2σ with the program OxCal 4.2 [Bronk Ramsey 2014]) (Figure 5.1; Table 5.3). The fill above the floor was highly disturbed by rodents and possibly looting, so it is unclear which occupation this date represents. This date was not included in the Bayesian analysis.

Finally, there is a possible third occupation represented by a pit feature (Feature 2.2, Unit 2 SE corner; Figure 5.6) in the caliche directly below the possible Black Mountain phase floor, and a possible pit structure also dug into the caliche (Figure 5.7). No ceramic sherds were found in association with Feature 2.2 and very few sherds were found in Pithouse C ($n = 5$; Appendix

**Figure 5.7** Possible pit structure (Pithouse C) in Locus 1.
B, Table B.2). Although I initially believed that these were “features” dug into the caliche by prehistoric peoples, I now wonder if they could represent the natural erosion processes of the caliche bedrock. Further excavation is needed to clarify either interpretation.

**Stratigraphic Sequence of the Black Mountain Component (Locus 2)**

Locus 2 has three periods of occupation/construction (Figure 5.8). Four rooms (A, B, C, and D) and two pit structures (pithouses A and B) were encountered during excavation. Table 5.1 provides a summary of the units found in each room and pit structure. Note that some of the units cover more than one room because architecture was not visible before excavation. Therefore, units could not be laid out according to the location of architecture. Each occupation surface (OS 1, 2, and 3) likely represents a different period of occupation/construction. In the earliest Black Mountain phase occupation in Locus 2, two pit structures (pithouses A and B) were excavated. Pithouse A sits directly beneath room A, which is part of the Black Mountain phase room block (Figures 5.9 and 5.5, Table 5.1). In other words, the walls of the room block are directly on top of and aligned with pithouse A. Pithouse B is just north of the two-track road that cuts through the site (Figures 1.4 and 5.2; Table 5.1; in Figure 5.2, pithouse B is encompassed in Units 10, 16, 19, and 20). It was discovered during GPR prospecting conducted by TARL. The GPR work uncovered a “hot spot,” which, through excavation, was determined to be a hearth or thermal feature in a bench of the pit structure (Chapter One, Figure 1.9).

Only a portion of these two architectural features was excavated. Ceramic types (such as Playas series, El Paso Polychromes, and St. John’s Polychromes) and three radiocarbon dates, discussed below, strongly suggest that the pit structures date to the Black Mountain phase, possibly early in the phase. Two sherds of earlier Mimbres pottery (Undifferentiated Mimbres
Figure 5.8 Schematic profile view of construction sequence and radiocarbon and dendrochronology samples in Locus 2. Radiocarbon sample (AA104764) from pithouse B is not shown. This schematic shows stratigraphic relationships. To show this stratigraphic relationship, OS 1 and 2 in rooms A and B were combined and are shown on the right side of the figure. Room C is shown at left. See Figure 5.9 (plan view) for horizontal relationship of samples.
Figure 5.9 Plan view of portion of Locus 2. See Figure 5.2 for all Locus 2 units. Pithouse A is beneath room A.
Ware and Mogollon Red-on-brown) were recovered from pithouse B, but these sherds came from the upper levels of fill that was disturbed by the mechanical grading. They do not represent the period of construction or occupation (Table 5.2).

Three maize samples were submitted for radiocarbon dating from the two pit structures (Table 5.2). Sample AA104764 (FN141) came from the hearth or thermal feature in pithouse B and likely represents the final use of this structure. Sample AA104761 (FN 190) came from a pit feature (Feature 9.6) in pithouse A. Sample AA104758 (FN 146) came from fill just above the floor of pithouse A (OS 3) and is believed to represent fill from the later period of room block construction (Figures 5.8, 5.9, and 5.10).

The next occupation in Locus 2 is represented by two occupation surfaces (OS 1 and OS 2) in rooms A, B, C, and D of the Black Mountain phase room block (Figures 5.8, 5.9, 5.10). Similar to the construction of pithouse A, where the walls of the pit structure are directly beneath the walls of the room block, the walls associated with OS 1 and 2 are built directly on top of each other. Although Figure 5.8 is a schematic to show the stratigraphic association of dates, it accurately represents the construction sequence and articulation of the pithouse A and room block walls.

The approximate area of this adobe room block is 1,750 m² with a probable room count of about 85 rooms. However, as discussed in more detail below and summarized in Chapter One, there could be a Black Mountain phase component beneath the Cliff phase room block (Locus 1) in the eastern half of the site. If so, the Black Mountain occupation at LA 49 could be considerably larger. OS 2 represents the middle period of the three defined stratigraphic periods of construction. This occupation surface was observed in all four rooms excavated in the Black
Figure 5.10 Plan view of Locus 2 showing units and composite photograph of Figure 5.9. See Table 5.1 for detailed list of association of rooms, pit structures, and units.

Mountain room block (Figure 5.8 and 5.9). Room A was aligned with and built directly atop the walls of pithouse A.

Although many of the intramural features in rooms A, B, C, and D were damaged by looting and therefore not useful for comparison of technological traits between periods, we excavated walls A and C to determine the construction methods (Appendix A; Figure 5.11). The excavation of these walls provides a baseline comparison for architectural similarities/differences between the Classic Mimbres and Black Mountain phase and is examined in more detail in the discussion section of the chapter (see Nelson and Hegmon 2001). Similar to Classic Mimbres
masonry walls, the Locus 2 room block walls contained large upright cimientos with coursings of large and small cobbles. The main difference between the Classic Mimbres walls and the Locus 2 Black Mountain phase walls is the amount of adobe (see Figure 5.8 and 5.11).

One hearth (Feature 12.2) was discovered on OS 2 in room B. Two samples (AA104760, FN289; AA104762, FN 290) of *Zea mays* from this hearth were submitted for radiocarbon dating and likely represent one of the final uses of this room. A second sample of *Zea mays* (AA104759, FN138) was collected from the room fill just above OS 2 and submitted for radiocarbon dating. OS 1 (the latest of the floors) was remodeled three times. Although there is evidence of this floor level in all four rooms, room C was the only area where the floor was intact and well defined. One corncob (AA104763, FN 337) from between OS 1A and OS 1B (Figures 5.8 and 5.9) in room C was submitted for radiocarbon. The stratigraphic levels
associated with OS 1 were heavily disturbed in the other rooms because of looting and mechanical grading at the site. Radiocarbon sample AA104763 (FN 337) was the only sample for the final occupation that came from undisturbed contexts. Thin trash fill separated the remodeled floor surfaces (OS 1A, OS 1B, and OS 1C). Even though sample AA104763 (FN 337) was collected from between OS 1A and 1B, since the sample came from trash, the event dated by this sample likely represents an earlier occurrence than the construction of the floors.

Forty-seven tree-ring samples were collected, 36 of which were submitted to the Laboratory of Tree-Ring Research (LTRR) at the University of Arizona for dating. These samples included ponderosa, pinyon, oak, and cottonwood. The three samples that dated were all ponderosa pine. Two of the samples (NAN-189 and NAN-191) came from the same roof beam, which was found resting on the middle of three floors (OS 2) in the room block (Figures 5.8 and 5.9; Table 5.4). Note that the “NAN” designation was applied by the LTRR and does not reflect actual provenience of these samples. The third sample (NAN-193, FN 204a-c) came from trash fill between OS 1 and OS 2 and produced a cutting date of 1266B. NAN-193 was cut sometime after the ponderosa growing season of 1266 but before the initiation of growth in 1267. Analysis of floral materials from LA 49 by Karen Adams (2014) shows that no ponderosa pine was used in hearths. Since the ponderosa pine was not a local resource and was either collected from the Mimbres River drainage during a flood event or was brought down from the mountains, it likely represents valuable construction material. Therefore, even though NAN-193 was found in room fill, it probably represents construction material associated with room A, OS 2.

In summary, research conducted at the Black Mountain site from 2010 to 2012 showed that LA 49 contains two Postclassic Mimbres components (Figures 1.3, 1.4, and 1.5). These Postclassic room blocks (Locus 1 and 2) both include multiple remodeling events.
datable materials collected from Locus 2 have helped to define the complex stratigraphy and occupational history (Tables 5.3 and 5.4). Since only one date of uncertain context was recovered from Locus 1, further research is clearly needed to refine the occupational history of Locus 1.

**Refinement of Chronology: Absolute Dating**

This section explores Bayesian analysis of the Black Mountain phase chronometric data. Stratigraphic and geomorphological evidence and the construction sequence suggest that the Black Mountain phase room block (Locus 2, rooms A-D) was built shortly after the pit structures (pithouse A and B). Absolute dating techniques and refinement of these techniques with Bayesian analysis were employed to clarify the occupational sequence. In this section of the chapter, I refine beginning and end dates of the Black Mountain phase occupation at LA 49. Although the Cliff phase chronology is also key for understanding the social transformation, BMAP was only able to collect one absolute date of uncertain context from Locus 1, thus the refinement of this period at LA 49 is still a work in progress (Table 5.3). For details on the Cliff phase stratigraphy, see Chapter One and Appendix A.

**Bayesian Analysis: Pulling Together the Radiocarbon and Tree-Ring Data**

Bayesian analysis provides a method for relating radiocarbon dating from archaeological contexts with independent archaeological information. As explained by Bayliss and colleagues (2007:4), archaeologists can use the Bayesian approach to:

analyse the new data we have collected about a problem (‘the standardized likelihood’) in the context of our existing experience and knowledge about the problem (our ‘prior beliefs’). This enables us to arrive at a new understanding of
the problem which incorporates both our existing and our new data (our ‘posterior belief’).

In terms of the research at the Black Mountain site, *prior beliefs* are represented by the stratigraphic sequence of the archaeological deposits in Locus 2. The *standardized likelihoods* are the calibrated radiocarbon dates (B.P. and error margin) and the tree-ring cut date (NAN-193). The updated probability (*posterior beliefs*) represents how well the radiocarbon dates “fit” statistically with assumptions about the stratigraphic information (Figure 5.12).

\[
\text{Stratigraphy (prior beliefs) + AMS dates (standardized likelihoods) = Updated (posterior)}
\]

**Figure 5.12** Visual explanation and data input of Bayesian analysis.

The goal of Bayesian analysis is to attain a more precise date range for archaeological contexts. It is important to keep in mind that the Bayesian approach is a *probabilistic* method used as a way to estimate the strength of beliefs about a particular hypothesis. The Bayesian approach also quantifies the uncertainties of these estimates (Bayliss et al. 2011; Bayliss et al. 2007; Buck et al. 1996). The *posterior beliefs* (updated probabilities) are conveyed as probability distributions. Therefore, the outcomes of the model are dependent on the available data and the archaeological understanding of the data at that time. When new data are collected and input into the model, the outcomes (probability of the posterior beliefs) of the model will change. In other words, the *posterior beliefs* “are interpretative estimates, which will change as additional data become available or as the existing data are modeled from different perspectives” (Bayliss et al.
Therefore, the Bayesian approach fits well with archaeological research because it allows us to update previous knowledge by using a quantitative method (Bayliss et al. 2007).

Chronological modeling for the Black Mountain site used the program OxCal v.4.2 (Bronk Ramsey 1995, 1998, 2001, 2009a). In OxCal v.4.2, there are two types of Bayesian models that can be used to reinterpret radiocarbon dates in light of archaeological information: “sequence” and “phase” models (McNutt 2014). A sequence analysis examines dates collected from a known stratigraphic sequence (prior beliefs) to establish the degree to which the radiocarbon dates (standardized likelihoods) produce an ordered sequence. This model also provides the degree of uncertainty (error) of each radiocarbon date within that sequence. A phase model is used when there is no known reliable sequence for the dates, for example, if several unordered dates were collected from the room fill between two floors of a single stratigraphic level. In a phase model, the dates are related but their sequence is unknown. In OxCal, there is also an option to run multiple phase models within a sequence. The multiphase models in a sequence are well suited for the Black Mountain site as these models work well at “single sites where the stratigraphy and taphonomy of the samples [radiocarbon/tree-ring dates] is such that well defined constraints can be imposed on events known to have taken place at a site” (Bronk Ramsey 2009a:348; see also McNutt 2014).

Specifically, Bayesian analysis of the Black Mountain site radiocarbon and tree-ring data uses a multiphase sequential model. In a multiphase sequential model, the model considers that phases follow one another but they may or may not be formed as a continuous deposit. There is stratigraphic evidence at the Black Mountain site for a continuous construction sequence of the Black Mountain phase pit structures and room block. (The walls of room A are aligned with and built directly on top of the walls of pithouse A, and there is little to no natural fill on the floor of
pithouse A.) However, the combined calibrated age range (ca. cal A.D. 1000 to 1200) of the pit structure floors (AA104761 and AA104764) does not suggest a continuous occupation (Table 5.3).

The radiocarbon sample (AA104758, cal A.D. 1160-1260) excavated from the fill in pithouse A and the sherds found in this fill indicate the refuse was dumped sometime after A.D. 1200. Three sherds were found in the pithouse A trash fill within 0.5 cm above the floor (OS 3). These sherds were one Carretas Polychrome (A.D. 1250/1300-1450), one Chupadero B/w with a sub-glaze (A.D. 1150-1550), and one Playas series (A.D. 1100/1150-1400) (Table 5.2). Since Carretas Polychromes were not made before A.D. 1250, the calibrated age range for the final use of the pit structures is likely before A.D. 1200. The sherds and radiocarbon date (AA104758) from the fill suggest dumping of refuse between A.D. 1200 and 1250 and a brief punctuation in the construction sequence. This also provides evidence that the trash fill above the floor of pithouse A is associated with this later occupation of the room block. Based on the un-modeled radiocarbon dates and the sherds found in floor fill, it appears that there was a short punctuation between the final use of pit structures A and B and the construction of the Black Mountain phase room block. Therefore, the Bayesian analysis uses the multiphase sequential model.

It is important to consider that the chronology and dates of Chihuahua polychromes are still under debate, with relatively few absolute dates compared to earlier Mimbres periods (Whalen and Minnis 2009). Evidence suggests that Carretas Polychrome was a later Chihuahuan type starting no earlier than 1250, and some researchers suggest it was as late as 1300 (Hendrickson 2003; Neuzil and Lyons 2006; Rakita and Raymond 2003; Whalen and Minnis 2009:110-149, 2012). However, these researchers agree that further refinement of the chronology of Chihuahua wares is warranted.
Bayesian Analysis of Black Mountain Site Chronometric Data

The following section discusses the reliability of the Bayesian interpretation, presents two possible alternative interpretations for the Black Mountain site data, and summarizes the implications of the results for our understanding of the Black Mountain phase. The Bayesian models for the chronology of the Black Mountain room block are shown in Figure 5.13 and Tables 5.5 and 5.6. The multiphase sequential models utilize three phases to examine the radiocarbon and tree-ring cut dates. These phases are based on the prior beliefs of the stratigraphic information described above. In the multiphase sequential model, each phase represents a group of dates in a single stratigraphic level (related events). In the models presented in Tables 5.7 and 5.8, Phase 1 represents the two pit structure dates (AA104761 and AA104764). Phase 2 represents the fill event of pithouse A (AA104758). Finally, Phase 3 represents the construction and occupation of the room block, specifically the construction of OS 2 (AA104760, AA104762, and NAN-193) and the use of the rooms (AA104763) (Table 5.7).

Below, I provide a detailed analysis of the radiocarbon and dendro dates and an outlier date that was left out of the model (AA104759), and discuss how these data relate to the construction sequence of the site.

Phase 1 dates came from a hearth (pithouse B, Feature 10.1) and a pit feature (pithouse A, Feature 9.6) in the Locus 2 pit structures. The hearth date (AA104761) represents final or near-final use of pithouse B, and the pit feature sample (AA104764) could represent a date from any point during the use of pithouse A. Based on the models, it seems likely that the final use of the pit structures predate cal A.D. 1211, although the final of use of these pit structures could be as early as cal A.D. 1061 (Figure 5.13 and Table 5.7, see start and end dates for Phase 1). The Bayesian analysis and calibrated AMS dates suggest that the final use of pithouse B was slightly
Figure 5.13 Multiphase sequential analysis. Phase 1 includes two pit structure AMS dates. Phase 2 includes the AMS date from room fill in pithouse A. Phase 3 includes the AMS and tree-ring dates associated with the construction and use of the pueblo rooms.
Table 5.5. Multiphase Sequence Analysis.

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Note: Phase 1 includes two pithouse AMS dates. Phase 2 includes the AMS date from room fill in pithouse A. Phase 3 includes the AMS and tree-ring dates associated with the construction and use of the pueblo rooms.
### Table 5.6. Multiphase Sequence Analysis with AA104759 Showing Poor Agreement

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*Note:* Phase 1 includes two pithouse AMS dates. Phase 2 includes the AMS date from room fill in pithouse A. Phase 3 includes the AMS and tree-ring dates associated with the construction and use of the pueblo rooms.
Table 5.7. Phases and Events Represented by Each Phase in the Bayesian Model

<table>
<thead>
<tr>
<th>Phase</th>
<th>Event</th>
<th>Date of Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phase 1</td>
<td>Final use of pit structures</td>
<td>cal A.D. 1061 to 1211</td>
</tr>
<tr>
<td>Phase 2</td>
<td>Fill before construction of OS 2 or continued use of site</td>
<td>cal A.D. 1120 to 1265</td>
</tr>
<tr>
<td>Phase 3 (start date)</td>
<td>Construction of OS 2</td>
<td>A.D. 1265</td>
</tr>
<tr>
<td>Phase 3 (end date)</td>
<td>Final use of OS 2 and construction of OS 1</td>
<td>cal A.D. 1262 to 1290</td>
</tr>
</tbody>
</table>

Note: Cal A.D. Yrs. ± 2σ modeled dates are used. For Phase 3 start date: modeled radiocarbon data show dates of construction between cal A.D. 1250 and 1280, but the dendro dates suggest construction started around A.D. 1265 to 1270.

Table 5.8. Loci, Types, and Frequencies of Salado and Chihuahuan Polychromes

<table>
<thead>
<tr>
<th>Locus 1</th>
<th>Ware</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chihuahuan Wares</td>
<td>43</td>
</tr>
<tr>
<td></td>
<td>Chupadero B/w</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>El Paso</td>
<td>222</td>
</tr>
<tr>
<td></td>
<td>Mimbres Painted</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Playas Series</td>
<td>263</td>
</tr>
<tr>
<td></td>
<td>Roosevelt Red Wares</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>St Johns Polychrome</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>625</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Locus 2</th>
<th>Ware</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chihuahuan Wares</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Chupadero B/w</td>
<td>154</td>
</tr>
<tr>
<td></td>
<td>El Paso</td>
<td>167</td>
</tr>
<tr>
<td></td>
<td>Mimbres Painted</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>Playas Series</td>
<td>1287</td>
</tr>
<tr>
<td></td>
<td>Roosevelt Red Wares</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>St Johns Polychrome</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>1674</strong></td>
</tr>
</tbody>
</table>

Note: Combination of loci and types showing that the frequencies of the Salado and Chihuahuan polychromes were too low to run a Correspondence Analysis. See Table 5.1 for date ranges of ceramics. Not all ceramics from each Locus were used. See Appendix B: Table B.2 and B.3 for details of all ceramics for each Locus.
earlier than pithouse A, but the dated event of pithouse B could represent any period of its use.
As described above, the single Phase 2 date (AA104758) suggests that the beginning of the room block construction (OS 2) began around cal A.D. 1250 (Table 5.7).

Phase 2 (AA104758), which represents the fill in the pithouse A, has a modeled date of deposit between cal A.D. 1165 and cal A.D. 1268. This fill could represent materials placed in the pit structure before the construction of the room block and OS 2. If there was a punctuation between the final use of the pit structures and construction of the room block, it could also represent continued use of the site, with the pit structure serving as a midden. There was about 5 to 10 cm of trash fill on the surface of OS 3 (pithouse A), and the walls of pithouse A are directly beneath room A. No wind-blown sediments or ponding events were seen in the stratigraphic layers below the trash fill. Therefore, it seems likely the fill was placed in the pit structure shortly after its final use.

Phase 3 represents the construction and use of the rooms in the room block and includes four radiocarbon dates associated with three radiocarbon samples (AA104759, AA104760, AA104762, AA104763). The date (AA104759) recovered from the room fill above OS 2 (room A) is *not* statistically contemporaneous with the two hearth dates (Feature 12.2: AA104760, AA104762) (Figures 5.8 and 5.9). Table 5.8 shows that this radiocarbon date has poor agreement when run in the multiphase sequential model. The calibrated date for AA104759 (cal A.D. 1045 to 1244) is nearly 100 years older than the rest of the dates in the room block sequence. Since this date came from fill (and therefore it is unknown what event this date represents), and is not statistically contemporaneous with the other dates in the model, this sample was eliminated from the analysis (see Bronk Ramsey 2009b:3).
Bayesian analysis of the radiocarbon dates from the room block suggests a start date between cal A.D. 1236 and 1268 (Tables 5.5 and 5.7, see start date for Phase 3). Based on the dendro dates (construction of the room) and the hearth dates (Feature 12.2, final use of the room), OS 2 construction likely started around 1266, and the room block was occupied for a brief period (Tables 5.7 and 5.8). The radiocarbon sample (AA104763) found in the trash fill between OS 1A and OS 1B appears to be associated with trash from the earlier occupation (OS 2), and it was therefore included in Phase 3. Based on the Bayesian modeling of the radiocarbon and tree-ring dates, the final use of OS 2 and the construction of OS 1 were sometime between cal A.D. 1262 and 1294.

The use life of rooms is a debated topic in Mimbres archaeological research (e.g., Blake et al. 1986; Cameron 1990; Gilman 1989:221-223; Lekson 2006; Nelson et al. 2006:414-418; Shafer 2003:96). It seems likely that room use life was variable through time (see Cameron 1990; Nelson et al. 2006:414-418). In this estimate, I use a 25- to 30-year room occupation based on the likely period of room use for OS 2 (see also Shafer 2003:96, who suggests 20- to 25-year room use). Although rooms can be abandoned for reasons other than use life, at this point there is no evidence of rapid abandonment.

Based on the dendrochronology and modeled radiocarbon dates, I suggest construction of the OS 2 started around A.D. 1265 and the final phase of construction was around A.D. 1290 (25-year room use). There are two floors in the room block: OS 2 (earliest room block occupation) and OS 1 (latest room block occupation, which was remodeled three times). Radiocarbon data from Locus 2 does not provide information on the final use of the room block (OS 1). The stratigraphic evidence described above shows that the rooms and walls associated with OS 1 and OS 2 were built directly on top of each other and align (Figure 5.8). This provides
evidence there was no occupation break between the final use of OS 2 and the construction of the room associated with OS 1. Therefore, the beginning of construction for OS 1 likely started around A.D. 1290 and room use may have continued for approximately 25 to 30 years, suggesting the end of the occupation of the Locus 2 room block was around A.D. 1320.

This end date puts the final occupation of Locus 2 well into the Cliff phase (A.D. 1300 to 1450) and means that the occupations in Locus 1 and Locus 2 may have overlapped. Although the radiocarbon sample from Locus 1 came from questionable contexts, the dated event shows that at least one period of construction/occupation in Locus 1 was nearly contemporaneous with the occupation of Locus 2. Therefore, there is a possibility of a long (late 1100s to late 1300s) and large (between 85 and 175 rooms, depending on the occupation phase) occupation at LA 49 (Figure 1.3 and Table 5.7). Further refinement of the Locus 1 occupation (both Black Mountain and Cliff phases) is needed, and this could reframe our understanding of Postclassic period settlements.

The modeled chronometric dates and stratigraphy provide two alternative interpretations of the dating of the final use of the pit structures and the construction of the room block. It is important to keep in mind that in the multiphase sequence model, phases within the sequence may or may not be formed as a continuous deposit, and the Bayesian model provides probabilities, not absolute dates (Bayliss et al. 2007; Bayliss et al. 2011; Bronk Ramsey 1998, 2009a; McNutt 2014). Using the modeled dates from Locus 2, the first interpretation suggests a gap (about 55 years, A.D. 1210 to 1265, or approximately two generations) between the final use of the pit structures (Phase 1) and the construction of the room block (Phase 3 start date) (Table 5.7). Using the stratigraphic data, the second interpretation suggests that there was little, if any, break between the final use of the pit structures and the construction of the room block (wall
alignment of pithouse A and the room block, trash fill, no natural fill). Phase 2 (cal A.D. 1165 to 1268), which dates either fill before construction of OS 2 or trash fill representing the continued use of the site, provides preliminary evidence that even if there was a break between the final use of the pit structures and construction of the room block, the site was still in use. At this point, more radiocarbon data (standardized likelihoods) are needed to be able to update the posterior beliefs and refine the construction sequence of the pit structures and room block.

Whether or not there was a break, I propose that the stratigraphy and construction sequence imply that the same people built both the pit structures and room block in Locus 2. First, the room block walls (room A) are built directly on top of the pithouse A walls (Figure 5.8). This suggests a social connection to the previous occupants. Second, pithouses A and B contain little natural fill. The Black Mountain site is located on dunes in the Deming plain. This area is frequently windy and the topsoil is fine sand. Wind and ponding events deposited natural fill in abandoned rooms at a rapid rate. There was no evidence of these natural fill events in the lower levels of pithouses A and B. Therefore, people constructing the room block either cleaned out the natural fill before filling the pithouse A with trash and construction fill or these stratigraphic deposits represent a continuous occupation and further refinement is needed of the radiocarbon data.

People also may have continued to live at the site. In Chapter One and above, I provide evidence that there may be a Black Mountain phase occupation in Locus 1 (Figure 5.3). Thus, once the people who built the pit structures decided to stay at the site, they may have started construction in Locus 1 and then expanded or moved back to Locus 2 around A.D. 1265. Radiocarbon data and refinement of the Locus 1 stratigraphy are needed to answer this question. These will be key components of future research. Although it is difficult to propose a
construction date for the pit structures (likely between A.D. 1100 and 1200, see Table 5.6 and 5.8), the pottery, geomorphology, construction sequence, and radiocarbon data provide strong evidence that these pit structures were built during the Black Mountain phase. Consideration of the geomorphology, construction sequence, and radiocarbon and dendrochronology dates from Locus 2 provides evidence that construction in Locus 2 ended around 1320.

Relative Dating: Ceramic Seriation and Cross-Dating

While ceramic seriation has been a useful tool for refining relative dating at numerous sites and regions in archaeological research (e.g., Duff 1996; Kintigh et al. 2004; LeBlanc 1975; Lyman et al. 1998; O’Brien and Lyman 2013; Peeples and Schachner 2012; Schachner 2012), seriation was not possible for ceramic data from LA 49 because of the long time spans of several common ceramic types dating to both the Black Mountain and Cliff phases (Appendix B; Table 5.2 and 5.8). The types at Black Mountain and Cliff phase sites that provide a more detailed time resolution (e.g., St. Johns Polychrome, Roosevelt Red Wares, and Chihuahua polychromes) (Carlson 1970; Sayles 1936; Laumbach 2009; Neuzil and Lyons 2006) do not occur in high numbers at LA 49 or at most Black Mountain and Cliff phase sites (Nelson and LeBlanc 1986:266-270; Ravesloot 1979; Taliaferro 2014:466-469). Moreover, few sites dating to these phases, including LA 49, have stratified middens. Although there are clearly stratified deposits in the Locus 1 and 2 room blocks (see description of stratigraphic sequences above), the lack of stratified middens and the low frequency of time-sensitive ceramic types did not lend itself to seriation (Appendix B).

Standard seriation techniques could not be employed at LA 49 because of the low frequencies of diagnostic sherds in too many contexts (Appendix B). For example,
Correspondence Analysis (CA) is a common statistical multivariate scaling process used to order observations (e.g., counts of sherds in stratified deposits) relative to an element of variability (e.g., time) (e.g., Duff 1996; Lyman et al. 1998; O’Brien and Lyman 2013). However, low frequencies of sherd counts can increase the error margin in the analysis (Duff 1996; Eckert 2003; O’Brien and Lyman 2013; Peeples and Schachner 2012; Sokal and Rohlf 1995). For the Black Mountain site ceramic data, there were too few time-sensitive ceramics (less than 10% of total sample) to run a meaningful CA. No matter how stratified deposits and contexts were grouped and combined, these data still had numerous cells with low frequencies (> 20 sherds), and these low frequencies drove the analysis (Table 5.8).

Therefore, presence/absence and frequency data of well-dated ceramic types provide the best data for interpretation. Cross dating is the principle that diagnostic artifacts (in this case ceramics) that are well dated at one archaeological site/region will be approximately the same age when found at other sites (see Orton and Hughes 2013; Rice 1987; Shepard 1956). Although this technique is not without problems (see Shepard 1956:306-333), ceramics are generally well dated in the American Southwest and, therefore, cross dating is an accepted method (Cordell and McBrinn 2012:83-84). At the Black Mountain site, this method provides evidence that dendrochronological data do not represent old wood and the radiocarbon samples do not represent annuals that were stored for a long time. Cross dating also suggests that Locus 2 dates to the Black Mountain phase because of the lower appearance of Chihuahuan and Roosevelt Red Wares in Locus 2 than in Locus 1.

As shown in Table 5., there were more Chihuahua polychromes and Roosevelt Red Wares (both ceramic types that date after A.D. 1275/1300) associated with the Cliff phase room block and more St. Johns Polychromes, Chupadero Black-on-white, and Playas Red Wares
(types that start around 1150/1200) associated with the Black Mountain phase room block. This suggests that Locus 2 predated the upper Cliff phase levels of Locus 1 (ceramic seriation shown in more detail in Appendix B: Tables B.2 and B.3). In the possible Black Mountain phase occupation of Locus 1 (Figure 5.3), few diagnostic sherds (n = 16) were found in the lower stratigraphic levels and these types, such as Playas Red Wares, span both the Black Mountain and Cliff phases. Therefore, cross-dating methods could determine if this earlier occupation represents a Black Mountain component. Future work at the site will focus on this area of occupation.

**Summary and Discussion**

This chapter reviewed radiocarbon and tree-ring dates as well as the stratigraphy, construction sequence, and construction techniques of the Black Mountain phase pit structures and room block in order to understand the timing of the Black Mountain phase at LA 49. These dates suggest that at LA 49 the Black Mountain phase began sometime between A.D. 1100 and 1200 and ended around A.D. 1320. Although one radiocarbon date (cal A.D. 1267 to 1392) was excavated from the Cliff phase occupation in Locus 1, since this sample came from distributed fill, it did not provide further resolution of the Locus 1 occupations. Of critical importance is the lack of any Classic Mimbres phase component at or near LA 49. To provide a more regional context for the social transformation, in the final section of this chapter, I evaluate the possibility that migrants built the Locus 2 (Black Mountain phase) pit structures. I also review chronometric data from Old Town and compare them to data presented in this chapter on the Black Mountain site. Finally, I summarize the technological similarities found between the construction of Classic Mimbres and Black Mountain phase walls.
The construction of pit structures, in or around a later permanent pueblo room block, has been noted as an archaeological signature associated with migrants. Although the construction of temporary pit structures by migrant groups is most famously associated with the Kayenta populations at Point of Pines (Haury 1958), in fact, the construction of temporary pit structure villages is a signature executed by several migrant groups in the American Southwest. Examples of this practice are found at sites such as Orayvi Pueblo, the Davis Ranch Site, Reeve Ruin, Spear Ranch, the Leaf Water Site, Pindi Pueblo, Ormand Village, and sites in the Safford Valley (e.g., Cameron 1999; Clark 2001; Di Peso 1958; Lyons 2003; Neuzil 2008; Stubbs and Stallings 1953; Wendorf and Stubbs 1953:23-24). Wendorf and Stubbs (1953:23-24) consider the possibility of migrants but suggest that the pit structures at the Leaf Water Site in the Chama Basin were more permanent and not “expedient,” but since they date to the 1300s, it seems possible they could represent migrants.

Lyons (2003:97-98) discusses the movement of Hopi-Tewa migrants who moved from the Rio Grande Valley to First Mesa. He recounts Hopi oral traditions, which describe the construction of temporary pit structures as “probationary settlements” that allowed resident and migrant populations to develop social, economic, and political relationships. The dates (cal A.D. 1061 to 1211) for the final use of the pit structures at the Black Mountain site and construction of the Black Mountain phase room blocks is a bit early for Kayenta migrants, who are thought to have entered the region around A.D. 1275 (Clark 2001; Neuzil and Lyons 2006). Since this signature is seen in several regions of the American Southwest, it may suggest the presence of migrants, although not necessarily Kayenta migrants, at the Black Mountain site.

Based on the radiocarbon dates, Pithouse B (encompassed by Units 10, 16, 19, and 20) was likely not contemporaneous with the room block, providing additional evidence that they
may have been constructed by migrants or Mimbres Valley resident population who were moving in from other parts of the region. The date that was pulled from the hearth in the pit structure was earlier than any of the dates for the room block (cal A.D. 1029-1159; AA 104764; see Table 5.1). With the cutting date of 1266 (NAN-193) of construction material in the room block, it seems unlikely that Pithouse B and the room block were not contemporaneous.

It is also important to consider that these pit structures may have been non-domestic architecture. If we consider the trend of the decrease in public architecture and communal pit structures from the Late Pithouse period to the Classic Mimbres, the lack of large communal structures or plaza in Locus 2 suggests the development of a more corporately organized religious and social system at the end of the Classic Mimbres (see Creel and Anyon 2003; Shafer 1999, 2006). At this point, there is so little data on the pit structures in Locus 2 that it is difficult to suggest their use. So few Black Mountain phase sites have been excavated that it is challenging to speculate on the social organization of the phase (Shafer 2006:31). Either way, it is important to consider at least the possibility that the pit structures may have been use for non-domestic activities.

At LA 49, the construction of the Black Mountain phase room block walls shows some technological continuity with Classic Mimbres construction. Although various Black Mountain site formation processes, such as looting and mechanical grading, have complicated the occupational history by destroying walls and numerous intramural features, there is some indication that wall construction techniques in Locus 2 were similar to methods used by earlier Classic Mimbres peoples. As suggested by Clark (2001, 2011), construction methods are a low visibility attribute that is not easily replicated. Although several scholars have suggested that low and high visibility attributes are unstable during migration events (Ortman 2012; Ortman and
Cameron 2008; Stone and Lipe 2008) and during social transformation (Chapter Three), as suggested in Chapter Three, it is critical to examine both high and low visibility attributes. Wall construction techniques add another low visibility attribute to the dataset.

Several researchers note a change in construction materials from cobblestone masonry to puddled adobe during the transition from the Classic Mimbres phase to the Black Mountain phase (Creel 1999; LeBlanc 1977; Shafer 1999; Taliaferro 2014). Although there was a change in construction materials from cobblestone masonry to puddled adobe, the adobe walls in the Black Mountain phase room block are made with large cimientos or upright foundation stones that were placed in wall trenches (Figure 5.8 and 5.11). This technological construction technique is very similar to earlier Classic Mimbres occupations (Cosgrove and Cosgrove 1932; Creel 2006c Shafer 2003) but also shows similarities to construction techniques in northern Chihuahua and northern Sonoran deserts (Lekson 2002:72). Therefore, this technological feature may represent resident populations (people who remained in the Mimbres Valley after the Classic Mimbres phase) who continued old practices. It may also show an amalgamation of practices. Migrant populations from northern Mexico may have brought adobe technology with them, and if the resident population was renegotiating and transforming their identities, their technologies may have represented both old and new practices. Adobe construction is seen in some parts of the Mimbres region throughout the sequence, so this technology was not completely new (e.g., Creel 1999:108-110, 116-117; Wallace 1998). Large cimientos have not been reported at other Black Mountain phase sites (Anyon and LeBlanc 1984; Creel 1999; Ravesloot 1979), but the possible technological similarity to Classic Mimbres room blocks, along with the configuration of intramural features, warrant further examination.
The comparison of data from Old Town and the Black Mountain sites demonstrates the Black Mountain phase was not a uniform process throughout the region. Research at Old Town suggests there was a continued occupation from the Classic/Terminal Classic to Black Mountain phase (Creel 1999, 2006b; Taliaferro 2014). Several lines of evidence, including continuity of burial practices and the first appearance of “Black Mountain phase” material culture near the end of the Classic/Terminal Classic Mimbres phases (Table 1.1), indicate a continuous occupation. Research at Old Town also provides evidence for at least two periods of construction during the Black Mountain phase (Taliaferro 2014:141-187; Taliaferro and Creel 2007) based on analysis of the construction sequence and the appearance of Tucson Polychrome sherds in the upper level of construction fill (e.g., wall-fall and/or roof-fall). The first, earliest phase of post-Mimbres construction supports a continued occupation from the Classic/Terminal Classic phase to the Black Mountain phase. The second, later construction shows that a subsequent room block was built over the initial Black Mountain phase room block. This area contained a few Tucson Polychrome sherds, implying this second phase of construction began sometime around A.D. 1275 (Neuzil and Lyons 2006).

In summary, I suggest that both the Black Mountain site and Old Town Ruin provide preliminary evidence that migrant populations as well as populations with connections to the previous Classic Mimbres populations were living in the Mimbres Valley after A.D. 1150. The construction of the Black Mountain phase room block on top of Black Mountain phase pit structures could suggest migrants at LA 49, although the construction technique of walls at Black Mountain might also show connection to earlier populations. Although there appears to be a break between the final occupation of the Black Mountain phase pit structures and the construction of the Black Mountain phase room block, the construction of the room block wall
directly on top of pithouse A suggests connections between the groups that built the pit structure and the room block. Since the Bayesian analysis of the absolute dates is a probabilistic method, additional data will help to refine further the chronology at LA 49. Although there is strong evidence of a continued occupation at Old Town (Creel 1999, 2006b; Taliaferro 2014), I propose that the multiple construction sequences, the juxtaposition of the construction sequence, and the appearance of Roosevelt Red Wares at Old Town may also suggest a migrant population. Research at Old Town and the Black Mountain site further highlights the diverse ways people approached reorganization at the end of the Classic Mimbres.
CHAPTER VI

POTTERY PRODUCTION, EXCHANGE, AND USE AT THE BLACK MOUNTAIN SITE

Introduction

An examination of the movement of ceramic objects through time and across the Mimbres region provides a detailed understanding of changes in the social interaction before and after the social transformation. Utilizing an object life history approach (e.g., Appadurai 1986, Dietler and Herbich 1998; Dobres and Hoffman 1994; Gosden and Marshall 1999; Jones 2005; Kopytoff 1986; Wallis 2011), this chapter examines the production, exchange, and use of pottery from the Black Mountain site (Black Mountain and Cliff phases) and the Mimbres region to explore the nature of the social transformation. Ceramic compositional data produced through neutron activation analysis (NAA) is used to identify likely ceramic production zones of pottery from the Black Mountain site. In order to examine the circulation and production of pottery, these data are related to previous NAA investigations conducted in the Mimbres region (Brewington et al. 1996; Creel et al. 2002; Gilman et al. 1994; James et al. 1995; Powell-Marti and James 2006; Schriever 2008; Speakman 2013; Taliaferro 2014).

Below, I examine the geology of the Mimbres region and show that there is sufficient geological diversity for NAA. I explain the techniques used to analyze the NAA data and review the sampling methodology (ceramics type/wares and macroscopic temper groups) of the BMAP data set. Petrographic data for the Black Mountain site sample are also reviewed. Next, I present the methods used to define the compositional groups at LA 49. I provide a discussion of each group and its likely production location. I also explore the interpretation of these groups utilizing an object life history and history of practice approach (Chapter Three). With this theoretical framework, the production, exchange, use, and final deposition of ceramics are examined from
the Classic Mimbres through the Cliff phase to provide a context for the social transformation and track differences/similarities through time. Using an object life history approach, I first explore the choice of clay sources and the production location (NAA data/production) of pottery at the Black Mountain site. The production locations are examined on a regional scale to highlight the exchange and circulation of pottery during the Classic Mimbres through Cliff phases. Because the Black Mountain site data set does not allow for the examination of use and organization of production. I use recent work at Old Town, which provides data for these stages (Creel et al. 2002; Taliaferro 2014). The final deposition of ceramics from several sites is then examined for the Black Mountain and Cliff phases (Creel 1999, 2006c; Ravesloot 1979; Taliaferro 2014) and compared to earlier periods. These data, which examine object life histories from A.D. 1000 to 1450, provide evidence for the continuation of populations from the Classic Mimbres to Black Mountain phase as well as preliminary evidence of small groups of migrant populations.

**Geological Setting**

Effective application of NAA necessitates a relatively high level of geological diversity. Numerous ceramic compositional studies in the Mimbres region have shown that the geological diversity in southwestern New Mexico allows for a general indication of production areas (Creel 1999; Creel et al. 2002; Gilman et al. 1994; James et al. 1995; Miller et al. 1998; Speakman 2013). The basin and range area of southwestern New Mexico has a complicated geological history and a wide variety of formations. The Mimbres Valley is less diverse geologically than the region as a whole. Around the Black Mountain site, the geologic setting is composed primarily of intrusive and extrusive volcanic events (Anderson and Jones 1994 Hoffer 1971). Consolidated sedimentary units are also present, and include sandstone, limestone, and some
shale. Creel and colleagues (2002) suggest that the wide variety of exposed rocks and the extensive geological faulting in the region have distributed geologic materials and created chemically distinct clay samples, which are ideal for compositional analysis of pottery through NAA (see also Gilman et al. 1994).

**Ceramic Chemical Characterization Using NAA**

Previous archaeological studies examining the exchange and circulation of ceramics have utilized a variety of chemical and mineralogical methods (petrography, ICP-MS, XRF, and NAA) to isolate likely production zones of pottery (Bishop et al. 1982; Neff and Glowacki 2002). Depending on the research question, geology of the region under study, and previous research in the region, these methods can provide useful information for defining ceramic production zones. For the Mimbres region, NAA is the prevailing method for defining groups of pottery that are compositionally similar (Brewington et al. 1996; Creel et al. 2002; Brewington and Shafer 1999; Gilman et al. 1994; James et al. 1995; Schriever 2008; Speakman 2013: Taliaferro 2014). Prior research, therefore, provides a strong baseline for evaluating possible production zones of the ceramics from the Black Mountain site.

Several researchers provide detailed discussion of the technological and preparation procedures of NAA (Duff 1999; Glascock 1992; Neff and Glowacki 2002; Speakman 2013). Thus, I only briefly review these procedures. All the samples for this study were analyzed at the Archaeometry Laboratory at the University of Missouri Research Reactor (MURR). MURR measures 33 element abundances through the NAA sampling procedures (Table 6.1). The statistical analyses of the Black Mountain samples were run without nickel because, in the American Southwest and New World in general, the quantity of nickel in NAA samples consistently falls below a measurable level (personal communication, Jeffery Ferguson 2015).
Table 6.1 Element Concentrations Measured by MURR

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<td>Barium</td>
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<td>Calcium</td>
</tr>
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<td>Ce</td>
<td>Cerium</td>
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<td>Co</td>
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<td>Cr</td>
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<td>Na</td>
<td>Sodium</td>
</tr>
<tr>
<td>Nd</td>
<td>Neodymium</td>
</tr>
<tr>
<td>Ni</td>
<td>Nickel</td>
</tr>
<tr>
<td>Rd</td>
<td>Rubidium</td>
</tr>
<tr>
<td>Sb</td>
<td>Antimony</td>
</tr>
<tr>
<td>Sc</td>
<td>Scandium</td>
</tr>
<tr>
<td>Sm</td>
<td>Samarium</td>
</tr>
<tr>
<td>Sr</td>
<td>Strontium</td>
</tr>
<tr>
<td>Ta</td>
<td>Tantalum</td>
</tr>
<tr>
<td>Tb</td>
<td>Terbium</td>
</tr>
<tr>
<td>Th</td>
<td>Thorium</td>
</tr>
<tr>
<td>Ti</td>
<td>Titanium</td>
</tr>
<tr>
<td>U</td>
<td>Uranium</td>
</tr>
<tr>
<td>V</td>
<td>Vanadium</td>
</tr>
<tr>
<td>W</td>
<td>Waspalute</td>
</tr>
<tr>
<td>Zn</td>
<td>Zinc</td>
</tr>
<tr>
<td>Zr</td>
<td>Zirconium</td>
</tr>
<tr>
<td>Zr</td>
<td>Zirconium</td>
</tr>
</tbody>
</table>

NAA is a bulk analysis technique. Since the slip, paint, and surface treatments are removed before analysis, only the ceramic paste and tempers are measured. Once the exterior portions of the ceramic are removed, they are washed, dried, ground into a powder, and divided into two samples. These samples are exposed to irradiations and flooded with neutrons. One sample is exposed for five seconds and the second for 24 hours. This exposure to radiation creates isotopes that emit gamma rays. The gamma ray emissions are measured at various points to determine the half-lives of the 33 elements. These measurements provide data on the abundance of elements present in the sample.

The main goal of NAA is to identify distinct chemical composition groups. The second objective is to assign the compositional groups of unspecified provenience to previously known groups (Glascock 1992). These compositional groups can then be linked to production locations through the criterion of abundance, which assumes that the most common chemical composition group at a site is locally made (Bishop et al. 1982; Duff 1999; Glascock 1992; Neff 2002). While the criterion of abundance is a common method in NAA analysis, it raises some obvious questions. For example, if the sample for a site or region is small, the “most common” sample may not have been made at the site. Therefore, large data sets are required for successful NAA (see later discussion of groups G1, G2a, G2b, G3, G4, and G5). The analysis of clay samples at
times can make a strong argument for local production (Speakman 2013). Although BMAP did not submit raw clays, several raw clay samples are included in the large Mimbres NAA data set (Creel et al. 2002; Speakman 2013). Identification of compositional groups allows for a reconstruction of economic and social networks and an examination of whether these networks were stable or varied over time.

The statistical processes used to explore the NAA data are thoroughly reviewed by several researchers (Baxter and Buck 2000; Bieber et al. 1976 Bishop and Neff 1989; Duff 1999, 2002; Glascock 1992; Glowacki 2006; Neff 2000, 2002; Peeples 2011). Glascock (1992:16) emphasizes that “there is no single ‘textbook’ method for data reduction and interpretation that guarantees a satisfactory result for all applications. As a result, different approaches are required to achieve greater understanding of each data set.” Below, I describe the macroscopic analyses and how these analyses were used to define the Black Mountain NAA data set. I also briefly summarize the methods used to create compositional groups, which are guided by the procedures presented in Duff (1999, 2002), Glascock (1992), Glowacki (2006), Peeples (2011), and Neff (2002).

The Black Mountain Site Ceramic Sample

The Black Mountain site ceramic sample contained a total of 7,209 sherds. Table 6.2 shows the total ceramic counts (painted and non-painted types/wares) for Loci 1 and 2. These sherds were recovered from isolated finds, surface collection units, and excavation. Table 6.3 shows the sherds collected from the surface collection units for Locus 3. No excavation was conducted in Locus 3. These tables include only sherds larger than 2 cm, as sherds smaller than 2
cm could not be accurately identified. Several researchers (LeBlanc and Whalen 1980; Taliaferro 2014; Ravesloot 1979) and Cliff phase (LeBlanc and Whalen 1980; Nelson and LeBlanc 1986) note that Black Mountain sites have low frequencies of painted wares. Specifically, LeBlanc and Whalen (1980:283) suggest that painted ceramics represent about 3% to 15% of most Black Mountain and Cliff phase sites surveyed and excavated by the Mimbres Foundation. The painted ceramics from the Janss, Disert, and Stailey sites also range from about 4% to 12% (Nelson and LeBlanc 1986:139). Similarly, the Black Mountain component at Old Town Ruin had a painted assemblage that represented about 17% of the total assemblage (Taliaferro 2014:323-335).

Although the Black Mountain site painted assemblage was slightly higher for Locus 1 (n = 33%), the frequency for Locus 2 was similar (n=14%). The total ceramic assemblage (n = 7,209) contained about 18% painted sherds (n = 846). The slightly higher amount of painted ceramics in Locus 1 is not surprising since BMAP collected several diagnostic sherds as isolated finds that were later determined to represent Locus 1 provenience. Since a smaller area was excavated in Locus 1, these isolated finds contributed to a higher than expected total of painted wares.

The Black Mountain Site Macroscopic and NAA Analyses

Macroscopic Temper Analysis

I conducted macroscopic analysis on all sherds 3 cm and larger (Appendix B). The macroscopic study, guided by Suzanne Eckert, provided a baseline for selecting NAA and petrographic samples. The ceramic sample analyzed for technological and macroscopic tempers consisted of approximately 4,700 sherds out of a total of 7,209 sherds. The remaining 2,500 sherds were less than 2 cm and too small for analysis. Although decoration and technological attributes were recorded (paint, incising, slip, corrugation, etc.; see Appendix B), because of the small size (less than 2 cm) of most sherds and the relatively small quantity of decorated wares
### Table 6.2 Locus 1 and 2 Painted and Non-Painted Ceramic Counts by Type and Ware

<table>
<thead>
<tr>
<th>Painted Wares</th>
<th>Loc 1</th>
<th>Loc 2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Babicora Polychrome</td>
<td>6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Carretas Polychrome</td>
<td>8</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Chihuahua Polychrome Undiff</td>
<td>17</td>
<td>13</td>
<td>30</td>
</tr>
<tr>
<td>Chupadero B/w</td>
<td>32</td>
<td>154</td>
<td>186</td>
</tr>
<tr>
<td>Cliff Polychrome</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Cliff W/r</td>
<td>8</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>Dublan Polychrome</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>El Paso B/br</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>El Paso Bi and Polychrome</td>
<td>10</td>
<td>22</td>
<td>32</td>
</tr>
<tr>
<td>El Paso Undiff</td>
<td>210</td>
<td>145</td>
<td>355</td>
</tr>
<tr>
<td>Glia Polychrome</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Lincoln B/r</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Madera B/r</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Maverick Mnt</td>
<td>16</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Mimbres Red washed</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Mimbres (Style I, II, III)</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Mollogon R/br</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Ramos B/w</td>
<td>3</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Ramos Black</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Ramos Polychrome</td>
<td>2</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Roosevelt Red Ware Undiff</td>
<td>29</td>
<td>4</td>
<td>33</td>
</tr>
<tr>
<td>St Johns B/r</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>St Johns Polychrome</td>
<td>1</td>
<td>13</td>
<td>14</td>
</tr>
<tr>
<td>Three Rivers R/t</td>
<td>2</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Tonto R/b</td>
<td>6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>Undiff Brown Ware Painted</td>
<td>4</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Undiff Mimbres B/w</td>
<td>1</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Undiff Gray Ware</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Undiff White Mnt Red Ware</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Undiff White Ware Painted</td>
<td>1</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Villa Ahumada Polychrome</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Wingate B/r</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>370</strong></td>
<td><strong>410</strong></td>
<td><strong>780</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non-painted Wares</th>
<th>Loc 1</th>
<th>Loc 2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clapboard Corrugated</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Clapboard Corrugated smudged</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Incised Corrugated</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Incised Corrugated, smudged</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Indented Corrugated</td>
<td>5</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>Indented Corrugated, smudged</td>
<td>13</td>
<td>26</td>
<td>39</td>
</tr>
<tr>
<td>Patterned Corrugated</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Plain Corrugated</td>
<td>2</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Plain Corrugated, smudged</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Plain ware, smudged</td>
<td>12</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>Playas Red Cord marked</td>
<td>5</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>Playas Red Incised</td>
<td>27</td>
<td>215</td>
<td>242</td>
</tr>
<tr>
<td>Playas Red Punctate</td>
<td>124</td>
<td>478</td>
<td>602</td>
</tr>
<tr>
<td>Playas Series</td>
<td>107</td>
<td>576</td>
<td>683</td>
</tr>
<tr>
<td>Smeared Corrugated</td>
<td>6</td>
<td>18</td>
<td>24</td>
</tr>
<tr>
<td>Smeared Corrugated, smudged</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Undifferentiated Brown Ware</td>
<td>427</td>
<td>1005</td>
<td>1432</td>
</tr>
<tr>
<td>Undifferentiated Gray Ware</td>
<td>0</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Undifferentiated Red Ware</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Zoned Corrugated</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>735</strong></td>
<td><strong>2391</strong></td>
<td><strong>3126</strong></td>
</tr>
</tbody>
</table>
Table 6.3  Locus 3 Painted and Non-Painted Ceramic Counts by Type and Ware

<table>
<thead>
<tr>
<th>Locus 3 Types</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chupadero B/w</td>
<td>1</td>
</tr>
<tr>
<td>Undifferentiated White Ware, no paint</td>
<td>1</td>
</tr>
<tr>
<td>Undifferentiated Brown Ware</td>
<td>41</td>
</tr>
<tr>
<td>Undifferentiated Gray Ware</td>
<td>1</td>
</tr>
<tr>
<td>St Johns Polychrome</td>
<td>1</td>
</tr>
<tr>
<td>Mollgon R/b</td>
<td>2</td>
</tr>
<tr>
<td>Three Circle R/w</td>
<td>1</td>
</tr>
<tr>
<td>Mimbres Style I</td>
<td>1</td>
</tr>
<tr>
<td>Clapboard Corrugated</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
</tr>
</tbody>
</table>

(n = 846, 18%), examination of these attributes did not allow for a detailed analysis. As noted in Chapter Three, decoration and design layout can help to distinguish shifting exchange networks and migration. Although the sample did not lend itself to the examination of decoration and design (high visibility traits), other archaeological features, such as the use of pottery in burial, provide data on high visibility attributes. I recorded a total of 16 macroscopic temper groups and subgroups (Appendix B). NAA and petrographic samples were selected based on similarities and differences among temper groups, ceramic types, and site distribution (Appendix B and C; Tables 6.2 and 6.3). NAA analysis of Black Mountain and Cliff phase ceramics from the Mimbres region and the selection of the LA 49 site NAA sample are described below.

**The Mimbres Region NAA Data Set**

Around 3,600 Mimbres-Mogollon ceramics (including whole pots and sherds) and 160 clay samples from almost 165 sites in New Mexico, Texas, Arizona, and northern Mexico provide an important source of comparison for the Black Mountain site (Creel et al. 2002; Gilman et al. 1994; James et al. 1995; Speakman 2013). This sample was the product of numerous projects and was detailed in recent work by Robert J. Speakman (2013). It is often
possible to determine the exact source location for lithic materials such as obsidian because lithic sources are generally more localized and tend to be compositionally homogenous (Shackley 2005; Chapter Seven). Ceramic NAA samples are not as easily linked to a specific source.

As Speakman (2013:63) notes, “the ubiquity of ceramic raw materials usually makes it impossible to sample all potential [clay sources].” Consequently, ceramic NAA samples are not as easily related to specific clay sources. NAA is a bulk characterization process that measures the element concentrations of both the clay paste and temper materials that may have been added after the clay was collected. As a result, NAA ceramic samples do not always group chemically with their source material (Arnold et al. 1991; Neff and Glowacki 2002). But since the Mimbres region has a large NAA data set, this technique still provides the best method for comparison with LA 49 ceramics. Clay samples were not collected for this study because of the problems noted above and because 160 samples from the Mimbres region had previously been submitted to MURR.

Black Mountain Site NAA Sample

Previous research has examined 352 sherds from Black Mountain phase sites, with the majority of these sherds coming from the Old Town site (Creel et al. 2002; Taliaferro 2014). This earlier analysis also includes pottery from the Montoya and Walsh site, as well as several other sites in the Mimbres region (Creel et al. 2002; Taliaferro 2014:340-414). The sample from the Black Mountain site adds 340 ceramics to this regional corpus (Table 6.4, Table 6.5). A variety of types from Locus 1 (Black Mountain phase pithouses and room block) and Locus 2 (Cliff phase room block) were chosen in order to track changes in production through time and to evaluate if pottery types that first appear during the Black Mountain phase can be linked to earlier Classic Mimbres production zones.
Sherds were selected based on ceramic type and macroscopic temper group. Almost one-third of the samples were plain wares selected to provide a possible baseline for local production. I also selected sherds that represented a variety of Postclassic types (Chihuahuan Wares, Jornada Wares, Playas wares, Roosevelt Red Wares) to track exchange and social connections during the Postclassic periods. Table 6.4 shows the number of types and wares represented in the LA 49 NAA sample. As shown in Table 6.5, 205 sherds were submitted from Locus 2 (Black Mountain phase pithouses and room block), 124 were submitted from Locus 1 (Cliff phase room block), and 11 were submitted from areas of the site that could not be directly linked to an architectural component (Isolated Finds (ISOs) and Surface Collection Units). These sherds of “unknown” provenience were submitted because there were few Roosevelt Red Wares at the site. To ensure that multiple NAA samples were not submitted from the same vessel, a few sherds from most wares were submitted from non-architectural areas (Table 6.5). In addition, 13 Roosevelt Red Wares from the Black Mountain site were submitted in 2011 as part of a large-scale study conducted by Archaeology Southwest (Huntley et al. 2014; Ownby et al. 2014).

Statistical Analyses of the Black Mountain Site NAA Sample

Statistical analyses of the NAA data were performed using the GUASS program developed by Hector Neff at MURR. The raw data were transformed to base 10 logarithms. Since multivariate statistics assume multivariate normality, this data transformation compensates for differences in magnitude between elements and creates distributions that more closely replicate normal distribution (Baxter 1994; Duff 1999; Neff 2002). In the context of these archaeological data, the first round of statistical analyses should been seen as exploratory rather than confirmatory (Duff 1999; Neff 2002). Neff (2002) recommends the use of several contextual and multivariate methods to create initial compositional groups.
### Table 6.4 Black Mountain Site NAA Sample by Ware and Type

<table>
<thead>
<tr>
<th>Ware</th>
<th>Ceramic Type</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chihuahuan wares</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Babicora polychrome</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Carretas polychrome</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Chihuahua Red-on-brown</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Chihuahuan polychrome (Undiff)</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>Dublan polychrome</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Madera Black-on-red</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Ramos B/w</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Ramos Black</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Ramos polychrome</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Villa Ahumada polychrome</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td><strong>Corrugated wares</strong></td>
<td></td>
<td>23</td>
</tr>
<tr>
<td>Incised corrugated, smudged</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Indented corrugated</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Indented corrugated, smudged</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Tularosa Fillet Rim</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Smearred corrugated</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td><strong>Jornada Mogollon wares</strong></td>
<td>El Paso polychrome</td>
<td>17</td>
</tr>
<tr>
<td><strong>Mimbres Painted wares</strong></td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Mollogon R/b</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Boldface (Style I)</td>
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<td></td>
</tr>
<tr>
<td>Transitional (Style II)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Mimbres Classic B/w (Style III)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Mimbres painted white</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td><strong>Painted white ware</strong></td>
<td>Socorro B/w</td>
<td>1</td>
</tr>
<tr>
<td><strong>Plain ware</strong></td>
<td>Plain ware</td>
<td>101</td>
</tr>
<tr>
<td><strong>Playas red wares</strong></td>
<td></td>
<td>91</td>
</tr>
<tr>
<td>Playas Red Cord marked</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Playas Red Incised</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>Playas Red plain</td>
<td>27</td>
<td></td>
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<tr>
<td>Playas Red Punctate</td>
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<td></td>
</tr>
<tr>
<td>Playas red wares</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Roosevelt red wares</strong></td>
<td></td>
<td>42</td>
</tr>
<tr>
<td>Cliff W/r</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Gila polychrome</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Maverick Mountain polychrome</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Salado polychrome (Undiff)</td>
<td>17</td>
<td></td>
</tr>
<tr>
<td>Tonto B/r</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>340</td>
</tr>
</tbody>
</table>
Table 6.5 Black Mountain Site NAA Sample by Locus and Ware

<table>
<thead>
<tr>
<th>Period</th>
<th>Ceramic Ware</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Locus 2</td>
<td>Chihuahuan ware</td>
<td>19</td>
</tr>
<tr>
<td>Black Mountain room block</td>
<td>Corrugated ware</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Jornada Mogollon ware</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Mimbres Painted ware</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Plain ware</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td>Playas Red wares</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>Roosevelt red wares</td>
<td>7</td>
</tr>
<tr>
<td>Locus 2 Total</td>
<td></td>
<td>205</td>
</tr>
<tr>
<td>Locus 1</td>
<td>Chihuahuan ware</td>
<td>33</td>
</tr>
<tr>
<td>Cliff room block</td>
<td>Corrugated ware</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Jornada Mogollon ware</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Mimbres Painted ware</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Painted white ware</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Plain ware</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Playas Red wares</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Roosevelt red wares</td>
<td>28</td>
</tr>
<tr>
<td>Locus 1 Total</td>
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<td>124</td>
</tr>
<tr>
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<td>Chihuahuan ware</td>
<td>1</td>
</tr>
<tr>
<td>ISOs and Surface Collection Units</td>
<td>Corrugated ware</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Jornada Mogollon ware</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Playas Red wares</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Roosevelt red wares</td>
<td>7</td>
</tr>
<tr>
<td>Unknown Total</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>340</td>
</tr>
</tbody>
</table>

*Note:* All Locus 1 sherds came from the upper stratigraphic levels and most likely represent the Cliff phase occupation of Locus 1.

For the Black Mountain sample, this first round of analysis, conducted at MURR with Jeffery Ferguson, utilized Cluster Analysis (CA)\(^1\), Principal Component Analysis (PCA), visual

\(^1\) Cluster Analyses (CA) were used early on during group evaluation as a method to explore some of the groups that were not holding together statically. Glascock (1992:17) notes that CA can be problematic because it “forces” data samples into groups that may not hold up in other types of statistical analyses. In other words, in a CA, every sample is forced into some level of association with the rest of the samples in the dataset and, therefore, this analysis can distort relationships among samples. Although it can be a useful exploratory method, it did not provide resolution for the BMAP NAA data.
assessment of bivariate plots, and non-compositional data (pottery types) to explore possible compositional groupings. These methods have several drawbacks when used individually, but when used together, they improve the quality of archaeological interpretations, especially if group assignments are strongly associated across multiple methods (Bishop et al. 1982; Glascock 1992; Neff 2000). Once groups were established, these compositional clusters were evaluated for coherence through Mahalanobis distance (Appendix E). GUASS converts Mahalanobis distances into probabilities of group membership for each sample. Multiple groups are compared and the probability of membership for each sample is noted for each compositional group. For Mahalanobis distance, the number of samples (NAA samples) in each compositional group must be larger than the number of variables (elements) used in the comparison. Therefore, since 32 elements were used in the Black Mountain NAA data set, Mahalanobis distance can only be used to evaluate compositional groups with 33 or more samples.

This method tends to work best with large data sets. However, when Mahalanobis distance is paired with PCA, the number of samples per compositional group can be smaller. Although this method is less statistically rigorous, it permits for the evaluation of more samples and groups (Duff 1999; Neff 2002). Because some of the Black Mountain compositional groups were small (less than 33 per group), Mahalanobis distance analyses were combined with PCA to allow for assessment of group assignment (Appendix E). For the BMAP NAA data, factor scores for the first three principal components (accounting for 81.8% of variation in the data set) were used. Although the Black Mountain sample has a relatively high number of unassigned samples ($n = 94$, 28% of the sample), I accept this large number of unassigned samples because there is a high level of statistical confidence for each of the group assignments. In other words, the higher level of unassigned samples has to do with the confidence level of samples assigned to
meaningful compositional groups. Some NAA studies in the American Southwest contain 30 to 35% unassigned samples, so the percentage for the Black Mountain sample is lower than average (e.g., Duff 1999; Glowacki 2006; Neff 2002). Researchers at MURR outlined the initial compositional groups. With the guidance of Jeffery Ferguson, I then continued to manipulate the data to evaluate group assignment through a combination of Mahalanobis distance, PCAs, bivariate plots, and non-compositional data (for detailed explanation of methods see Duff 1999, 2002; Glascock 1992; Glowacki 2006; Peeples 2011; Neff 2002).

Appendix B contains the ceramic types and temper groups determined through macroscopic analyses for the entire Black Mountain site sample. The macroscopic analyses, ceramic type assignments, and temper group assignments were used to select the NAA sample. Appendix C specifies the ceramic type and ware, archaeological context, temper groups, and paste colors for the NAA and petrographic samples. Photos of the sherds before NAA sampling are shown in Appendix D and the Mahalanobis distance statistics for the NAA data are in Appendix E.

**Black Mountain Site NAA Compositional Groups**

A total of 246 samples from the 340-sample data set were assignable to 11 compositional groups. There were 12 groups in total, but the “unassigned” group does not represent chemical composition similarities. Five of the BMAP groups (M49a, M5a, M5b, PR1, and PR2) correspond to groups defined by Speakman (2013), Creel and colleagues (2002), and Taliaferro (2014). At this time, six of the BMAP groups (G1, G2a, G2b, G3, G4, and G5) appear to be new compositional groups only known to occur at the Black Mountain site (Figure 6.1, Table 6.6). Below, I review the groups present at the Black Mountain site.
**Group 1 (G1)**

Group 1 is a small compositional group with only four samples. Although this group is small, it holds together well on the bivariate plots (Figure 6.2). Group 1 did not track with any previously known NAA groups from the Mimbres region or the southern Southwest (Creel et al. 2002; Speakman 2013; Taliaferro 2014). Because the group is small, its production location cannot be inferred. However, since there was one Mimbres painted ware (likely Style I or II) and three plain wares, it may represent a production zone in the Lower Mimbres Valley (Table 6.6). The addition of more NAA samples from the Black Mountain site could dissolve this group in further analyses, but since the samples group so closely chemically; they will remain as a group until additional data are collected (Appendix E).

**Groups 2a and 2b (G2a and G2b)**

Compositional groups 2a and 2b appear to represent subgroups of a compositional continuum (Figures 6.2 and 6.3). These groups consist of Chihuahuan polychromes (group 2a = 78%; group 2b = 78%) and plain wares (Table 6.6). There was also one Roosevelt Red Ware in Group 2a. Little data has been published on compositional analyses of Chihuahuan polychromes (but see Bishop et al. 1998; Woosley and Olinger 1993). Therefore, it was not possible to conduct NAA group comparisons of the Chihuahuan polychromes from the Black Mountain site with NAA samples from northern Mexico. Petrographic analysis of the Chihuahuan polychromes from the Black Mountain site, discussed in more detail below, suggests that these samples may be local to the Lower Mimbres region because the temper materials reflect the local geology (Britton 2014). The macroscopic analysis of the polychromes may suggest differences in the size and sorting of Chihuahuan ware temper materials. This difference may provide evidence of a nonlocal production location; however, petrographic analysis is generally better able to provide
Figure 6.1  Bivariate plot of all NAA groups.

Figure 6.2  Bivariate plot showing groups G1, G2A, G2B, and G3.
Table 6.6 Summary of NAA Groups, Production Locations, and Ceramics Types

<table>
<thead>
<tr>
<th>NAA Group</th>
<th>Origin</th>
<th>Ceramic Types</th>
<th>Confidence Level</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
<td>Unknown</td>
<td>Mimbres B/w and plain wares</td>
<td>n/a</td>
<td>BMAP</td>
</tr>
<tr>
<td>G2a</td>
<td>Lower Mimbres Valley (possibly northern Mexico)</td>
<td>Chihuahuan wares, a few plain wares, one Salado poly</td>
<td>medium</td>
<td>BMAP</td>
</tr>
<tr>
<td>G2b</td>
<td>Lower Mimbres Valley (possibly northern Mexico)</td>
<td>Chihuahuan wares, a few plain/corrugated wares</td>
<td>medium</td>
<td>BMAP</td>
</tr>
<tr>
<td>G3</td>
<td>Lower Mimbres Valley</td>
<td>Plain wares and Playas Red</td>
<td>medium</td>
<td>BMAP</td>
</tr>
<tr>
<td>G4</td>
<td>Lower Mimbres Valley</td>
<td>Postclassic types</td>
<td>medium</td>
<td>BMAP</td>
</tr>
<tr>
<td>G5</td>
<td>Unknown</td>
<td>Plain wares and Playas Red</td>
<td>n/a</td>
<td>BMAP</td>
</tr>
<tr>
<td>M49a</td>
<td>Upper Mimbres Valley (possible second sub-group in Middle/Lower Mimbres Valley)</td>
<td>Entire ceramic sequence</td>
<td>high</td>
<td>Speakman 2013</td>
</tr>
<tr>
<td>M5a</td>
<td>Upper Gila Valley</td>
<td>Mimbres B/w (Style I to III) and Postclassic types</td>
<td>medium</td>
<td>Speakman 2013</td>
</tr>
<tr>
<td>M5b</td>
<td>Upper Gila Valley</td>
<td>Alma, Reserve, plain/corrugated</td>
<td>medium</td>
<td>Speakman 2013</td>
</tr>
<tr>
<td>PR1</td>
<td>Middle Mimbres Valley (likely Old Town Ruin)</td>
<td>Postclassic types (Playas Red wares, El Paso poly)</td>
<td>high</td>
<td>Creel et al. 2002; Taliaferro 2014</td>
</tr>
<tr>
<td>PR2</td>
<td>Upper/Middle Mimbres Valley (Old Town/Walsh)</td>
<td>Postclassic types (Playas Red wares, El Paso poly)</td>
<td>high</td>
<td>Creel et al. 2002; Taliaferro 2014</td>
</tr>
</tbody>
</table>

more detailed geologic provenience information (cf. Shepard 1956). Shepard (1956:138-141) notes that macroscopic analysis is an important preliminary step in any ceramic analysis study, but petrographic analysis is key for detailing source locations.
**Group 3 (G3)**

Group 3 could not be related to any other known group used in the comparison (Creel et al. 2002; Speakman 2013; Taliaferro 2014). This group contains 15 samples and is composed of plain wares (87%) and Playas Red Wares (13%) (Table 6.6, Figures 6.1 and 6.2). Since Group 3 contains mostly plain wares and is unknown at any other site, this assemblage could represent a production location in close vicinity to the Black Mountain site. Ceramics from Group 3 are also present in both Locus 1 and Locus 2. Since there are only 15 samples in the group, additional analysis would help to provide stronger evidence of the production zone. However, the Mahalanobis distance analysis shows that this group has a tight chemical composition (Appendix E).
**Group 4 (G4)**

Group 4 is also a new compositional group that does not track with any groups from Creel and colleagues (2002), Speakman (2013), Taliaferro (2014). Like Group 3, Group 4 contains mainly plain wares (33%) and Playas wares (53%), and could represent a production locus near the Black Mountain site (Table 6.6, Figure 6.3). There is also one Roosevelt Red Ware (Cliff White-on-red) and one El Paso Polychrome in Group 4. Only one sample was submitted for petrographic analysis for this group (Appendix C). Identification of the production zone of this group would be helped by additional NAA samples and an examination of the petrography.

**Group 5 (G5)**

Group 5 consisted of only two sherds; therefore, it is difficult to identify its production location. Although this group is very small, because the samples had a very similar chemical composition, they were submitted as a group in the hope that further analysis will either confirm or eliminate the group (Appendix E, Figure 6.1).

**Group Mimbres 5 (M5)**

Speakman (2013:117-118) notes that the Mimbres 5 group was established as part of a project conducted by Chris Turnbow in the mid-2000s. As earlier data sets (e.g., Gilman et al. 1994) were incorporated into Turnbow’s analysis, researchers concluded that there were two groups in the M5a sub-groups (5a, 5b, and 5c) (Speakman 2013). The Mimbres 5a and 5b subgroups are present at the Black Mountain sites.
**Group Mimbres 5a (M5a)**

As this group currently stands, it contains 98 samples from Speakman’s (2013) analysis and eight from Taliaferro’s (2014) research, for a total of 106 samples. This NAA group contains a diversity of pottery types. It is composed of Mimbres Style III and Postclassic types such as Playas Red and Reserve Smudged, although there are a few Mimbres Styles I and II. A majority of samples from this group are undifferentiated plain wares. Speakman (2013:118-119) speculates that the production location for this group occurred somewhere in the Upper Gila Valley. Because of the lack of diversity in Gila River alluvium, further clay sampling and additional NAA pottery samples are needed to further refine the production area of Group M5a (Speakman 2013).

At the Black Mountain site, Group M5a contains 15 samples (Figures 6.1 and 6.4). These samples represent a diversity of pottery types (Table 6.6, Appendix C), which include Indented corrugated smudged, Mimbres Style I, plain wares, Playas Red Wares, and a variety of Roosevelt Red Wares (Tonto Black-on-red, Maverick Mountain Polychrome, Gila Polychrome, and undifferentiated Salado polychrome). The Roosevelt Red Ware types all come from Locus 1. During the Cliff phase, about 60% of the obsidian from the Black Mountain site was coming from the Upper Gila (Mule Creek obsidian) (Chapter Seven). Since these four Roosevelt Red Ware sherds were also made in the Upper Gila Valley, these two lines of evidence could suggest an increased social connection to people in the Upper Gila who were participating in the Salado phenomenon.
Figure 6.4  Bivariate plot showing relationship of group M5a from Taliaferro (2014), Speakman (2013), and the Black Mountain site.

**Group Mimbres 5b (M5b)**

Speakman (2013:120-122) suggests that the Mimbres 5b group has a production location in the Upper Gila Valley. A majority of samples from this group are composed of early pottery types including Alma, Reserve, and Three Circle Red-on-white. There is also a small portion of Mimbres Style I, II, and II. The 5b group contains 13 clay samples. Although a majority of the clay samples with the highest membership probabilities to this group come from the Upper Gila, a few of the clay samples (with lower membership probability) come from the Middle and Lower Mimbres Valleys. Because of the diverse origin of clay samples in this group, Speakman (2013:120) raises questions about “whether or not a single clay sample is sufficient for linking ceramic compositional groups to specific geographic locales within [the Mimbres] region.” He
concludes that the production location of this group is the Upper Gila because a majority of the clay and ceramic samples come from locations and sites in the Upper Gila.

Samples belonging to M5b from the Black Mountain site include Mimbres Style II, Playas Red Wares, plain wares, and an undifferentiated Salado polychrome (Table 6.6). This group contains a total of seven samples and all were found in Locus 2 of LA 49 (Figure 6.5). Since the production location of this group is likely located in the Upper Gila Valley, this group provides further evidence of social connections to populations in the Upper Gila during the Black Mountain phase.

**Group Mimbres 49a (M49a)**

Speakman (2013:169-171) developed Group M49a. The original group contains 133 ceramic samples and eight clay samples that were collected from 37 sites, a majority of which were located in the Upper and Middle Mimbres Valley. There are also 20 Playas Red Wares assigned to M49a from Taliaferro’s (2014) data set. The data set from Speakman (2013) and Taliaferro (2014) consists of a wide range of pottery types that date to the entire Mimbres sequence. These ceramics include Mimbres Styles I, II, and III as well as Alma plain, Three Circle Red-on-white, Playas ware, Reserve, Tularosa, and Gila Polychrome (Speakman 2013:Appendix E). Speakman (2013) notes that samples from this group were likely produced near the Elk Ridge site in the Upper Mimbres. Since there are also a large number of samples from the NAN Ranch and Old Town, he acknowledges that this large group could represent two production locations. Speakman suggests that further analysis may help to refine and sub-divide Mimbres 49a.

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2 Because the M49a group was large (n=77), a MANOVA was run to examine variation among pottery types within the group. There were only three Chihuahuan polychromes, therefore, I
Figure 6.5 Bivariate plot showing relationship of group M5b from Speakman (2013) and the Black Mountain site.

There are 77 samples from the Black Mountain site assigned to M49a (Figure 6.6). The Black Mountain M49a group contained a variety of pottery types, including all the Roosevelt Red Wares, Playas Red Wares, and plainwares (Table 6.6). The Roosevelt Red Wares (n = 32, 41%) represent the largest portion of the M49a sample from the Black Mountain site. Playas Red Wares (n = 16, 19%) and plainwares (n = 18, 23%) also make up a large portion of the group.

I retained the first 2 PCAs, which collectively explain 55% of the variance in the data. I retained the first 2 PC axes scores and used these as the new dependent variables for the MANOVA. Results from the MANOVA indicate that there is a significant difference between group multivariate means (P < 0.001). In order to see what groups (pottery types) differ, post-hoc Hotellings-T$^2$ test were run with a Bonferroni correction to account for multiple comparisons. Results showed that Salado polychromes differ from all other wares. Since NAA is a bulk analysis method, this variation could mean that the clay for the Salado polychromes came from a different creek bed or that different tempers were added to each of the pottery types. Macroscopic analysis provides evidence that the Salado polychrome tempers were different from all other pottery types.
The rest of the Black Mountain site M49a sample is composed of corrugated wares (n = 8), one El Paso Polychrome, and two Chihuahuan polychromes. In the original analysis of the Black Mountain NAA samples and an independent analysis conducted by Matthew Taliaferro, the Roosevelt Red Wares and the two Chihuahuan wares in M49a were assembled as separate group. This group also contained a few Playas wares, plain wares, and an El Paso Polychrome. However, when the group was compared to M49a it did not hold together statistically.

Since a majority of M49a samples from Taliaferro’s (2014:378-379) group (n = 20) came from sites in the Middle and Lower Mimbres Valley and there are 77 samples from the Black Mountain site, there is some evidence that this group may, in fact, represent two subgroups. The two independent analyses mentioned above further support the notion that M49a may represent two separate subgroups. However, the statistical analyses of this compositional group and materials from the Black Mountain site did not further divide the group (Figure 6.6; Appendix E). Future analysis of this M49a at the Black Mountain site will include the complementary evidence from petrographic analysis. Currently, only three petrographic samples are represented in group M49a from Black Mountain (Appendix C).

*Group Playas Red 1 (PR1)*

Seven samples from the Black Mountain site were assigned to the Playas Red 1 group (Figure 6.7). This group was initially established by Creel and colleagues (2002). They suggest that this group was produced at Old Town and contains Playas Red Wares and a few plain wares. Taliaferro’s (2014:381) analysis provides additional support that this group was produced at Old Town. Pottery clay found in room C2, a Black Mountain phase room at Old Town, was also a member of this group. Thus, the appearance of this group at the Black Mountain sites suggests connections with Old Town during the Black Mountain phase.
Figure 6.6  Bivariate plot showing relationship of group M49a from Taliaferro (2014), Speakman (2013), and the Black Mountain site.

**Group Playas Red 2 (PR2)**

The Playas Red 2 group was also established by Creel and colleagues (2002) and contains Playas Red Wares, plain wares, and El Paso Polychromes. This group was likely produced in the Middle Mimbres Valley, since a majority of samples found in this group come from Old Town and Walsh. Taliaferro (2014:381-382) notes that this group might also come from areas around the modern town of El Paso, Texas, since a high portion of this group came from sites (Hueco Tanks, Hot Well, and FB 6884) in the El Paso vicinity. There were 52 samples (Playas Red Wares, plain wares, and El Paso Polychromes) from the Black Mountain site that group with Playas Red 2 (Table 6.6, Figure 6.8). Since this group is thus far composed entirely of later pottery types, it may represent a clay source that was not utilized until the Postclassic Mimbres. The high percentage of samples in the Playas Red 2 group from the Black Mountain site and
other sites in the Lower and Middle Mimbres Valley provides further evidence for production in the Middle and/or Lower Mimbres as opposed to areas around El Paso.

**Petrographic Temper Analyses of Black Mountain Site Pottery**

Previous chemical and petrographic analyses indicate there were several production locations for Chihuahuan polychromes. Bishop and colleagues (1998) used NAA to establish several production locations around Paquimé. Petrographic research on pottery from the Joyce Well site, a Postclassic period site with high amounts of Chihuahuan polychromes, suggests that Ramos Polychrome was made locally (Carpenter 2002). Woosley and Olinger (1993) used X-ray fluorescence (XRF) to examine 382 sherds of Ramos Polychrome from around Paquimé and southern New Mexico and Arizona. Their analysis showed that polychromes “from southern
Figure 6.8  Bivariate plot showing relationship of group PR2 from Taliaferro (2014) and the Black Mountain site.

Arizona and New Mexico sites originated at a source or sources other than the Casas Grandes Valley” (Woosley and Olinger 1993:119). Building on these studies that show Chihuahua polychromes were not solely produced at Paquimé, the NAA and petrographic analysis of Chihuahua polychromes from the Black Mountain site provide preliminary evidence that the Chihuahuan polychromes from the site may not have been produced at Paquimé. However, their specific production location is unknown at this time.

Numerous researchers and studies highlight the complementary nature of using both NAA and petrographic analysis (Bishop et al. 1982; Clark 2006; Eckert and Schleher 2012; Fowles et al. 2007; Neff et al. 2006; Wallis 2011). In particular, recent work by Ownby and colleagues (2014) could provide an additional assessment of the petrographic and NAA data of the BMAP sherds. The analysis by Ownby and colleagues (2014:152) utilizes a “mixed mode approach based on dissimilarity matrices and multidimensional scaling,” which allows for
assessment of production zones and pottery distribution and exchange (see also Baxter et al. 2008). This is a newly developed method, published after the BMAP petrographic samples were selected and analyzed. Therefore, the sampling procedures for the petrographic material from the Black Mountain site need further refinement. Future analyses will utilize the methods described by Ownby and colleagues (2014) to further evaluate all groups in the Black Mountain site data set.

Forty-six petrographic thin sections were examined (Appendix C; Britton 2014). Of these sherds, 33 were large enough for both NAA and petrographic analysis. Selection of petrographic samples was also based on ceramic type and macroscopic temper group. Many of the decorated sherds from the Black Mountain site were not large enough to provide samples for both NAA and petrography; therefore, not all samples submitted for petrography could also be submitted for NAA. As discussed earlier (Chapter Three and above), a large portion of the sherds from the Black Mountain site were 3 cm or less. This made sample selection challenging. Since sample selection was conducted before the NAA was complete, petrographic samples were based on macroscopic temper groups and ceramic type (Appendix B: Table D.1). Table 6.7 shows all 46 thin sections by ware and petrographic temper group. Table 6.8 shows petrographic temper groups by NAA groups. The petrographic analysis suggests that all temper groups came from the Mimbres region (Mimbres Valley, Upper Gila Valley, etc.) geological resources (Britton 2014). Future analyses will help to detail more specific locations of the temper materials. Because the petrographic samples were selected before the NAA analysis was complete, 39% (n = 13, Table 6.7) of the petrographic samples are unassigned. In order to make a more detailed comparison, future analyses will base petrographic sample selection on these NAA groups. (see Ownby et al. 2014).
Table 6.7 Petrographic Groups by Ceramic Ware

<table>
<thead>
<tr>
<th>Ceramic Ware</th>
<th>Temper Group 1</th>
<th>Temper Group 2</th>
<th>Temper Group 3</th>
<th>Temper Group 4</th>
<th>Temper Group 5</th>
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<td>5</td>
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<td>--</td>
<td>--</td>
<td>9</td>
</tr>
<tr>
<td>Corrugated wares</td>
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<td>2</td>
<td>--</td>
<td>--</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Jornada Mogollon wares</td>
<td>--</td>
<td>2</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>2</td>
</tr>
<tr>
<td>Mimbres Painted ware</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Plain ware</td>
<td>--</td>
<td>11</td>
<td>--</td>
<td>2</td>
<td>--</td>
<td>13</td>
</tr>
<tr>
<td>Playas red wares</td>
<td>--</td>
<td>5</td>
<td>1</td>
<td>--</td>
<td>3</td>
<td>9</td>
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<tr>
<td>Salado polychromes</td>
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<td>3</td>
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<td><strong>Total</strong></td>
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<td><strong>25</strong></td>
<td><strong>4</strong></td>
<td><strong>2</strong></td>
<td><strong>11</strong></td>
<td><strong>46</strong></td>
</tr>
</tbody>
</table>

Table 6.8 Petrographic Groups by NAA Group

<table>
<thead>
<tr>
<th>NAA Groups</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Group 4</th>
<th>Group 5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>G1</td>
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<td>--</td>
<td>--</td>
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<td>G2b</td>
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<td>1</td>
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<td>--</td>
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</tr>
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<td>G3</td>
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<td>G4</td>
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<tr>
<td>M49A</td>
<td>--</td>
<td>--</td>
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<td>2</td>
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</tr>
<tr>
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<tr>
<td>M5B</td>
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<td>0</td>
</tr>
<tr>
<td>PR1</td>
<td>--</td>
<td>--</td>
<td>1</td>
<td>--</td>
<td>--</td>
<td>1</td>
</tr>
<tr>
<td>PR2</td>
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<td>2</td>
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<td>Unas</td>
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<td><strong>16</strong></td>
<td><strong>3</strong></td>
<td><strong>2</strong></td>
<td><strong>10</strong></td>
<td><strong>33</strong></td>
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</tbody>
</table>
Discussion: Interpretation of NAA Results Using Object Life Histories and Histories of Practice

The NAA data explained above assigned 246 sherds (72% of the sample) into 11 groups. Some of these groups (M5a, M5b, M49a, PR1, and PR2) were defined by previous studies (Creel et al. 2002; Speakman 2013; Taliaferro 2014) and ascribed to production locations in the Mimbres and Upper Gila Valleys (Table 6.6). Six of these groups were defined by the BMAP research project (G1, G2a, G2b, G3, G4, and G5). The production location of the BMAP groups may be in the Lower Mimbres Valley or near the Black Mountain site, since they are not represented in any other NAA data set from the Mimbres region. However, further analysis is needed to determine production locations of these groups more precisely. Below, I describe possibilities for the diversity of ceramic source locations at the Black Mountain site. Then, I examine the BMAP data and data from other sites to provide an object life history (production, exchange, use, and final deposition) of pottery before and after the transformation (history of practice).

In this chapter, non-local pottery is defined as types and wares traditionally made outside the Mimbres region. For example, Chihuahuan polychromes are generally thought to be made in northern Mexico or near Paquimé (but see Woosley and Olinger 1993 for evidence that some Chihuahuan polychromes were made in southern Arizona). As described in more detail below, there is preliminary evidence that non-local pottery types such as Chihuahuan polychromes, were made near the Black Mountain site or in the Lower Mimbres Valley during the Postclassic periods. Local pottery is defined as types made in the Mimbres Valley and region. For example, work conducted by Creel and colleagues (2002), Speakman (2013), and Taliaferro (2014) provide evidence that Playas Red Wares were made in the Mimbres Valley. Earlier research suggested that this type was made in northern Mexico (Sayles 1936; see LeBlanc 1977).
Production of Playas Red Wares in the Mimbres Valley does not eliminate the possibility that some Playas were made in northern Mexico, but since little NAA research has been conducted in northern Mexico, it is difficult to suggest alternative production locations at this time.

In the following sections of this chapter, I examine the choice of clay sources by potters from the Postclassic periods, and ask whether they used sources that had been utilized during the Classic Mimbres phase or relied on new clay sources. Next, NAA data is assessed in more detail to determine the possible production location of pottery at the Black Mountain site. I then examine production locations from a regional perspective to highlight the exchange and circulation of pottery during the Classic Mimbres through Cliff phases. Next, because the Black Mountain site data set did not allow for the examination of use and organization of production (because no whole vessels were excavated from the site) recent work at Old Town provides data for these stages (Creel et al. 2002; Taliaferro 2014). Finally, the placement of pottery in Black Mountain and Cliff phase burials is examined at several sites (Creel 1999, 2006c; Ravesloot 1979; Taliaferro 2014) and compared to burial practices and placement of pottery in burials during the Classic Mimbres. These data, which examine the object life histories and the history of use of pottery from A.D. 1000 to 1450, provide evidence for the continuation of populations from the Classic Mimbres to Black Mountain phase as well as preliminary evidence of small groups of migrant populations.

**Possibilities for Production Location Diversity**

Two main production zones are represented in the ceramic sample from the Black Mountain sites. One is from the Upper Gila Valley and the second is from the Mimbres Valley. Two explanations can be offered as to why the Black Mountain site includes pottery from several production zones. First, there could be local clays (from the Mimbres region) with similar
geological signatures in the various regions (Upper Gila, Upper, Middle, and Lower Mimbres Valley). For example, in Speakman’s (2013:169-171) discussion of the M49a group, he notes that this group may represent two distinct compositional groups: one from the Upper Mimbres and one from the Middle/Lower Mimbres. Since there were many samples from the Upper Mimbres Valley, Speakman (2013) suggests this is the production location. However, since there were also a high number of samples from NAN Ranch, Old Town, and now the Black Mountain site (n=77), the M49a group may eventually be split between Middle/Lower and Upper Mimbres Valley sources.

Second, potters at the Black Mountain site may have collected compositionally discrete clays from multiple regions. While there is evidence that people living at the Black Mountain site had exchange relationships and social connections with people in the Upper Gila (groups M5a and M5b, see Chapter Seven for obsidian), this second scenario seems less likely because Black Mountain site residents would have had to travel over 100 km to collect these clays. Previous research indicates that potters usually travel less than 10 km to collect clay (Arnold 1985). It seems more likely that people would have been utilizing down-the-line exchange or traveling to and from the Mimbres and Upper Gila Valleys to exchange for finished pottery vessels. Distinguishing the exchange of raw clays from exchange of finished pottery in the archaeological record is difficult (see Zedeño 1998). Therefore, both possibilities remain open. In either case, the appearance of clays or finished pottery at the Black Mountain site (Lower Mimbres Valley) from the Upper Gila and Upper and Middle Mimbres Valleys indicates social connections among these subregions.
Outlining Object Life Histories: Production Location and Technological Choices

“Identifying where vessels were made compared to where they were deposited is a significant step toward outlining object life histories and is crucial for understanding patterns of interaction in the past” (Wallis 2011:87). When production location and exchange of pottery (two segments of an object’s life history) are considered through NAA data along with the history of clay use (length of use of clay sources, history of practice), we can see that prehistoric peoples at the Black Mountain site were using well-established clay sources and maintaining long-standing exchange networks. We can see that populations at the Black Mountain site were also using resources first exploited during the Postclassic period (post-1150). Selection of clay sources during the production of pottery represents a technological choice that can help us to track the social connections of potters (see Jones 2002).

Since clays are socially constituted resources (Jones 2005) and there is a range of physically appropriate clays in the Mimbres Valley (Creel et al. 2002; Gilman et al. 1994; Taliaferro 2014), the appearance of new clay sources provides an additional line of evidence for migrants. Clay and other raw materials must possess both physically and culturally appropriate properties in order to be used in the production of material culture (Jones 2002; Tacon 1991; see also Arnold 1971). Thus, if we view the selection of clay resources as a socially and historically grounded process (Jones 2002:86-93), archaeologists can study the production process of pottery as a technological endeavor situated within the social relationships and history of the prehistoric peoples making these pots.

With this framework in mind, I suggest that clay sources used before and after 1150 may represent a continuation of populations (resident populations), while clay sources first used after-1150 may represent migrants. Although Classic Mimbres society was nonhierarchical (Gilman 2006; Gilman et al. 1994; Gilman and Powell-Mari 2006), there is evidence for some social
differentiation among corporate groups (Creel 2006b; Hegmon et al. 2006; Shafer 2006). These corporate groups represent co-residential units, such as kinship-based residences, that have common economic interests (Shafer 2006; see Wilshusen 1989). Shafer (2006) suggests that residential spaces were passed on through corporate or family groups. The prime landholdings were occupied by early inhabitants of a village, who may have had special claims to residential space and farming land. Based on this social system, I propose that the long-term use of clay resources, such as the M49a group, may also highlight claims to specific clay resources by family groups or groups of potters who lived in the Mimbres Valley before 1150. The M49a group, defined by Speakman (2013), coincides with two possible production locations: one in the Upper Mimbres Valley and one in the Middle/Lower Mimbres Valley (Table 6.6).

This compositional group contains pottery types from the entire Mimbres sequence and provides evidence that during the Black Mountain phase, some potters (likely resident groups) in the Mimbres Valley continued to utilize clay sources imbued with social and historical value. On the other hand, the use of new but local clay sources in the Middle and Lower Mimbres Valley after 1150 may represent people turning away from the social systems in place during the Classic Mimbres phase. It may also represent populations who were new to the region and did not have knowledge of or access to clay sources (M49a) with strong historical and social claims by resident families. Several local clay sources (G2a, G2b, G3, G4, G5, PR1, and PR2) were used to make only Postclassic wares (Playas Red series, Chihuahuan polychromes, etc.). In Taliaferro’s examination of PR1 and PR2, he suggests the production locations of these groups are in the Middle Mimbres Valley, with PR1 located near Old Town (Table 6.6). Although the potters who used PR 1 may not have lived at the Black Mountain site, the appearance of ceramics from these
sources represent social and economic connections to potters (possibly immigrant potters) at Old Town.

The social implications of the pottery from the Black Mountain site groups (G2a, G2b, G3, G4, and G5) are slightly more complicated to interpret. It is possible that these represent pottery made at the site, but since less NAA has been conducted in the Lower Mimbres (Speakman 2013), these results are still preliminary. Since these groups do not contain Classic Mimbres wares, they could represent resources utilized by migrants. (See Group 1, which has Classic Mimbres wares and could represent a local production zone.) However, there are no Classic Mimbres sites within the vicinity of LA 49, and population in the Lower Mimbres Valley was considerably lower than in the Upper and Middle Mimbres during the Classic (Blake et al. 1986), so clay resources in the Lower Mimbres Valley were likely not exploited heavily until the Postclassic. Since there are multiple clay sources in the Mimbres region (Creel et al. 2002; Gilman et al. 1994), the selection of clay resources can be viewed as a socially and historically informed technical choice made during the production process. It can inform archaeologists about the social ties of the potters. The examination of production choices from ceramics at the Black Mountain site provides evidence of both resident and migrant populations living at LA 49.

**Outlining Object Life Histories: Exchange**

During the Classic Mimbres period, most ceramics were produced in the Mimbres region (Creel et al. 2002; Creel and Speakman 2012; Gilman et al. 1994; Nelson 1999:39). During the Black Mountain phase, exchange networks expanded and many pottery types were imported from the Jornada Mollogon (El Paso Polychromes), Salinas and Sierra Blanca of the Tularosa Basin (Chupadero Black-on-white), Cibola (St Johns Polychrome), Upper Gila Valley (groups M5a and M5b), and northern Mexico (Chihuahua polychromes) (Carlson 1970; Clark 2006;
Creel et al. 2002; Sayles 1935, 1936; Speakman 2013). Although exchange networks expanded, some pottery types which first appear before 1150 (Playas Red Wares) were locally made (Creel et al. 2002; Taliaferro 2014; Speakman 2013). Some of the Black Mountain phase types, such as Playas Red Wares, were made with local clay sources utilized during the Classic Mimbres (Creel et al. 2002). There is also evidence that Black Mountain phase populations exploited new clay sources (Creel et al. 2002; Speakman 2013; Taliaferro 2014). The NAA data from the Black Mountain site provide evidence that pottery was produced in the Mimbres Valley and also provide evidence of pottery produced outside the Mimbres Valley, in areas such as the Upper Gila Valley. Here is it important to keep the BMAP sampling strategy in mind. The BMAP NAA sample does not contain pottery types whose production location is known to be nonlocal (for example, there is no Chupadero Black-on-white) (see Clark 2006; Creel et al. 2002). Samples selected, such as Chihuahuan polychromes and Roosevelt Red Wares, have been shown to have multiple production locations. Therefore, the full diversity of exchange is not represented in the LA 49 data set.

Since exchange is socially constituted, tracking change or stasis allows for an understanding of social connections before, during, and after the Mimbres transformation (Creel et al. 2002; Eckert 2008; Nelson et al. 2011; Wallis 2011; Woolf 1998). As highlighted in the discussion above, exchange and production are closely tied and can be difficult to tease apart (Zedeño 1998; see Mills and Crown 1995). Both raw clays and finished pottery could have been exchanged within the region. Therefore, if raw clays were traded by potters at LA 49, the potters could have created pottery with a nonlocal chemical signature. While it is challenging to differentiate these processes, both show economic and social connections among groups.
Several researchers have proposed that the groups who remained in the Mimbres Valley (resident groups) expanded their social and economic networks geographically around 1150. In other words, Mimbres Valley resident population maintained their social and economic connection with groups who left the Mimbres Valley around 1150 (Nelson and Hegmon 2001; Nelson et al. 2006; Nelson et al. 2011; see Duff 2002 and Peeples 2011 for similar events in the Cibola region). NAA data from the Black Mountain phase highlights this expanded social and economic network because pottery made in the Mimbres Valley in this period is distributed more widely than in previous periods. Pottery is also coming from more distant locations outside the Mimbres Valley, such as the Upper Gila. In order to track the types of social connections (close ties, face-to-face interactions versus regional ties, less frequent interactions) embedded in these shifting exchange practices I compare the exchange of decorated and non-decorated wares at the Black Mountain site.

Comparing the origins of decorated and non-decorated wares can highlight various social connections because of the varied values placed on these goods (Abbott 2000:133-140; Duff 2002:25-28; Graves 1991; Zedeño 1994). In the American Southwest, plain and corrugated wares (non-decorated wares) are assumed to show close kinship ties and represent face-to-face interactions (e.g., Abbott 2000:133-140; Huntley 2004; Duff 2002:25-28; Zedeño 1994). Investigations in regions such as the Cibola and Mesa Verde (Duff 2002; Glowacki 2006; Huntley 2004; Peeples 2011) have shown that non-decorated wares (utilitarian wares) moved infrequently between river valleys and were more commonly exchanged within river valleys. On the other hand, decorated wares are assumed to highlight less frequent interactions, such as the exchange of goods at feasts, public ceremonies, and trade fairs (Crown 1994; Spielmann 2004; Zedeño 1998).
As discussed in Chapter Three, the analytical distinction between decorated and non-decorated (utilitarian) wares is problematic because in using it, archaeologists are imposing a dichotomy that may not have existed in the past. In the American Southwest some wares types, such as corrugated or incised, are considered non-decorated or utilitarian. While the differences between painted wares and plain wares (those with no exterior decoration such as corrugation, incising, cord-marking, or punctuation) may be significant, the “decorations” on vessels with incising or corrugation may in fact send social messages--much like the messages communicated by types decorated with paint (see Hegmon et al. 2000). Therefore, I combined types and wares into three “ware groups”: decorated, painted; decorated, corrugated/incised; and plain. The exchange of decorated painted wares likely represents less frequent interactions, while the exchange of plain wares likely represents close-knit relationships. I suggest that at times the exchange of the decorated corrugated/incised wares could represent close social ties and could also mark identity. If these wares are being traded beyond the local river valley or in a period of identity renegotiation, differences in corrugation type or the layout of incised, punctated, and cord marked designed on Playas Red Wares could easily highlight differences in group affiliation.

To evaluate changes in clay source use through time and among ware groups, the relative frequencies of the ware groups at each production location (Mimbres Valley and Upper Gila) were examined. Chi-squares were not used for this analysis because the sample of decorated painted ware is over-represented in the NAA sample and does not represent a random sampling (see Sokal and Rohlf 1995). In other words, only 18% of the total ceramic sample is painted

3 The decorated, corrugated/incised group includes a number of treatments such as cord marking, corrugation, incising, punctation, finger indentation, and a number of corrugation treatments: basically, any treatment that is not paint. See Appendix B (Surface Treatments) for more detail.
decorated wares but nearly 31% of the NAA sample is painted decorated wares. As described in the discussion of sample selection procedures above, the painted wares represent a higher percentage of the NAA sample because this study focused on changes in pottery over time, and the diversity of painted wares represents one of the major changes between the Classic Mimbres and Black Mountain phase.

A comparison of the frequency data within each ware group does illustrate important differences. For example, Peeples’s (2011:137-139, Table 5.1) comparison of the circulation of utilitarian and decorated wares shows that during the Pueblo III and IV period in the Cibola region, between 85% and 90% of the “utilitarian” wares (corrugated and plain) were found in the area where they were produced, whereas 10% to 15% of these wares were found outside their production zone. On the other hand, during these same periods, about 50% to 80% of the (painted) decorated wares were found in the area where they were produced and 20% to 50% were found outside of their production zone. This example highlights that painted ceramics were exchanged among regions more frequently than plain wares. While I examined various ware groups, the data for the Black Mountain site show a similar frequency of pottery types within each ware group produced in the Mimbres Valley and in the Upper Gila Valley (Table 6.9; Appendix E, Table E.1, E.2). Table E.1 and E.2 shows various combination of these ware groups. In other words, “ware groups” from the Upper Gila and Mimbres Valley appear in similar frequencies at the Black Mountain sites.

Although the sample size for the ware types made in the Upper Gila is low, the higher-than-expected quantities of plain wares produced outside the Mimbres Valley suggest that people at the Black Mountain site had close ties with folks in the Upper Gila Valley (see Zedeño 1994, 1995). Widely distributed non-decorated wares may also indicate migrants who maintain
relationships with inhabitants from their previous homeland and continue to exchange pottery with family members (see Zedeño 1998). Therefore, the apparent exchange of plain wares between the Mimbres Valley and Upper Gila Valley provides another line of evidence for a migrant population living at Black Mountain. It could also suggest long-standing, close relational ties with populations in the Upper Gila Valley and people at the Black Mountain site. In other words, populations living in the Mimbres Valley during the Classic Mimbres moved to the Upper Gila and maintained social ties with resident populations who established the Black Mountain sites. Alternatively, small groups of migrants may have moved to the Black Mountain site from the Upper Gila and maintained close ties with groups who remained in the Upper Gila. Either way, there is strong evidence that most of the pottery made during the Classic Mimbres remained near where it was made and that it was uncommon for pottery to be exchanged outside the valley (Creel and Speakman 2012; Gilman et al. 1994). Sites in the Lower Mimbres Valley imported more pottery than sites in the Upper and Middle Mimbres Valleys. Creel and Speakman (2012) suggest that sites below 1,650 meters in the Lower Mimbres had depleted their fuel and, therefore, could no longer produce pottery. Therefore, the Black Mountain site NAA data suggest close social connection to populations living in the Upper Gila Valley during both

<table>
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<th></th>
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<th>Corrugated/Incised</th>
<th>Totals</th>
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<td>Upper Gila</td>
<td>7 (3%)</td>
<td>7 (3%)</td>
<td>8 (3%)</td>
<td>22 (9%)</td>
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<tr>
<td>Totals</td>
<td>89 (37%)</td>
<td>66 (28%)</td>
<td>85 (35%)</td>
<td>240</td>
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</table>

Table 6.9 Frequency Data of Black Mountain Site Ware Groups with Production Location in the Mimbres (Local) and Upper Gila (Non-local) for Three Ware Groups
the Black Mountain and Cliff phases. In Chapter Seven, this connection is further supported by obsidian source data.

There is evidence that much of the typologically “nonlocal” pottery was made in the Mimbres Valley (Table 6.6 and 6.9), providing evidence for an expansion in social networks compared to earlier Mimbres periods. The appearance of the “nonlocal” pottery may also suggest a less formalized type of interaction. While there are several examples of the Roosevelt Red Wares being produced locally by Kayenta migrants (see Crown 1994), since few sourcing analyses have been conducted on pottery types from northern Mexico (Chihuahuan Wares) (but see Bishop et al. 1998; Woosley and Olinger 1993), at this point I am unable to confirm whether the G2a and G2b groups are local or nonlocal. There are far fewer NAA and clay samples from the Lower Mimbres Valley (see Creel et al. 2002; Speakman 2013). Although the petrographic analysis provides evidence that the Chihuahuan Wares (G2a and G2b) were produced in the Mimbres Valley (Britton 2014), at this point it is difficult to determine a precise production location. Therefore, there is a possibility that the Chihuahuan Wares at LA 49 were made at or near Paquimé.

The production of Playas Red Wares in the Mimbres Valley, a type once thought to have been produced in northern Mexico (Sayles 1936; see LeBlanc 1977), also indicates expanding social networks. Evidence is mounting that Playas Red Wares were produced in the Mimbres Valley (Creel et al. 2002; Taliaferro 2014). Due to limited sourcing analyses in northern Mexico, it is unclear whether these wares were produced at Paquimé as well. However, their high frequency at Paquimé suggests a social tie between people in the Mimbres Valley and northern Mexico (Sayles 1936). Therefore, production of nonlocal wares in the Mimbres Valley suggests social connections to groups throughout the southern Southwest and northern Mexico. This local
reproduction of “nonlocal” wares likely represents a different type of social connection than the exchange of utility wares. It is more representative of broader social groups that do not have frequent social interactions, but may also represent migrant groups who continued to make pottery types from their homeland with clay from the Mimbres Valley (Clark 2001; Eckert 2008; Peeples 2011; Wiessner 1984). Technological analyses of “nonlocal” whole vessels produced in the Mimbres Valley would further help to determine the types of social connections represented by these locally produced replicas. Since no whole vessels were excavated at the Black Mountain site and most of the sherds that were obtained were less than 3 cm, this type of analysis was outside the scope of the research project.

**Outlining Object Life Histories: Vessel Use**

Vessel use represents another aspect of an object’s life history that can help archaeologists to understand the social context and meaning of ceramic vessels (e.g., Appadurai 1986; Dietler and Herbich 1998; Dobres and Hoffman 1994; Gosden and Marshall 1999; Jones 2002; Wallis 2011). Vessel use provides a way to examine social practices through time, which may help to unpack, for example, whether or not the people living in the Mimbres Valley represent the continuation of a resident population or the immigration of small groups of new populations. As detailed in Chapter Three, several researchers suggest that high visibility attributes, such as burial practices, are not ideal for tracking social identity because they may represent emulation of practices and traits (e.g., Carr 1995b; Clark 2001; Voss and Young 1995). Other researcher have noted that during a migration situation or social transformation, identities are unstable and under negotiation (e.g., Ortman and Cameron 2008; Stone 2003; Woolf 1998; Lekson 2009:311-313; Lekson et al. 2002). Consequently, attributes that were formerly low visibility or not easily recognized by outsiders may become more active and distinct markers of
identity during migration. For example, Stone (2003) notes that migrants from Point of Pines consistently expressed their migrant identities, whereas migrants to Silver Creek and Grasshopper did not. Likewise, just because a trait is highly visible and a strong marker of identity does not mean it would be replicated by and brought with migrant populations. For example, there is a suite of characteristic Mesa Verde traits that were not carried to migration destinations (Lipe 2010; Stone and Lipe 2008). Archaeologists must carefully choose how we link populations to previous or newly developed social identities. Clearly, it is useful to have several lines of evidence, both low and high visibility makers. This allows us to examine the various levels at which identity is formed (Barth 1969; Beekman and Christensen 2003; Haraway 1991; Wiessner 1983; Wobst 1977).

In a recent study, Taliaferro (2014:303-339, 404-414) provides a detailed examination of pottery production and use in the Mimbres region from the Late Pithouse period through the Black Mountain phase (Table 1.1). Focusing on ceramics from Old Town, Taliaferro (2014) considers production sequence, the organization of production, and vessel form and function. Part-time specialists made pottery during the Classic Mimbres phase, and this practice continues during the Black Mountain phase (see Gilman 1989; Gilman et al. 1994; LeBlanc 1983:138-139, 2006). Shafer (1985, 2003) argues for craft specialization during the Classic because of the potters’ grave at the NAN Ranch, but Gilman and colleagues (1994) maintain that specialization was not full-time, based on the absence of social hierarchy in Mimbres society and the lack of specialized production features (e.g., workshops or kilns). Use-ware patterns on Black Mountain phase pottery and the form and function of ceramics from the Black Mountain phase occupation at Old Town also point to continuity in the use and meaning of ceramics from the Classic Mimbres through the Black Mountain phase. Using these lines of evidence, Taliaferro (2014)
concludes that there was little change in the organization of pottery production and use of pottery after the social transformation around 1150.

**Outlining Object Life Histories: Final Deposition**

Burial practices and the use of pottery in burials provide additional lines of evidence for continuity from the Classic Mimbres to the Black Mountain phase (Creel 1999; LeBlanc 1977; Taliaferro 2014:415-425; but see Shafer 1999). While burial practices are considered high visibility attributes that could be more readily copied by migrant groups (Clark 2001), it is key to consider both high and low visibility attributes in order to examine questions related to continuity or migration of populations. Classic Mimbres inhabitants frequently buried individuals in an upright flexed position, with a killed bowl placed on the head of the deceased. This practice was first seen during the Late Pithouse period and continues in some, but not all, burials through the Black Mountain phase (LeBlanc 1977; Creel 1989, 1999; Hegmon et al. 1999; Shafer 1999, 2006). LeBlanc (1977:16) specifically notes that the populations inhabiting Black Mountain phase sites were “made up of an agglomeration of previously unrelated peoples… [and] that the presences of flexed inhumations with ‘killed’ bowls represents a continuation of the Mimbres tradition.”

The main difference between the Classic Mimbres and Black Mountain phase implementation of this burial practice is the type of vessel used in the burial. During the Classic Mimbres, bowls were frequently Mimbres Black-on-white vessels (although plain and textured vessels were sometimes used). During the Black Mountain phase, Postclassic types (El Paso Polychrome, Playas Red series, Chupadero Black-on-white) and plain wares were killed and placed in inhumations (Creel 1999; Ravesloot 1979; Taliaferro 2014:415-419). Playas wares are noted at sites around the end of the Classic Mimbres period. It has been suggested that the
production of these vessels began at the end of the Classic Mimbres or beginning of the Terminal Classic (Creel 1999; Taliaferro 2014). Of the four burials found in the Black Mountain phase component of Old Town, one was a cremation, one was an inhumation, and two (one adult and one infant) were inhumations which had killed bowls associated with the deceased (Taliaferro 2014:415-418). Burials found at the Black Mountain phase sites of Walsh and Montoya had several inhumations associated with killed bowls (Ravesloot 1979). At Walsh, 18 burials were excavated: 15 were inhumations and three were cremations. Of the 15 inhumations, five interments were associated with pottery, only one of which was a killed bowl. Montoya contained one cremation and four inhumations. Two of the four inhumations at Montoya were associated with killed bowls.

Three inhumations were encountered at the Black Mountain site. However, since we did not have a burial permit, these interments were not fully excavated. As explained in Appendix A, once we determined that the remains were human, excavation was terminated. Although no burials were fully or systematically excavated, it is worth briefly discussing one of the inhumations located by BMAP. This extramural inhumation was located in Trench C just south of the exterior wall of the Black Mountain phase room block (Figure 5.2). Based on very limited excavation, it appears that this individual was placed in an upright flexed position. The burial had been severely damaged by the mechanical grading and the head of the individual was no longer associated with the body, yet preliminary evidence suggests this individual was buried in an upright flexed position. Although no pottery was associated with the burial, it appears the individual was interred in a manner commonly seen at Late Pithouse and Classic Mimbres period sites.
Burial practices in the Mimbres Valley shifted from the Late Pithouse through Cliff phase from inhumations to cremations (Creel 1989; LeBlanc and Whalen 1980; Taliaferro 2014:415-425). While cremations are seen in the Mimbres region from the Late Pithouse through the Cliff phase, there was a sudden increase in their frequency during the Black Mountain phase. Flexed inhumations with killed bowls is a distinctively Mimbres practice, and their presence suggests that at least some people stayed in the Mimbres Valley (Creel 1999; Taliaferro 2014; see also Shafer 1999 for flexed inhumations with killed bowl as a Classic Mimbres practice). The increase in cremations during the Black Mountain phase, a practice first seen during the Late Pithouse, could suggest immigrant populations as well. Since this was already an accepted, albeit an uncommon practice in the Mimbres region, if small migrant groups had previously used this burial technique in their homeland, the increase in cremations could have been a way to incorporate migrants into Black Mountain phase population social practices (see Crown 1994; Woodson 1999; Stark et al. 1998 for incorporation of migrants).

Summary

This chapter has presented NAA and petrographic data from LA 49 and examined the object life histories of ceramics from the Black Mountain site and other Black Mountain phase sites in the Mimbres region. The evidence suggests that Black Mountain phase inhabitants were composed of both resident and immigrant populations. NAA and petrographic data suggest that Black Mountain site inhabitants may have been making some ceramics at the site and also exchanging or procuring pottery from the Upper and Middle Mimbres Valley and the Upper Gila. The examination of “ware group” (decorated, painted; decorated, corrugated/incised; and plain) indicates that Black Mountain site people were exchanging nearly equal quantities of these three ware groups. Since plain or utilitarian wares made in the American Southwest are rarely
exchanged over long distances, the appearance of plain wares from the Upper Gila Valley could
denote migrants and/or personal ties to population in the Upper Gila. During the Classic
Mimbres period, the production of nearly all ceramic types was local. Thus, this NAA data from
LA 49 suggests there was an expansion in exchange during the Black Mountain phase.

NAA data also provide evidence that both continued resident groups and immigrant
groups inhabited the Black Mountain site. Some pottery from the Black Mountain site was
produced from clay sources that were newly exploited during the Postclassic (G2a, G2b, G3, G4,
G5, PR1 and PR2, n = 143), while some was crafted with clays that were used throughout the
Mimbres sequence (M49a, M5a, n = 92). Of course, the NAA sample may not be representative
of actual frequencies in the whole assemblage, but the continued use of clays suggests continuity
in populations. These resident populations may have had claims to these long-term clay sources
and the exploitation of new clay sources could be indicative of migrant populations who had to
find different resources in order to craft pottery.

Taliaferro’s (2014) recent examination of pottery production from the Late Pithouse
period through the Black Mountain phase suggests continuity in production practices. Burial
practices and the use of pottery in burials also suggest that practices seen in the Mimbres region
(upright flexed inhumations with killed bowls) continued into the Black Mountain phase and
provide another line of evidence of resident population remaining in the region. The increase of
cremations during the Black Mountain phase could also suggest the appearance of migrant
groups or resident populations that were resisting the social structure in place during the Classic
Mimbres. These data show that populations during the Black Mountain phase may have been
composed of several social groups, highlighting the diversity of ways Black Mountain phase
populations experienced the social transformation.
CHAPTER VII
BLACK ROCKS AT BLACK MOUNTAIN:
OBSIDIAN SOURCING IN THE MIMBRES REGION
FROM THE LATE PITHOUSE PERIOD THROUGH THE CLIFF PHASE

Introduction

This chapter examines the history of exchange and procurement of obsidian at the Black Mountain site and throughout the Mimbres region from the Late Pithouse period to the Cliff phase. The investigation of stability and changes in obsidian exchange networks, over a 450-year period from 17 sites, provides insight into the nature of the transitions around A.D. 1150 and 1250/1300 (Figure 7.1). Exchange networks are defined as individuals, communities, and/or organizations that participate in similar economic practices (see Mills et al. 2015). These exchange networks can reflect the social connections of groups utilizing similar or disparate resources. As described in Chapter Three, exchange is a socially and historically constituted process, so economic connections may signify a number of relationships including familial ties, face-to-face interactions, wide ceremonial events, exchange partnerships, or political alliances. These social interactions constituted by exchange may occur as frequent interactions (e.g., people seeing each other on a daily basis) or infrequent (e.g., people coming together a few times a year for optical and ceremonial events) (for discussion of obsidian exchange as socially embedded see Lazzari 2010; Torrence 2011:34-35).

In the discussion below, I further develop the methodological and theoretical framework used in this study. I then briefly review the history of obsidian research in the American Southwest and northern Mexico. I describe the research objectives and sample for the obsidian analysis. Through statistical analyses, I compare obsidian source use in the Lower Mimbres and Upper/Middle Mimbres. I trace both through time and link the shifts seen in obsidian source use
to the transitions around A.D. 1150 and A.D. 1250/1300. I argue that the changes observed in obsidian source use from the Late Pithouse/Classic periods to the Black Mountain phase suggest a broad regional shift in social and economic connections. These changes are also linked to people who moved from the Mimbres Valley to the Eastern Mimbres around 1150 (Chapters One
and Two). I also argue that the shifts seen from the Black Mountain to Cliff phases are connected to the Salado phenomenon and Kayenta immigrants in the Mule Creek region and to the events occurring in the Casas Grandes region after A.D. 1250/1300 (Chapter Two). These data further support the expansion of social and economic connections after 1150.

**Obsidian Exchange as a Socially Constituted Process**

Appadurai (1986) argued that a primary objective of exchange is to create or sustain social connection. This endeavor may not reflect the economic value of the goods involved. By applying this view to the exchange of obsidian in the Mimbres region, we can focus on the role of obsidian exchange as a means to negotiate, develop, and maintain social relations rather than simply a means of provisioning people with a valuable resource. Tied to this idea of obsidian as an important social resource is the fact the obsidian must be both physically and socially appropriate as a raw material for the production of the final product (e.g., projectile point, scraper, or other stone tool). Physical, cultural, and historical knowledge of the material all inform the selection of raw materials by prehistoric peoples (Jones 2002; Tacon 1991). Previous work suggests that obsidian sources are socially charged locations on the landscape and, therefore, important for tracking socioeconomic relationships (e.g., Clark et al. 2011; Clark et al. 2012; Shackley 2005:134-146; Taliaferro et al. 2010; Chapter Three). Consequently, obsidian source location highlight both shared preference for obsidian from specific sources and social connections shared between groups using the same sources. Shackley’s (2005:28-87) summary of obsidian sources in the American Southwest notes that while obsidian varied in artifact quality, most sources were sufficiently high quality to be used for flaked tools. None of the sources used in this study are of a substantially higher quality.
One final consideration in viewing obsidian as a socially constituted item of exchange is that recent work in the American Southwest (e.g., Arakawa et al. 2011; Clark et al. 2011; Clark et al. 2012; Shackley 2002, 2005:134-146; Taliaferro et al. 2010) has shown that people do not always procure obsidian from the closest or most accessible source. Thus, source location can highlight social connections (see also Andrefsky 2009). For example, Arakawa and colleagues (2011) show that although people in the Mesa Verde obtained obsidian from a variety of sources, shortly before the A.D. 1300 migration, obsidian was acquired almost exclusively from the Jemez Mountains. They suggest that this shift in obsidian procurement represents the establishment of return migrations prior to A.D. 1300. These studies further highlight that while obsidian may be a valuable raw material, the social process embedded in exchange of this material are just as important. Recognizing the possible social uses of obsidian significantly develops the methods through which we can understand the exchange of obsidian in the Mimbres region.

While examination of obsidian exchange networks alone cannot tell us whether the social transitions during the periods under study represent immigration, reorganization, and/or continuity of populations, it provides an important line of evidence. The changes evident in obsidian procurement strategies indicate social, economic, and/or political shifts in the Upper/Middle Mimbres Valley and Lower Mimbres region during the Mimbres Classic phase and the Black Mountain and Cliff phases. There are some differences between the Upper/Middle and Lower Mimbres Valleys in resource use through these periods. Evidence for these shifts in economic practices is discussed in the following sections.

While the transitions around 1150 and 1250/1300 have long been a focus of archaeological research (see Chapters One and Two), researchers have typically used ceramics,
household organization, architecture, and mortuary practices to understand these changes. Less attention has been paid to obsidian exchange networks (but see Taliaferro et al. 2010 for detailed discussion mainly focusing on periods before 1150; Taliaferro 2014). Although the processes of exchange (collection of raw materials, raw materials brought to sites, down-the-line exchange, etc.; see Chapter Three) cannot be observed directly, obsidian sourcing is a useful technique for tracking economic and social connections in the American Southwest and northern Mexico because it allows archaeologists to link materials found at archaeological sites directly to sources (Shackley 2005). As discussed in Chapter Six, ceramic sourcing is not usually able to link pottery directly to clay source locations. Obsidian is one of the few lithic materials that can be linked directly to sources location (Andrefsky 2009; Shackley 2005).

The results presented below use X-ray fluorescence (XRF) analysis of obsidian to build upon and extend previous research on obsidian sourcing analysis within the Mimbres region (e.g., Arakawa et al. 2011; Cameron and Sappington 1984; Duff et al. 2012; Loendorf et al. 2013; Mills et al. 2013; Roth 2000; Shackley 2005; Taliaferro et al. 2010; Vierra 2005). All of the obsidian was sent to the University of Missouri Research Reactor (MURR) for XRF analysis. Forty-seven samples collected in 2010 were sent to MURR and the Archaeological XRF Laboratory at the University of California, Berkeley. This analysis showed that the two labs are comparable (personal communication Jeffrey R. Ferguson, 2011). These data provide an additional line of evidence for understanding the transitions in the Mimbres area. The findings also have implications for research on the broader Southwest region and northern Mexico.

**Obsidian Research in the American Southwest and Northern Mexico**

Obsidian is an extrusive igneous rock, also known as volcanic glass, which forms when felsic lavas with high levels of silica cool very rapidly so that their atomic structure is disordered.
(Shackley 2005:10). The disorder of the atomic structure of obsidian causes it to have no preferred direction of fracture and creates extremely sharp edges when broken. This creation process can also cause obsidian to be very brittle and not suitable for artifact manufacture (Shackley 2005:7-27). The formation of obsidian is an extremely rare event (Fink and Manley 1987; Marsh 2000), and obsidian suitable for making artifacts is even rarer (Shackley 2005:22). Because of the varied geology and diversity of trace elements found in obsidian from the American Southwest and northern Mexico, there are numerous obsidian sources with distinctive chemical signatures (Ferguson and Skinner 2003; Shackley 1988, 1995, 1998a, 2005:7-27). XRF provides a tool to quantify the trace elements of obsidian. Since the proportions of the elements remain relatively consistent within single obsidian flow events and varies between events, the obsidian from the American Southwest is ideal for chemical characterization studies such as XRF (Glascock et al. 1998; Shackley 2005).

Although the quality and size of obsidian nodules vary at these sources, there are numerous primary and secondary deposits that contain artifact-quality obsidian. Secondary deposits are chemically indistinct from the primary sources, and through processes of erosion, obsidian can be deposited as far as 100 km from the primary source (Church 2000; Shackley 2005). Stevenson and McCurry (1990) note the existence of secondary deposits of artifact-quality obsidian along the Rio Grande River, between 100 and 400 km from its source in the Jemez Mountains. The secondary deposition of obsidian is an important factor to consider in sourcing because if archaeologists do not take erosion processes into account erroneous assumptions may be made about the nature of procurement and exchange. The presence of a secondary deposit may be due to opportunistic collecting and may not relate to direct social or economic interaction with groups living around the primary source. For example, Church (2000)
has shown that Rio Grande gravels from the Jemez and Mount Taylor obsidian sources were washed 400 km down the Rio Grande (see also Shackley 1998a, 1998b; Stevenson and McCurry 1990). Obsidian nodules from secondary deposits along the Rio Grande in central and southern New Mexico are small and brittle due to erosion, but the authors suggest that prehistoric peoples occasionally collected and used material from these sources.

Obsidian sourcing studies in the American Southwest were slow to gain recognition as a useful tool for tracking economic and social connections (Shackley 2005:3-6). Although a few studies were undertaken (Boyer and Robinson 1956; Jack 1971; Schreiber and Breed 1971), it was not until the late 1980s that research in the American Southwest began to use XRF as an approach to investigate exchange. These early studies used both chemical and macroscopic analyses to determine the procurement strategies of prehistoric peoples. More recent research in the region has acknowledged the usefulness of obsidian sourcing studies to examine social and economic connections, especially when paired with ceramic sourcing studies (e.g., Clark 2001; Shackley 2005:147-171; Arakawa et al. 2011; Duff et al. 2012; Loendorf et al. 2013; Mills et al. 2013; Roth 2000; Shackley 2005; Taliaferro et al. 2010; Vierra 2005). Obsidian sourcing has been relatively uncommon in archaeological research on the Mimbres region (but see Taliaferro et al. 2010). This chapter builds on previous work and provides new data and interpretation of social and economic connections.

Research Objectives and Description of Sample

Research Objectives

The obsidian sourcing analysis had three primary objectives in relation to this research. The first was to determine the source locations of obsidian artifacts from LA 49 in each of the temporal components, but focusing primarily on the Black Mountain and Cliff phases. The
second objective was to compare these results with other sites in the Mimbres region, from the Late Pithouse period through the Cliff phase, in order to track the use of obsidian over a 450-year period and identify patterns of change or continuity (Table 3.2). The third was to determine whether obsidian sourcing data from LA 49 and the Mimbres region can provide information on the nature of the transitions between A.D. 1150 and 1450.

As noted in Chapters One and Three, this study examines three processes that may explain the nature of the transitions around A.D. 1150 and 1300 (Table 3.1). If resident populations continued to occupy the Mimbres Valley, we might see no change in the location of obsidian procurement over time. The continuation of obsidian exchange networks could suggest a continuity of populations in the area who were utilizing existing economic and social connections. If migrant populations came into the region after 1150, we might expect a change in obsidian sources. The appearance of new obsidian exchange networks could represent either a population replacement or populations who continued to live in the region and reorganized existing social connections. If there was a diversity of groups (both resident and migrant), we should expect a diversity (old and new) of obsidian sources. If there was continued use of previous obsidian quarries as well as the appearance of new ones, this could suggest the reorganization of economic and social connections and could indicate both continuity and replacement of populations.

Although these explanations provide a useful starting point, human interactions and motivations are considerably more complicated than any analytical model (Table 3.1). Certainly, several other social processes might explain change or consistency in obsidian source use. For example, as discussed in Chapter Four, we know that some groups left the Mimbres region while others remained (Creel 1999; Nelson 1999; Nelson and Hegmon 2001; Taliaferro 2014). If new
populations were subsumed within exchange systems already in place, these migrants might not be visible in the archaeological record. The exchange of obsidian is a social endeavor and one that might occur through various kinds of processes (down-the-line trade, people traveling to the source location, etc.). These processes are difficult to observe using obsidian XRF data. Additional lines of evidence, such as ceramic souring and wall construction, also help to refine our understanding of the social processes.

Shackley (2005:87) notes that none of the obsidian sources in the American Southwest provide evidence of direct economic control, although he proposes that it is possible some of the sources were “controlled” through social boundaries. He (2005:135) suggests that when populations procuring the obsidian did not have direct access to the resource they had to “pay” for obsidian “through exploiting kin relationships or payment due to social boundary defense, or energy expenditure” (see also Shackley and Bayman 2001; Shackley 2002). Shackley (2002:70) also indicates that when the obsidian is regularly procured across long distances and “there are equal media for tool production nearby, [this] suggests a consistent interaction that cannot be ignored.” In other words, if obsidian seen at a site is not the from closest source or if there were other lithic raw materials that could have been utilized by prehistoric peoples, the use of obsidian from distant sources highlights social connections.

For example, some of the obsidian sources in the Mimbres Valley, such as Antelope Wells and Mule Creek, are close to Postclassic period settlements. The Joyce Well site is only a few kilometers from the Antelope Wells source and the 3-Up site is located near the Mule Creek sources (see Figures 7.1 and 7.2). As described in more detail below, obsidian from these sources is widely distributed throughout the southern Southwest. People living at the Joyce Well site, who were connected to the Casas Grandes regional system (Skibo et al. 2002), and the people living
Figure 7.2  Map of obsidian sources in the American Southwest. The Black Mountain site (LA 49) is starred. (Adapted from Shackley 2005:Figure 1.1.)
at 3-Up, who participated in the Salado phenomenon (Clark 2010; Clark et al. 2011), may have exerted some control over the distribution of the obsidian from these sources (Clark et al. 2011; see Shackley and Bayman 2001; Shackley 2002). At the very least, procurement of these resources would have required some level of social contact with groups living near the sources. That contact may have come about in several ways: the people living near the source may have traveled to surrounding and distant communities to exchange obsidian, there may have been down-the-line trade, and/or people from surrounding and distance communities may have traveled to the obsidian source (e.g., Arakawa et al. 2011; Clark et al. 2011).

New populations moving into a region could influence obsidian source procurement in a number of ways (see Stone and Lipe 2008). For example, if migrants decided to blend into their new homeland they may have joined in previously existing exchange networks. On the other hand, groups may have maintained exchange networks they established in their homelands. Changes in source procurement could also represent populations living in the region who were shedding their previous cultural practices or were attracted to newly emerging practices (Eckert 2008; Lekson 2002; Shafer 1999). Because there are several explanations for changes in source procurement, it is vital to adopt a broad regional perspective when considering what changes in procurement strategies mean for understanding the identities of populations (Lekson 1996a; Nelson and Hegmon 2001; Zedeño 1997). With this in mind, I attempt to frame the changes in obsidian procurement within a regional context and consider the influence of events linked to the Salado phenomenon, the movement of population from the Mimbres Valley to the Eastern Mimbres, and events in the Casas Grandes region.

The presence of Kayenta immigrants living in the Upper Gila and San Pedro Valleys highlights the influence of migrant populations on obsidian procurement practices. Work
conducted by Archaeology Southwest suggests that Kayenta immigrants at the 3-Up site in western New Mexico along the Upper Gila Valley were a major supplier of Mule Creek obsidian to sites in southeastern Arizona during the 14th century (Clark et al. 2011). The increased use of Mule Creek obsidian in the San Pedro Valley at Kayenta enclaves as well as the appearance of Kayenta immigrants at the 3-Up site around the same time suggests a strong socioeconomic connection between these groups. Furthermore, 3-Up is the only known large 14th-century site near the Mule Creek obsidian source (Clark et al. 2011). The site is composed of numerous room blocks with occupation from the Late Pithouse period through the Cliff phase (Clark et al. 2011).

In this chapter, I suggest that the 3-Up site was also a supplier of obsidian to sites throughout the Mimbres region, but especially in the Upper/Middle Mimbres, from the Late Pithouse to the Cliff phase. However, as discussed in more detail below, there was a shift away from the Mule Creek sources in the Upper/Middle Mimbres during the Black Mountain phase and a slightly increased focus on Mule Creek obsidian in the Lower Mimbres region during the Black Mountain and Cliff phases. Though the identity of the populations living near the Mule Creek obsidian sources may include numerous groups through time, some of these populations appear to have remained in the area from the Late Pithouse to the Cliff phase (Dungan 2012; Clark et al. 2011). As noted in Chapter Six, there is evidence of strong social connection, through the exchange of a higher-than-expected frequency of plain wares, between groups from the Upper Gila and the Black Mountain site. The exchange of obsidian over time also highlights this connection.

**The Black Mountain Sample**

The total sample for this study consists of 1047 pieces of worked and unworked obsidian from 18 sites in both the Lower and Upper/Middle Mimbres. It includes all periods from the Late
Pithouse to the Cliff phase (Figure 7.1; Table 7.2). Of the 1047 samples, 999 have known sources and can be linked to a specific period. There were 31 samples from the Black Mountain site that could not be linked to a specific phase and 17 samples (from all sites) that could not be assigned to a specific obsidian source. Below, I discuss some important considerations related to the sample.

In comparison to other Black Mountain and Cliff phase sites in the Mimbres region (Taliaferro 2014:211-271), the Black Mountain site has a higher diversity of flaked stone raw materials. Taliaferro (2014) examined these differences through time in the Mimbres Valley and notes that andesite/basalt appear more frequently at Late Pithouse period and Terminal Classic phase sites than at Black Mountain and Cliff phase sites. As shown in Table 7.1, there is a relatively high amount of andesite/basalt (local volcanic) in the Black Mountain assemblage. I suspect that this is due in part to the fact that the Black Mountain site sits at the base of the Black Mountain geological feature which is composed of quaternary basalt (Elyea and Gerow 1999:11). Basalt was frequently used at LA 49. It is represented in the cimientos and coursing stones in wall construction. There is so much basalt at the site that it was used as “expedient” groundstone. In other words, people living at LA 49 do not appear to have formalized groundstone tools. Nearly every piece of basalt we encountered had some of evidence that it was used as a grinding tool. Therefore, the higher amount of andesite/basalt in the flaked stone tool assemblage is not surprising.

Compared other assemblages in the Mimbres Valley (Taliaferro 2014), there is also a higher than expect amount of chalcedony and a slightly higher amount of jasper. Again, this is not surprising as Rock Hound State Park is about 30 km southeast of the Black Mountain site and has a wide variety of materials, including chalcedony and jasper. Although the flaked stone
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<td></td>
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Table 7.2 Obsidian Source Locations per Site and through Time

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<td>34</td>
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<td>--</td>
<td>1</td>
<td>--</td>
<td>--</td>
<td>27</td>
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<tr>
<td>Stailey</td>
<td>35</td>
<td>--</td>
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<td>--</td>
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<td>15</td>
<td>16</td>
<td>--</td>
<td>--</td>
<td>--</td>
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<td>283</td>
<td>42</td>
<td>74</td>
<td>17</td>
<td>1047</td>
</tr>
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</table>
assemblage at Black Mountain varies from other Black Mountain and Cliff phase sites in the region by material types, it appears that they were using locally available materials. Taliaferro notes (2014:225) that through time, people in the Mimbres Valley were utilizing more locally available materials. Since the Black Mountain site is in the Lower Mimbres Valley, people at LA 49 would have had access to a different variety of local materials and this is reflected in the flaked stone assemblage.

Obsidian is one of the few materials that can be tracked to a specific source location and does not occur naturally near the Black Mountain sites (see Shackley 1995, 2005). Obsidian represents only 5% (n = 222) of the total Black Mountain site flaked stone assemblage. Table 7.1 shows the total flaked stone assemblage from the Black Mountain site by lithic material through time and provides context for the obsidian assemblage at LA 49. While this is a relatively small percentage of the total assemblage (n = 3,999), obsidian plays an important role in understanding the transitions. Obsidian is likely over represented in the Black Mountain site sample. Since BMAP was focused on sourcing obsidian materials as part of the research question, any obsidian found was collected.

Two of the closest obsidian sources (Mule Creek and Antelope Wells) are each about 100 km from the Black Mountain site. Nutt Mountain, the closest source, is about 50 km from the Black Mountain site (Figure 7.2). Procuring obsidian directly would have been a challenge for most people living in the region (Taliaferro et al. 2010). Taliaferro and colleagues (2010:538) note that sites such as Old Town would have had to travel for a week to collect raw materials directly. Some secondary deposits of Mule Creek and Cow Canyon obsidian are found in southeastern Arizona and along the San Francisco and Gila Rivers (Shackley 1995), up to 100 km from their primary source. Shackley (1995) notes that this complicates tracking the exchange
of obsidian, especially among the Salado groups in the Upper Gila and southeastern Arizona during the Cliff phase.

Since there are no obsidian sources in the Mimbres Valley and secondary deposits are not present near LA 49 (cf. Shackley 1992, 1995, 2005), any obsidian found at the Black Mountain site was brought by prehistoric peoples and not by geological processes. Previous research in the Mimbres Valley has shown that people who occupied long-term settlements most frequently created flaked stone with raw material sources found a few kilometers from the site (Dockall 1991; Nelson 1981; Schriever et al. 2011). Because the closest obsidian sources are 50 to 100 km away from the Black Mountain site, obsidian is a resource that likely required the populations at Black Mountain to interact with other groups. (Whether the groups came to the Black Mountain site or groups from the Black Mountain site went to the source is unknown at this time.) It therefore provides an additional line of evidence for understanding social and economic connections throughout the Mimbres region. It is especially likely that the procurement of Mule Creek obsidian required interaction with other groups, as there were several groups living near the Mule Creek obsidian source (Clark 2010).

Through excavation and survey, 222 obsidian artifacts, including projectile points, preforms, cores, and debitage, were recovered from all components at the Black Mountain site (Table 7.2). The Late Pithouse component was surveyed but not excavated, thus the smaller sample size. The geochemical composition data from the Black Mountain site are compared to additional sites in the Mimbres region. Sixteen other sites were used in this analysis (Figure 7.1; Table 7.2; Table 7.3). Sourcing data from 11 of the 17 sites are reported in publications (Table 7.3). In February of 2014, I obtained obsidian from five additional sites (Dissert, Janss, Stailey, Montoya, and Walsh) curated at the Maxwell Museum in Albuquerque, New Mexico. These
Table 7.3 Site Information and Data References

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<th>Obsidian Count</th>
<th>Reference</th>
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</thead>
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<td>Taliaferro et al. 2010</td>
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<td>Disert</td>
<td>Grant</td>
<td>36</td>
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</tr>
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<td>Grant</td>
<td>90</td>
<td>Taliaferro et al. 2010</td>
</tr>
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<td>Jackson Fraction (LA 111413)</td>
<td>Grant</td>
<td>21</td>
<td>Taliaferro et al. 2010</td>
</tr>
<tr>
<td>Janss</td>
<td>Grant</td>
<td>27</td>
<td>this chapter</td>
</tr>
<tr>
<td>Montoya</td>
<td>Grant</td>
<td>14</td>
<td>this chapter</td>
</tr>
<tr>
<td>Old Town</td>
<td>Grant</td>
<td>175</td>
<td>Taliaferro et al. 2010</td>
</tr>
<tr>
<td>Stailey</td>
<td>Grant</td>
<td>35</td>
<td>this chapter</td>
</tr>
<tr>
<td>Swarts</td>
<td>Grant</td>
<td>24</td>
<td>Taliaferro et al. 2010</td>
</tr>
<tr>
<td>Walsh</td>
<td>Grant</td>
<td>25</td>
<td>this chapter</td>
</tr>
<tr>
<td><strong>Lower Mimbres</strong></td>
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<tr>
<td>76 Draw</td>
<td>Luna</td>
<td>131</td>
<td>Van Pool et al. 2013</td>
</tr>
<tr>
<td>Black Mountain (LA 49)</td>
<td>Luna</td>
<td>229</td>
<td>Dolan and Putsavage 2012; this chapter</td>
</tr>
<tr>
<td>Florida Mountain</td>
<td>Luna</td>
<td>39</td>
<td>Taliaferro et al. 2010</td>
</tr>
<tr>
<td>Joyce Well (LA 11823)</td>
<td>Hidalgo</td>
<td>34</td>
<td>Shackley 2011</td>
</tr>
<tr>
<td>Kipp Ruin (LA 153465)</td>
<td>Luna</td>
<td>109</td>
<td>Dolan 2012; Dolan and Ferguson 2012; Dolan and Putsavage 2012;</td>
</tr>
<tr>
<td>LA 173885</td>
<td>Doña Ana</td>
<td>22</td>
<td>Dolan and Gilman 2014</td>
</tr>
<tr>
<td>LA 176740</td>
<td>Doña Ana</td>
<td>19</td>
<td>Dolan and Gilman 2014</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>1047</td>
<td></td>
</tr>
</tbody>
</table>
samples were sent to Jeffery Ferguson and sourced at MURR. The five sites represent occupations in the Upper/Middle Mimbres region from the Black Mountain and Cliff phases. Since few studies had collected data on sites from the Upper/Middle Mimbres during these periods, the obsidian source data obtained from Dissert, Janss, Stailey, Montoya, and Walsh provide more detailed documentation of regional and temporal variation. More details on the obsidian data are provided in Appendix F.

To facilitate analysis, the 17 sites were divided into two regions based on their geographic location in the Mimbres region. The Upper and Middle Mimbres regions are grouped together and the Lower Mimbres region and the Deming Plain are grouped. Taliaferro and colleagues (2010:539, 543-544) split sites in the Mimbres region into six subgroups, but since they concluded that sites in the southern groups had similar procurement strategies, I combined sites in the Lower Mimbres with sites in the basin and range of the Deming plain and the boot heel of New Mexico (Figure 7.1). These sites are included in the Lower Mimbres group. Previous research also suggested important environmental, social, and economic differences between the Lower Mimbres and Upper/Middle Mimbres areas (e.g., Chapter One and Two; Hegmon 2002; Hegmon et al. 1999; Minnis 1985). Therefore, grouping the sites in this way provides a useful comparison for this study. Taliaferro and colleagues (2010:539-546) examined the use of each source individually by site. They suggest that some sources in the north (e.g., Mule Creek sources) were part of a related exchange network, just as sources in the south (e.g., Sierra Fresnal and Antelope Wells) may have been part of another network. While Gwynn Canyon and Cow Canyon obsidian were not always procured with Mule Creek (Taliaferro et al. 2010:539), Gwynn Canyon and Cow Canyon obsidian often show up with the Mule Creek
groups. Since there were few samples from Gwynn Canyon and Cow Canyon (n = 16), they were combined with the Mule Creek network.

To facilitate the evaluation, obsidian procurement networks were divided into four regions: (1) the Mule Creek exchange network, which includes all the Mule Creek sources as well as Cow Canyon and Gwynn Canyon; (2) the southern exchange network, which includes Antelope Wells, Sierra Fresnal, and Los Jagüeyes (Figure 7.2); (3) Nutt Mountain, a source which lies about 50 km east of the Black Mountain site; and (4) the Rio Grande sources, including all the Jemez sources and Mount Taylor.

The Nutt Mountain obsidian source was first identified in 2008 and has not been considered in many recent studies (Shackley 2014). Nutt Mountain’s trace element composition is very similar to the Gwynn Canyon and Mule Creek groups of Antelope Creek and Mule Mountains (Shackley 2014), so it is important to keep in mind that as work continues on this source the Nutt Mountain or Gwynn Canyon designation could change for some of the sites in the study. In total, there were only 42 samples from Nutt Mountain. Due to the small sample size, the statistical analyses below do not include Nutt Mountain (see Sokal and Rohlf 1995).

The “Rio Grande” sources were grouped together because, as was suggested by Church (2000) and Stevenson and McCurry (1990), they probably represent secondary deposits that were washed down the Rio Grande. Therefore, based on the available data, they do not appear to represent a network of socioeconomic exchange between the Mimbres region and people living near the Jemez or Mount Taylor sources. Because there were numerous groups living along the Rio Grande Valley through the Classic Mimbres to the Cliff phase (Lekson 1989c, 2006), the Rio Grande obsidians could have been collected and exchanged from anywhere along the Rio Grande or from the primary source locations (an area representing thousands of square
kilometers). While it seems likely that this exchange of secondary sources would only account for a small portion of the Rio Grande (or any) sources found at the Black Mountain site, it is still important to keep in mind.

Since this chapter examines source location as a means to track social connections, the Rio Grande sources are not discussed in detail. Future research will benefit from deeper consideration of this group of obsidian sources, but at this time is outside the scope of this study. The Lower Mimbres populations lived in closer proximity to the Rio Grande sources (over 100 km closer) than the Upper/Middle Mimbres populations, who rarely used Rio Grande obsidian but were located closer to the primary source (Jemez and Mount Taylor). This provides additional evidence for Church’s (2000) conclusion that the Rio Grande group represents a secondary source.

Temporal groupings used in this study require comment. The Late Pithouse and Classic sites in the Upper/Middle Mimbres (Galaz, Old Town, and Swarts) are well documented and have large obsidian samples (Anyon and LeBlanc 1984; Cosgrove and Cosgrove 1932; Creel 2006b; Taliaferro et al. 2010). Most of these sites contain both Late Pithouse and Classic occupations, but provenience data from previous obsidian analyses do not allow us to differentiate between the periods (Taliaferro et al. 2010). Taliaferro and colleagues (2010:544-545) propose that exchange patterns first seen in the Late Pithouse period continue through the Classic. Therefore, following Taliaferro and colleagues (2010), the samples from these two periods in the Upper/Middle Mimbres were combined. These periods were also combined in the Lower Mimbres to allow for comparison between the regions. Therefore, this study compares the use of obsidian during the Late Pithouse/Classic Mimbres, the Black Mountain phase, and the Cliff phase in the Upper/Middle and Lower Mimbres Valleys.
Obsidian Source Data and Statistical Analysis

To evaluate changes in obsidian source use through time and among regions, chi-square analyses were used to compare the Upper/Middle and Lower Mimbres regions and obsidian sources used during each of the periods (Late Pithouse/Classic, Black Mountain phase, and Cliff phase). These statistical analyses were run using Statistical Package for the Social Sciences (SPSS v.22). First, the obsidian source use was compared between the Upper/Middle and Lower Mimbres regions during the Late Pithouse and Classic periods. These data provide a baseline for the later Black Mountain and Cliff phases and track obsidian use before the transition around A.D. 1150. Obsidian source use was then compared between sites in the Upper/Middle and Lower Mimbres region during the periods after the transition (Black Mountain and Cliff phases). Obsidian sources at Black Mountain were also compared between the Black Mountain and Cliff phases. Finally, obsidian procurement throughout the region and through time was compared. This analysis focuses on how changes in obsidian source procurement may have affected people living at the Black Mountain site. These data expand and complement previous research and demonstrate that people in the Upper/Middle Mimbres region relied more heavily on the Mule Creek source (Taliaferro 2004; Taliaferro et al. 2010), except during the Black Mountain phase, when they diversified their procurement strategies. People in the Lower Mimbres region had more diverse obsidian resource procurement strategies, although these strategies show some change through time.

Upper/Middle and Lower Mimbres Regions: Late Pithouse and Classic Periods

A total of 475 obsidian artifacts from 10 sites were used to examine source use and social interaction during the Late Pithouse and Classic periods in southwestern New Mexico (Table 7.2). These results reinforce previous studies in suggesting that a diversity of strategies were
used in the Mimbres region during the periods before the transition around 1150. There was also a significant difference in source use between the Upper/Middle and Lower Mimbres regions before 1150. While people in the Upper/Middle Mimbres region relied almost exclusively on the Mule Creek sources, primarily the Antelope Creek sub-source, people in the Lower Mimbres region relied more heavily on the southern sources, such as Sierra Fresnal and Antelope Wells, but also utilized sources from Mule Creek, Nutt Mountain, and the Rio Grande gravels.

Of 327 obsidian samples from five sites in the Upper/Middle Mimbres used in this study, 96% came from the Mule Creek network, 1% from southern sources, and the remaining 3% from the Rio Grande sources or unknown sources (Figure 7.3). During these same periods in the Lower Mimbres region and areas south of the Mimbres Valley in the basin and range of the Deming Plain, there are 148 obsidian samples. Of this sample, about 16% came from the Mule Creek sources, 44% came from the southern sources, and 16% from Nutt Mountain, with the remaining 24% coming from the Rio Grande sources (Figure 7.4). As suggested by Taliaferro and others (2010), these data show that during the Late Pithouse and Classic periods sites in the Upper/Middle Mimbres relied on Mule Creek as their major obsidian source while sites in the Lower Mimbres had a more diverse obsidian network.

A two-tailed chi-square analysis was conducted in order to evaluate statistically whether the distribution of obsidian sources differed between the Upper/Middle and Lower Mimbres Valleys during the Late Pithouse and Classic periods. This analysis shows regional differences in obsidian source-use. Cramer’s V was used to measure the strength of association between nominal variables. A measurement of association among nominal variables takes into account the effect of sample size on the significance of the chi-square (Sokal and Rohlf 1995). Its value is interpreted in the same manner as a correlation coefficient. Table 7.4 shows the parameters for
**Figure 7.3** Late Pithouse/Classic - Upper/Middle Mimbres

**Figure 7.4** Late Pithouse/Classic - Lower Mimbres
characterizing strength of association. Since the chi-square values and associated P values do not convey relative strength of association between the independent and dependent variables, it is useful to run the Cramer’s V in order to understand the strength of association. The Cramer’s V also protects against over-interpretation of the small P values where there is a large sample size. The chi-square shows a statistically significant difference in source frequency between the Upper/Middle and Lower Mimbres Valleys during the Late Pithouse/Classic period and a high association between region and source (Table 7.5, $\chi^2 = 254.5; \, \text{df} = 1; \, p < .0001; \, \text{Cramer’s V} = .79$). In other words, people in the Upper/Middle and Lower Mimbres Valleys were utilizing two different exchange networks to procure their obsidian resources during the Late Pithouse and Classic periods.

Table 7.4 Guidelines for Characterizing Strength of Association (Sokal and Rohlf 1995)

<table>
<thead>
<tr>
<th>Cramer’s V Value</th>
<th>Strength of Association</th>
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<tbody>
<tr>
<td>&gt;.5</td>
<td>high association</td>
</tr>
<tr>
<td>.3 to .5</td>
<td>moderate association</td>
</tr>
<tr>
<td>.1 to .3</td>
<td>low association</td>
</tr>
<tr>
<td>0 to .1</td>
<td>little if any association</td>
</tr>
</tbody>
</table>

Table 7.5 Two-tailed Chi-square of Late Pithouse/Classic Period Sites in the Upper/Middle and Lower Mimbres Valleys

<table>
<thead>
<tr>
<th></th>
<th>Mule Creek</th>
<th>Southern</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Pithouse/Classic – Upper/Middle Mimbres Valley</td>
<td>315</td>
<td>3</td>
<td>318</td>
</tr>
<tr>
<td>Late Pithouse/Classic – Lower Mimbres Valley</td>
<td>24</td>
<td>65</td>
<td>89</td>
</tr>
<tr>
<td>Total</td>
<td>339</td>
<td>68</td>
<td>407</td>
</tr>
</tbody>
</table>

Note: Shows obsidian frequency data. $\chi^2 = 254.5; \, \text{df} = 1; \, p < .0001; \, \text{Cramer’s V} = .79$. 

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Sites in the Upper/Middle Mimbres Valley show evidence of long-distance exchange with Mexico during the Late Pithouse and Classic periods through the use of material goods such as macaws, copper bells, marine shell, and Mesoamerican iconography (Creel and McKusick 1994; Gilman et al. 2014; Vokes and Gregory 2007). There is, however, little to no evidence of obsidian exchange with sites outside of northern Mexico (see Taliaferro, et al. 2010). Likewise, pottery circulated within the Mimbres Valley during the Classic, but it was less frequently exchanged outside of the valley and much of the pottery, at least in the Upper/Middle and Middle Mimbres Valleys, remained at the site where it was made (Chapter Six; Creel and Speakman 2012; Gilman et al. 1994). People living at the large Late Pithouse and Classic sites in the Mimbres region were rather insular during the eleventh and twelfth centuries. This conclusion is further supported by this examination of obsidian exchange networks. Although research has shown that few objects circulated outside of the Mimbres region during the Classic (e.g., Creel and Speakman 2012; Gilman et al. 2014; Hegmon 2002:339), most studies have focused on the circulation of goods in the Upper/Middle Mimbres because there are few large Classic sites in the Lower Mimbres Valley. Moreover, as discussed in Chapter Four, population density was lower in the Lower Mimbres than the Upper/Middle Mimbres during the Classic. In comparison to the Upper/Middle Mimbres, sites in the Lower Mimbres have a more diverse pattern of obsidian exchange during the Late Pithouse and Classic periods (Figures 7.3 and 7.4), which may suggest a more expansive exchange network for these populations than previously recognized (see Gilman 2011; Dolan and Livesay 2015; Taliaferro et al. 2010). Because of the lower population density, groups in the Lower Mimbres may not have been as affected by the social conformity suggested by Nelson and colleagues for the Upper/Middle Mimbres (Nelson et al. 2011).
**Upper/Middle and Lower Mimbres Regions: Black Mountain and Cliff Phases**

Obsidian use was examined for the periods after the transition around 1150 to gain a more nuanced understanding of the social processes behind the changes seen in material culture. A total of 539 obsidian artifacts from nine sites were compared between the Upper/Middle and Lower Mimbres regions during the Black Mountain and Cliff phases in southwestern New Mexico (Table 7.2). While obsidian procurement at sites in the Upper/Middle Mimbres region is well documented for periods prior to the Black Mountain phase, there are fewer data for sites in the Upper/Middle or Lower Mimbres regions during the Black Mountain and Cliff phases (see Taliaferro et al. 2010). Through excavations at the Black Mountain site and collections from the Maxwell Museum, obsidian data from six additional sites dating to the Black Mountain and Cliff phases were added to the sample. These data have helped to refine regional variation for periods after 1150. As in the earlier Late Pithouse and Classic periods, people living in the Upper/Middle Mimbres relied heavily on the Mule Creek sources. The Black Mountain phase sites in the Upper/Middle Mimbres region present a more diverse pattern of economic and social connections for obsidian use than this region during the Classic Mimbres phase. The sites in the Lower Mimbres region during the Black Mountain and Cliff phases show greater diversity in their use of sources than the Upper/Middle Mimbres sites. The results presented here demonstrate some regional and temporal differences for the periods after the transition around 1150.

Of 39 obsidian samples from the Upper/Middle Mimbres region during the Black Mountain phase, 62% came from the Mule Creek network and 28% were from Nutt Mountain, with the remaining 10% from the southern sources (Figure 7.4). During this period, in the Lower Mimbres region and areas south of the Mimbres region in the basin and range of the Deming Plain, there are 115 obsidian samples. Of this sample, about 44% came from the Mule Creek network.
sources, 36% came from the southern sources, and 3% were from Nutt Mountain, with the remaining 17% coming from the Rio Grande and unknown sources (Figure 7.5).

Of 98 obsidian samples from the Upper/Middle Mimbres during the Cliff phase, 98% came from Mule Creek, while only 2% came from the Nutt Mountain source (Figure 7.7). In the Lower Mimbres region during this same phase, there were 289 obsidian samples from five sites. Thirty-seven percent came from Mule Creek, 54% from southern sources, 7% from the Rio Grande, and 1% from Nutt Mountain (Figure 7.8).

A two-tail chi-square analysis was used to compare obsidian use in the Upper/Middle and Lower Mimbres during the Black Mountain phase. This analysis was also conducted for the Cliff phase. Cramer’s V was also utilized to measure strength of association between nominal variables. The chi-square analyses for the Black Mountain phase between the Upper/Middle and Lower Mimbres shows that there is no statistical significance between obsidian sources during the Black Mountain phase (Table 7.6; $\chi^2 = 7.45; df = 1; p = .0032; \text{Cramer’s } V = .27$). This suggests people living in the Upper/Middle and Lower Mimbres region during the Black Mountain phase were using similar obsidian resources. The Cramer’s V further supports that there is no statistical significance because it shows there is little, if any, association between region and sources. The next section examines differences between the periods in each region. These analyses show a significant difference in obsidian provenance between the periods within regions.
Figure 7.5 Black Mountain phase - Upper/Middle Mimbres

Figure 7.6 Black Mountain phase - Lower Mimbres
Figure 7.7 Cliff phase - Upper/Middle Mimbres

Figure 7.8 Cliff phase - Lower Mimbres
Table 7.6 Two-tailed Chi-square of Black Mountain Phase Sites in the Upper/Middle and Lower Mimbres Valleys, Showing Obsidian Frequency Data

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<th>Mule Creek</th>
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<th>Total</th>
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<tr>
<td>Upper/Middle Mimbres</td>
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</tr>
<tr>
<td>Valley</td>
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<tr>
<td>Black Mountain phase –</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
<td>46</td>
<td>135</td>
</tr>
</tbody>
</table>

Note: $\chi^2 = 7.45; df = 1; p = .0032; \text{Cramer's V = .27.}$

For the Cliff phase there is a significant difference between the Upper/Middle and Lower Mimbres regions (Table 7.7; $\chi^2 = 99.66; df = 1; p < .0001; \text{Cramer's V = .53}$). There is also a high association for the Cramer’s V. During the Cliff phase, Mule Creek obsidian was a common source throughout the southern Southwest (Clark et al. 2011; Clark et al. 2012; Jones 2012). This is also the period in which the Salado phenomenon had far-reaching influence (Crown 1994; Dean 2000; Chapter Two). As described above, several researchers suggest that sites in the Upper Gila and in close proximity to the Mule Creek obsidian sources (e.g., 3-Up) had strong ties to the events surrounding the Salado phenomenon (Clark et al. 2011; Clark et al. 2012; Jones 2012; Lekson 2002; Nelson and LeBlanc 1986).

Table 7.7 Two-tailed Chi-square of Cliff Phase Sites in the Upper/Middle and Lower Mimbres Valleys, Showing Obsidian Frequency Data

<table>
<thead>
<tr>
<th></th>
<th>Mule Creek</th>
<th>Southern</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cliff phase –</td>
<td>96</td>
<td>0</td>
<td>98</td>
</tr>
<tr>
<td>Upper/Middle Mimbres</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cliff phase – Lower</td>
<td>106</td>
<td>153</td>
<td>261</td>
</tr>
<tr>
<td>Mimbres</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>202</td>
<td>155</td>
<td>359</td>
</tr>
</tbody>
</table>

Note: $\chi^2 = 99.66; df = 1; p < .0001; \text{Cramer’s V = .53.}$
Since Maverick Mountain and Roosevelt Red Ware sherds were found at the Black Mountain site \((n = 87)\) and Maverick Mountain and Roosevelt Red Wares are found at other sites in the Lower Mimbres (e.g., Kipp Ruin), it seems that events occurring in the Mule Creek area and associated with the Salado phenomenon also had some influence in the Lower Mimbres during the Cliff phase. Furthermore, the circulation of plain ware ceramics described in Chapter Six showed that people at the Black Mountain site had close ties to groups in the Upper Gila, especially during the Cliff phase (Table E.5). Sites in the Upper/Middle Mimbres had closer ties to the Mule Creek sources during the Late Pithouse/Classic periods (Taliaferro et al. 2010). Although Mule Creek continued to be used as a source in the Upper/Middle Mimbres over time, there was less focus on this source during the Black Mountain phase. During the Cliff phase, the Salado phenomenon was far-reaching and had varied influence in the Upper/Middle Mimbres (Lekson 2002, 2006; Nelson and LeBlanc 1986). The immigration of large populations of Kayenta groups may have created a greater focus on Mule Creek obsidian on the part of people living at sites in the Upper/Middle Mimbres (see Clark et al. 2011; Clark et al. 2012). The next section examines differences between the periods in each region. These analyses show a significant difference between the periods within regions.

**Upper/Middle and Lower Mimbres Regions: Comparing Obsidian through Time**

The differences in obsidian source procurement between periods and regions are examined in order to understand the transition after 1150. Differences between the Late Pithouse/Classic periods and Black Mountain phase are examined in both the Upper/Middle and Lower Mimbres regions (Tables 7.7 and 7.8). The differences between the Black Mountain and Cliff phases at the Black Mountain site are also examined (Table 7.10). Finally, a chi-square
Table 7.8 One-tailed Fisher’s Exact of Late Pithouse/Classic Period Compared to Black Mountain Phase in the Upper/Middle Mimbres, Showing Obsidian Frequency Data

<table>
<thead>
<tr>
<th>Upper/Middle Mimbres</th>
<th>Mule Creek</th>
<th>Southern</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Pithouse/Classic period</td>
<td>315</td>
<td>3</td>
<td>318</td>
</tr>
<tr>
<td>Black Mountain phase</td>
<td>24</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>Total</td>
<td>339</td>
<td>7</td>
<td>346</td>
</tr>
</tbody>
</table>

*Note:* Fisher’s exact = 0; $df = 1$; $p < .0001$.

Table 7.9 One-tailed Chi-square of Black Mountain Phase Compared to Cliff Phase at the Black Mountain Site, Showing Obsidian Frequency Data

<table>
<thead>
<tr>
<th>Lower Mimbres</th>
<th>Mule Creek</th>
<th>Southern</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Pithouse/Classic period</td>
<td>24</td>
<td>65</td>
<td>89</td>
</tr>
<tr>
<td>Black Mountain phase</td>
<td>51</td>
<td>42</td>
<td>93</td>
</tr>
<tr>
<td>Total</td>
<td>75</td>
<td>107</td>
<td>182</td>
</tr>
</tbody>
</table>

*Note:* $\chi^2 = 1.5$; $df = 1$; $p = .16$; Cramer’s $V = .11$. The result is not significant at $p < .05$.

Table 7.10 One-tailed Chi-square of Black Mountain Phase Compared to Cliff Phase at the Black Mountain Site, Showing Obsidian Frequency Data

<table>
<thead>
<tr>
<th>Black Mountain site (LA 49)</th>
<th>Mule Creek</th>
<th>Southern</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cliff phase</td>
<td>46</td>
<td>24</td>
<td>70</td>
</tr>
<tr>
<td>Black Mountain phase</td>
<td>51</td>
<td>42</td>
<td>93</td>
</tr>
<tr>
<td>Total</td>
<td>97</td>
<td>66</td>
<td>163</td>
</tr>
</tbody>
</table>

*Note:* $\chi^2 = 1.5$; $df = 1$; $p = .16$; Cramer’s $V = .11$. The result is not significant at $p < .05$. 
Table 7.11 All Sites and All Periods in Upper/Middle and Lower Mimbres Valley

<table>
<thead>
<tr>
<th>Mimbres Valley</th>
<th>Cliff phase</th>
<th>Black Mountain phase</th>
<th>Classic period</th>
<th>Late Pithouse/Classic</th>
<th>Late Pithouse</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mule Creek</td>
<td>202</td>
<td>75</td>
<td>39</td>
<td>277</td>
<td>23</td>
<td>616</td>
</tr>
<tr>
<td>Southern</td>
<td>153</td>
<td>46</td>
<td>0</td>
<td>3</td>
<td>65</td>
<td>309</td>
</tr>
<tr>
<td>Total</td>
<td>355</td>
<td>121</td>
<td>61</td>
<td>280</td>
<td>90</td>
<td>925</td>
</tr>
</tbody>
</table>

Note: \( \chi^2 = 240.52; df = 4; p < 0.00001; \) Cramer’s V = .52

analysis is conducted for all periods and the difference in use of sources used through time (Table 7.11).

If the same populations continued to live in the Mimbres region, we would expect a correspondence of source attributes within regions. For example, the Upper/Middle Mimbres Late Pithouse/Classic procurement strategies would correspond to the Upper/Middle Mimbres Black Mountain phase strategies. On the other hand, if new populations moved into the region, we would expect less correspondence of source attributes. Finally, if new populations moved into the region and some populations continued to live in the region, we would expect a greater diversity of obsidian source attributes between periods. Numerous social factors, such as mobility, migration, changing preferences, and social change, may influence the procurement of obsidian resources. Table 3.1 and 3.2 provide a baseline for examining the obsidian data, which are discussed in detail in the text.

In the Upper/Middle Mimbres, there is a statistically significant change from the Late Pithouse/Classic periods to the Black Mountain phase (Table 7.8; Fisher’s exact = 0; \( df = 1; p < .0001 \)). One of the expected cell frequencies is smaller than 5 in Table 7.8, so a one-tailed Fisher’s exact was used for this analysis because the assumptions of the chi-square were not met (Siegel and Castellan 1988). The one-tailed analysis shows directionality between the periods.
and suggests there was far more emphasis on Mule Creek in the Late Pithouse/Classic period and less in the Black Mountain phase. In other words, the shift from Mule Creek to southern sources was stronger in the Upper/Middle Mimbres region between these periods. This suggests that throughout the Mimbres region there was a reorganization of exchange networks sometime after A.D. 1150. While only two sites (Walsh and Montoya) are included in the Upper/Middle Mimbres sample during the Black Mountain phase and there are only 39 obsidian samples for this phase, samples from southern sources represent a much higher percentage of the total (38%) than during any other period in the Upper/Middle Mimbres. It is important to consider this sampling problem for Table 7.8. There is a massive amount of Mule Creek obsidian in the Late Pithouse/Classic contexts and this could skew the results.

The geochemical data suggest that from the Late Pithouse/Classic period to the Black Mountain phase in the Lower Mimbres region there was a statistically significant change in source use between these two periods, with a moderate association (Table 7.9; \( \chi^2 = 13.5; df = 1; p < .0001; \) Cramer’s \( V = .283 \)). This analysis demonstrates greater emphasis on the southern sources in Late Pithouse/Classic periods in the Lower Mimbres region and less emphasis on the southern sources during the Black Mountain phase. It is interesting to note that the quantity of obsidian from southern sources decreased again during the Cliff phase in the Upper/Middle Mimbres. The increasing reliance on Mule Creek sources could suggest a shift of focus to events surrounding the Salado phenomenon that were occurring in the Upper Gila Valley near the Mule Creek source (see Clark et al. 2011). Researchers suggest that the Salado phenomenon in the Upper Gila represented a new identity or religion that resulted from extended contact between ancestral Puebloan immigrants from the Kayenta region of northeastern Arizona and local groups in the southern Southwest (e.g., Chapter Two; Clark 2010; Clark et al. 2011; Clark et al. 2012;
Huntley 2012; Huntley et al. 2010). At the Black Mountain site, there was no significant change in source use from the Black Mountain to the Cliff phase (Table 7.10; $\chi^2 = 1.5; df = 1; p = .16$; Cramer’s V = .11). Again, the low Cramer’s V supports this conclusion.

A chi-square examining all periods shows there is a statistically significant change in use of sources through time (Table 7.11; $\chi^2 = 240.52; df = 4; p < 0.00001$; Cramer’s V = .52). For Table 7.11, it is important to remember that this chi-square does not show directionality. The significant $p$ value is not characterizing the difference in specific changes among cells. The $p$ value in Table 7.11 characterizes difference within the entire matrix. In other words, the significant $p$ in Table 7.11 represents differences in source frequency among time periods. One potentially confounding factor for Table 7.11 (a variable the researcher cannot [or did not] account for that may affect the variables that were measured) is that few sites represent multiple phases. Black Mountain is the only site that contains more than one period/phase in its dataset. Therefore, it is difficult to determine whether change is driven by the shifting use of obsidian sources or the fact that there is a different suite of sites for each period.

Proximity of sites to sources is examined in more detail in the discussion of results.

**Discussion**

At the beginning of this chapter, I proposed that shifting obsidian procurement patterns between regions and through time could indicate the reorganization of social connections, with continuity of some populations as well as the immigration of new groups. This appears to be the case. A comparison of obsidian source locations at sites in the Upper/Middle and Lower Mimbres region highlights the diversity of obsidian exchange networks through time. Obsidian procurement patterns suggest social and economic reorganization throughout the Mimbres region after 1150. In the following section, I summarize obsidian exchange strategies for the Lower
Mimbres. I then review exchange strategies for the Upper/Middle Mimbres. I suggest that the diverse and unstable patterns of obsidian sources seen in the Mimbres region after A.D. 1150 further highlight the complexity of economic, social, and political organization during the Postclassic.

**Lower Mimbres**

In the Lower Mimbres, there is a greater diversity of sources through time than in the Upper/Middle Mimbres. Social and economic expansion is supported by evidence of a larger quantity of Mule Creek obsidian used in the Lower Mimbres after the 1150 transition (Black Mountain and Cliff phases) as well as an increase of Nutt Mountain obsidian during the Black Mountain and Cliff phases. As discussed below, sites in the Upper/Middle Mimbres had an even higher quantity of Nutt Mountain than the Lower Mimbres. The Nutt Mountain source is close to the Eastern Mimbres. People were moving from the Mimbres Valley to the Eastern Mimbres after 1150 (Nelson 1999; Nelson and Hegmon 2011). Therefore, the increase in Nutt Mountain may show continuing connections between groups who continued to live in the Mimbres Valley (both the Upper/Middle and Lower) and groups who moved to the Eastern Mimbres.

Although the Lower Mimbres shows a greater diversity of source procurement through time, the continued use of southern sources (obsidian from northern Mexico and the boot heel of New Mexico) may demonstrate that populations living in the Mimbres region before 1150 continued to occupy the region. This could also suggest that if immigrants were moving into the Lower Mimbres, they were already aware of the southern sources and incorporated themselves into existing exchange networks.

During the Cliff phase, there was a slight decrease, yet continued use, of Mule Creek sources by people in the Lower Mimbres and at the Black Mountain site. This may indicate
continued links to the groups in the Upper Gila who were participating in the Salado phenomenon. At the Black Mountain site, there are Maverick Mountain polychrome and Roosevelt Red Wares (n = 87), which are associated elsewhere with Kayenta immigrants (Chapters Two and Six). Chapter Six noted the high frequency of plain wares produced in the Upper Gila at the Black Mountain site. Therefore, I suggest that people at the Black Mountain site were participating at some level in the Salado phenomenon or at least had close connections to groups living in the Upper Gila. As noted in previous chapters, while there is no “smoking gun” that proves immigrants (Kayenta or otherwise) were present at the Black Mountain site, several lines of evidence suggest immigrants are an important consideration for future research.

The diverse obsidian procurement strategies and continued use of southern sources in the Lower Mimbres could also suggest social and exchange connections to the Casas Grandes region during the Black Mountain and Cliff phases. Casas Grandes represents a major political, social, and economic transformation and population reorganization in the southern Southwest around A.D. 1250 (see Chapter Three). Focus on the southern obsidian sources (in northern Mexico and the boot heel of New Mexico) may represent increased interest in the Casas Grandes regional system around 1250/1300 (the end of the Black Mountain phase and beginning of the Cliff phase) on the part of people in the Lower Mimbres. Although it is unclear at this time where the Chihuahua polychromes found at the Black Mountain site were made, the presence of these polychrome vessels (n = 71) suggests some level of connection with Paquimé.

Interestingly, after 1250 (during the Cliff/Animas phases) at 76 Draw, which is south of LA 49, the most common obsidian source is Sierra Fresnal (northern Mexico), and a majority of the obsidian came from the southern sources (VanPool et al. 2013) (Table 7.2). Unlike people at the Black Mountain site, inhabitants at 76 Draw did not use diverse obsidian sources, and this
highlights variation among sites in the Lower Mimbres during the post-1150 periods. Given the limited obsidian sourcing for sites in the Casas Grandes regional system (Darling 1998; Fralick et al. 1998), it may be premature to suggest that the use of southern sources provides evidence of social or economic links to Paquimé through obsidian exchange networks (but see VanPool, et al. 2013). At this point, there is no evidence to suggest that Paquimé had control over obsidian procurement and exchange, although Di Peso and colleagues (1974 v. 8:189) do imply that people at Paquimé participated in long-distance obsidian exchange. Based on the close proximity of Paquimé to the southern sources it is possible that people at Paquimé and neighboring Medio period sites would have been procuring obsidian from these sources and would have encountered other populations using these sources.

In the Lower Mimbres, there were significant changes in obsidian procurement patterns from the Late Pithouse/Classic period to the Black Mountain phase, presumably linked to population shifts and the reorganization of social and economic connections at the end of the Classic Mimbres. Obsidian source data is complicated by several factors, including the level of social and economic interaction among groups living close to the source and those collecting materials from the sources. For example, groups living near the source may have been collecting the materials and exchanging them “down the line” or taking them to groups in other valleys and regions. Therefore, the continued use of specific sources may represent long-term (continued occupation) and/or new (migrant populations/reorganization) social/economic connections.

**Upper/Middle Mimbres**

Obsidian exchange patterns in the Upper/Middle Mimbres through time were, overall, more focused on the Mule Creek sources than in the Lower Mimbres. The obsidian exchange networks during the Black Mountain phase provide an exception to this pattern. During the
Black Mountain phase there was an increase in Nutt Mountain obsidian, which may indicate continued connections with groups who moved to the Eastern Mimbres around A.D. 1150. The appearance of southern sources at Black Mountain phase sites in the Upper/Middle Mimbres (Walsh and Montoya) further illustrates social reorganization and suggests that the shifts seen in material culture affected people throughout the Mimbres region. I suggest that the increase in reliance on southern sources from northern Mexico and the boot heel of New Mexico may be related to the slight population increase seen in the Lower Mimbres Valley during the Black Mountain phase. While populations in the Mimbres Valley decrease overall (Chapter Four; Blake et al. 1986; Peeples 2010), there is evidence that groups relocated to both the Lower Mimbres Valley and Eastern Mimbres. Just as the appearance of Nutt Mountain indicates continued connections with groups who moved to the Eastern Mimbres, the increase of southern sources in the Upper/Middle Mimbres suggests continued connections to groups who relocated in the Lower Mimbres Valley.

If, as Taliaferro and colleagues (2010:546) suggest, Mule Creek obsidian was a resource that had social importance and/or was collected from a location that had social significance, the shift to a more diverse procurement strategy in the Upper/Middle Mimbres during the Black Mountain phase (away from Mule Creek in the Upper/Middle Mimbres and toward Mule Creek in the Lower Mimbres), this would highlight the complexity of the social processes behind the changes in material culture. This may also demonstrate that people in the Upper/Middle Mimbres were turning their backs on the social organization of the Classic phase (Lekson 2002; Shafer 1999; see also Eckert 2008) and that during the periods after 1150 the Mimbres region was less unified (Hegmon et al. 2011; see also Duff 2002). There is some evidence that people living at the 3-Up site exerted some control over the distribution of the obsidian from Mule Creek (Clark
et al. 2011). While the southern sources track well as a group, there is more variation in the frequency of use of each of the southern sources from site to site (Dolan and Ferguson 2012; Taliaferro et al. 2010).

During the Cliff phase, people living in the Upper/Middle Mimbres shifted focus back toward the Mule Creek sources (Figure 7.6; Table 7.7). Scholars conducting research in the Upper Gila and southeastern Arizona suggest that use of Mule Creek obsidian during the 1300s highlights a connection to communities from the Kayenta region living around Mule Creek (Clark et al. 2003; Clark et al. 2011). Previous research has noted that during the Cliff phase the Mimbres Valley experienced an overall population decrease compared to the preceding period (Chapter Four; Nelson and LeBlanc 1986; Lekson 2006; Peeples 2010). Research by Archaeology Southwest and others (Clark et al 2011; Lekson 2002; Mills et al. 2013; Peeples 2010) has shown that sites in the Upper Gila experienced population increase, with Kayenta immigrants moving into already populated areas, albeit areas with a low population density. Archaeology Southwest proposes that Mule Creek obsidian was an important resource for sites in large parts of the southern Southwest after A.D. 1350 (Clark et al. 2011; Clark et al. 2012). The focus on Mule Creek obsidian during the Cliff phase in the Upper/Middle Mimbres and the appearance of Salado material culture (Lekson 2002; Nelson and LeBlanc 1986) suggest that the increased use of Mule Creek obsidian may have been related to ongoing social connections of Kayenta migrants moving into the Upper/Middle Mimbres.

Tracking Social Relationships through Exchange of Obsidian

Although some obsidian resource procurement research has shown that populations frequently use sources in closest proximity to where they live (e.g., Duff et al. 2012), Taliaferro and colleagues (2010:545-546) note that travel time to the obsidian source does not appear to be
the most important factor in obtaining materials for populations in the Mimbres region and southern Southwest (see also Clark et al. 2011; Clark et al. 2012). As shown in this chapter, people at the Black Mountain site were utilizing both Mule Creek and southern sources even though the Mule Creek obsidian would have required a longer travel time to collect or bring to the Black Mountain site. Therefore, it is important to consider factors other than ease of access when examining regional and site obsidian assemblages.

Several scholars have noted the importance of place, arguing that location plays an important role in creating social connections (e.g., Basso 1996; Harvey 1996; Joyce 2010; Massey 2005; Bowser and Zedeño 2009). Bowser and Zedeño (2009:1), following Basso, suggest that “place . . . is where history, both human and otherwise, happens and where knowledge gained by living history resides.” Drawing on this idea of place and taking into account that obsidian was not always collected from the sources in closest proximity to settlements in the Mimbres, I suggest that obsidian and obsidian source locations signify socially charged locations on the prehistoric landscape. They are important resources for researchers because they can provide an additional line of evidence for understanding social connections and socioeconomic reorganization. Taliaferro and colleagues (2010:546) suggest that “the preferences of Mule Creek sources might signify that this source or its geographic setting had significance within [the Mimbres] worldview” (see also Shafer 2003, 2006). The appearance of Kayenta migrants in the area around Mule Creek and the consistent use of this source during the Postclassic period may indicate connections to the Salado phenomenon. Crown (1994) has suggested that the Salado phenomenon worked to unite disparate groups in southeastern Arizona during a period of reorganization. Since groups in the Mimbres Valley were also experiencing
significant social changes, new forms of social organization may have been an appealing approach for navigating this liminal phase.

Previous research in the Mimbres region has suggested the existence of a united worldview during the Classic phase. The imagery found on Mimbres Black-on-white pottery communicated a cosmology and belief system that tied people to their ancestral lands (Gilman 1990; Moulard 1981; Shafer 1995; Thompson 1994). Changes in ceremonial organization, community organization, material culture, and imagery on ceramics suggest an increase in social complexity throughout the Classic Mimbres phase (e.g., Anyon and LeBlanc 1980; Gilman 1990; Gilman and Powell-Martí 2006; Hegmon 2002; Hegmon et al. 2006; Shafer 1995). The increased diversity of obsidian source use through time may indicate a reframing of this united worldview.

**Summary**

People in the Upper/Middle and Lower Mimbres Valleys during the Black Mountain phase expanded their social connections geographically to include groups over a broader region because of the lower population density in the Mimbres Valley (see Nelson et al. 2006; Nelson et al. 2011; Chapters Three and Six). Nelson and colleagues (2006, 2011) have proposed that the increase in pottery type diversity during Postclassic periods (1150) suggests expansion in exchange networks, which are different from the internally oriented networks seen during the Classic Mimbres (see also Duff 2002). In other words, there is evidence that resident populations in the Mimbres Valley maintained close social ties with the emigrants who left. Since people were moving out of the Mimbres Valley, the scale of social connections within the valley remained consistent in scale and expanded geographically. But people living in the Eastern Mimbres and those who remained in the Mimbres Valley continued to interact socially. The
increase in obsidian source diversity suggests an increase in the geographic extent of social connections. The expansion of this geographic network included people who moved to the Eastern Mimbres; therefore, it represents both continued social connections from periods before the Postclassic and new social connections. The fact that some of the obsidian resources remained the same is evidence that these expanded connections also incorporated long-standing relationships.

If we could fill in several important pieces of this puzzle, it would greatly clarify our understanding of the changes seen in obsidian exchange networks. First, there is a need for additional source data for sites in the Lower Mimbres during the Classic Mimbres phase. Second, additional data from other Black Mountain phase sites throughout the region would offer further insight into whether the shift in obsidian networks relates to regional differences between the Upper/Middle and Lower Mimbres region or if this is a result of the social reorganization that began around 1150. Although the data presented here suggest a significant shift in social and economic connections during the Black Mountain phase, there are only three sites that represent this phase (Black Mountain site, Walsh, and Montoya). Third, further geochemical characterization of obsidian from the Casas Grandes region is needed to expand our understanding of obsidian distribution networks stemming from communities in southwestern New Mexico. The limited analysis that has been conducted suggests people were procuring obsidian from local sources that have not yet been assigned to a specific source location (Darling 1998; Fralick et al. 1998). Thus far, there is no evidence directly linking events in the Casas Grandes region to obsidian sources included in the southern network.

The geochemistry of the obsidian artifacts analyzed from the Black Mountain site indicate a shift of focus toward raw material resources to the north, likely procured via
distribution networks surrounding the Salado phenomenon at the end of the Black Mountain phase. At the Black Mountain site, there is also a continued use of southern obsidian sources, which suggests social connections to the Casas Grandes regional system as well as the Salado phenomenon. I suggest that obsidian procurement represents shared knowledge that would have been passed on from generation to generation, thus shifts in obsidian exchange patterns could represent the appearance of new populations at the Black Mountain site, possibly associated with Postclassic Mimbres populations, who had previously utilized Mule Creek obsidian.
CHAPTER VIII
SOCIAL REORGANIZATION IN THE MIMBRES REGION

Introduction

The research reported here is based on three seasons of fieldwork (2010 to 2012) at the Black Mountain site (LA 49), near Deming, New Mexico. The Black Mountain site is the type site of the Black Mountain phase and likely one of the largest sites of the period (provisionally dated A.D. late 1100s to early 1300s). The shift from the Classic Mimbres phase (A.D. 1000 to 1150) to the Black Mountain phase, as well as the transition from the Black Mountain to Cliff phase, represents critical transitional periods in the southern Southwest. LA 49 has long been recognized as a key site for understanding social reorganization in the Mimbres region around A.D. 1150. But due to mechanical disturbance in the 1970s, archaeologists did not undertake field excavations at LA 49 until recently. Because of the mechanical grading, the site was almost invisible, graded to a series of very low mounds. My research proved that much of the site remains intact and can still provide key archaeological data. Research at LA 49 produced the first accurate map of the site, established the first chronometric dates (radiocarbon and dendrochronology), and collected controlled artifact samples. These chronometric data suggest that at the Black Mountain site the Black Mountain phase started in the late A.D. 1100s and ended around A.D. 1320.

While archaeologists agree that the periods directly following the Classic Mimbres phase represent a time of transition and social transformation, the processes behind the transitions have been highly debated (see Chapters One and Two). These debates revolve around whether the reorganization represents the immigration of new groups, a continuation of resident populations,
or a combination of these scenarios. This debate is complicated by the population decline that occurred in the Mimbres region around A.D. 1150, which makes it challenging to track possible immigrants. Although there are clearly other social processes which could account for the changes in material culture, this study has examined the three scenarios in relation to the Black Mountain site, framing these questions in relation to previous research on population estimates in the Mimbres region and the refinement of chronology at LA 49 for the Black Mountain phase.

In addition to providing important baseline data on this site and building on previous research at other sites, my research addressed key questions in Postclassic Mimbres archaeology, with implications for the archaeology of the American Southwest as a whole, and even beyond: Can archaeology detect and define the population composition of sites occupied during fluid, liminal periods, and if so, how? That is, how can we distinguish resident groups (people who continued to live in the Mimbres Valley) from migrants (those who moved in from surrounding communities) during periods of social reorganization and population decline? Although the picture is far more complex than this overly simplified dichotomy (resident versus migrant) might suggest, research at the Black Mountain site has provided key methods and data to help unravel this question.

In this chapter, I revisit the theoretical framework laid out at the beginning of the study and bring together the multiple lines of evidence that have been presented (population estimates, chronology, architectural technology, ceramic and obsidian circulation) to examine the processes behind the Classic to Black Mountain transition. I offer a synthesis of the stable and unstable patterns of social connection related to the transformations in the Mimbres region around A.D. 1150 and again around A.D. 1250/1300. I also explore the complex relationship between the
reorganization of exchange and migration. I conclude by summarizing the contributions of this study and discussing considerations for future research.

My data suggest that the transition around A.D. 1150 (as well as the second transformation around A.D. 1300) incorporated both migrant and resident populations. This process of incorporation was not a uniform event throughout the region, demonstrating that continuity can be a major part of cultural change. Cabana (2011:24) asks, “What if…we conceptualize change and continuity as the same process?” She goes on to suggest that from this perspective the past would be “filled with actors ‘strategically surviving,’ acting in ways to maintain, mobilize, or entrench rather than ‘acculturate’ to incoming cultures” (see also Duff 2002; Peeples 2011). During a period of social reorganization, identities are renegotiated and recreated, yet this does not eliminate the importance of historical processes and continuities (see Gosden 2005; Pauketat and Alt 2005; Woolf 1998). Therefore, change and continuity should not be viewed as mutually exclusive, but rather as two related aspects of reorganization.

**Population Estimates: A Baseline for Understanding Change**

Can archaeologists tell the difference between changes in exchange patterns and the appearance of new migrants, especially in fluid situations that might involve immigration of small groups? This question was examined in Chapter Four. Previous research (Cabana 2011; Cabana and Clark 2011; Clark 2001, 2011; but see Abbott 2003; Cameron 2008, 2014) suggested that archaeologists show population increase in order to propose that migrations occurred. However, as noted in Chapter Four, few regions offer the preservation, survey coverage, and precise chronological controls necessary for archaeologists to accurately reconstruct prehistoric populations at the level of detail necessary to differentiate between migration and shifting
exchange networks. I have suggested that during periods of population decline and social reorganization it can be especially difficult to see migrants (see Abbott 2003). But evidence of an overall population decrease does not eliminate the possibility that migrants may have played a role in the transition in the Mimbres Valley around 1150, as non-demographic data may indicate. In the case of the transition from the Classic Mimbres phase to the Black Mountain phase, we need more accurate regional, subregional, and site-level population histories in order to determine whether immigrants were involved in the transition.

This research utilized methodological and theoretical frameworks, described in Chapter Three, which may help to distinguish migrant from resident groups even though population estimates do not provide unambiguous evidence of immigration. Through these approaches, we can begin to develop methods that might differentiate between the reorganization of exchange networks, re-creation of social identities, and immigration. These methods also provide frameworks for understanding social, political, economic, and historical aspects of the transformation, allowing us to move away from simplistic explanatory models based on migration and exchange.

**Tracking Social Relationships during Periods of Transformation**

High and low visibility attributes provide useful techniques for differentiating archaeologically between migration and the reorganization of exchange (discussed in Chapter Three; e.g., Carr 1995a; Cabana and Clark 2011; Clark 2001, 2011; Costin 1998; Eckert 2008; Lemonnier 1992, 1993; Peeples 2011; Stark et al. 1998; Wallis 2011; Wiessner 1984 Zedeño 1998). Since these attributes are context dependent, their meaning can change in periods of transformation, such as during a migration, when resident populations are “turning their backs”
on the old ways and reinventing their societies, or when exchange patterns are reorganized (e.g., Eckert 2008; Lipe 2010; Ortman and Cameron 2008; Pauketat and Alt 2005; Stone 2003; Stone and Lipe 2008; Woolf 1998; Zedeño 1998). Low visibility attributes may provide information about local, frequent, face-to-face interactions and shared learning networks. High visibility attributes can provide information on broad-scale and regional connections, which are typically less frequent and more formal than local interactions (e.g., Beekman and Christensen 2003; Carr 1995a; Cordell and Habicht-Mauche 2012; Eckert 2008; Peeples 2011; Wallis 2011; Wiessner 1984). Because attributes are context dependent and can be unstable (discussed in Chapter Three; e.g., Ortman and Cameron 2008; Stone 2003; Stone and Lipe 2008), this research suggests that tracking both high and low visibility attributes is, therefore, important for understanding the processes behind transition. When these attributes are examined through space and time, what Pauketat and Alt (2005) call a history of practice, archaeologists can begin to unpack both local and regional changes and provide a broad-scale analysis of change (see Wallis 2011 for object genealogy, which is much like history of practice).

High and low visibility attributes were examined through an object life history approach (e.g., Appadurai 1986; Gosden and Marshall 1999; Jones 2002; Kopytoff 1986; Wallis 2011). For ceramics, this study tracked the dynamic history of these objects through their creation (production), use (consumption/exchange/reuse), and discard (final deposition) (discussed in Chapter Six). The history of practice of ceramics (Jones 2005; Wallis 2011; for other artifact classes see Gosden 2005; Pauketat and Alt 2005) was also tracked from the Classic Mimbres through the Cliff phase. Consideration of high and low visibility attributes of ceramics—contextualized in object life histories and histories of practice—allows us to see the interconnection, reorganization, and continuities that can occur during transition. For obsidian,
the history of source use was tracked from the Late Pithouse period through the Cliff phase. This portion of the study examined a sample of over a thousand artifacts, including obsidian flakes, stone tools, and raw materials. Although the obsidian data does not directly provide information on the questions surrounding migration and exchange, changes seen in obsidian exchange networks hint at social reorganization in the Postclassic periods.

**Chronological Refinement of the Black Mountain Site and Phase**

One of the major contributions of this research is chronological: radiocarbon and dendrochronology data from the Black Mountain phase occupation at Locus 2 of the Black Mountain site. Many regions in the Southwest have a tight chronometric control. The Postclassic periods in the Mimbres region are less well defined (Hegmon et al. 1999; LeBlanc 1977, 1980b; LeBlanc and Whalen 1980). The refinement of Postclassic chronology after A.D. 1150 is key to understanding the transition because the transition from the Classic Mimbres to the Black Mountain and Cliff phases is thought to have occurred on a short timescale of 50 to 75 years.

The data presented here and discussed in detail in Chapter Five suggest that at LA 49 the Black Mountain phase began in the late 1100s or early 1200s and ended around A.D. 1320. Bayesian analysis of radiocarbon and dendrochronology data from Locus 2 (Chapter Five) provides evidence that the construction of the initial Black Mountain phase pithouses (Locus 2, OS 3) began between the late A.D. 1100s and early 1200s. Construction of the first Black Mountain phase room block (Locus 2, OS 2, earliest room block occupation) started around A.D. 1265. The final phase of room block (Locus 2, OS 1, earliest room block occupation) construction occurred around A.D. 1290. Modeled radiocarbon data from Locus 2, summarized in Chapter Five, does not provide data to interpret the final use of the room block (OS 1).
However, the stratigraphic evidence described in Chapter Five, shows that the rooms and walls associated with OS 1, 2, and 3 were built directly on top of each other and align exactly (Figure 5.3). This may suggest there was little or no break in occupation between the final use of OS 2 (earliest room block floor) and the construction of OS 1 (latest room block floor). Therefore, the beginning of construction for OS 1 likely started around A.D. 1290 and room use may have continued for around 25 to 30 years (see Chapter Five; also Shafer 2003:96, who proposes 20- to 25-year room use), suggesting the end of occupation of the Black Mountain phase (at least at the Locus 2 room block) was around A.D. 1320. Thus, these data provide evidence that at LA 49 the Black Mountain phase began in the late 1100s to early 1200s and ended around A.D. 1320.

The use of pithouses may indicate that migrants may have been a part of the initial Black Mountain site community (Chapter Five). Elsewhere in the Southwest, pithouses were often the first architectural form constructed and used by immigrants, probably because of their ease of construction and short projected use-lives; that is, they were constructed for shelter while more elaborate and permanent pueblos were planned and built (e.g., Cameron 1999; Clark 2001; Di Peso 1958; Lyons 2003; Neuzil 2008; Stubbs and Stallings 1953; Wendorf and Stubbs 1953:23-24). On the other hand, the construction methods of pueblo walls at Black Mountain show technological similarities to Classic Mimbres construction techniques, suggesting population continuity on a sub-regional scale (Figure 5.5). At LA 49, the construction of the Black Mountain phase pit structures followed in a very short time by a spatially related Black Mountain room block could suggest migrants (Chapter Five).

At the Old Town site, 45 km north of Black Mountain, there is strong evidence that significantly reduced populations from the Terminal Classic phase continued to live at the site (Creel 1999, 2006b; Taliaferro 2014). In Chapter Five, I suggested that the multiple construction
sequences, the misalignment of the new over old construction, and the appearance of Roosevelt Red Wares at Old Town might also indicate a later arrival (post-A.D. 1275) of migrants (see Taliaferro 2014:154-174; Putsavage et al. 2015). The situation at Old Town may be similar to the probable occupation sequence in Locus 1 at LA 49, which suggests a break in occupation between the Cliff phase and the possible Black Mountain phase occupation (Chapter Five). These two sites show differences in the Black Mountain phase occupation. Old Town indicates a continued occupation of the site from the Classic Mimbres to the Black Mountain phase, whereas LA 49 has no Classic Mimbres occupation and may indicate that both resident and migrant populations were living at the site. Research at Old Town and the Black Mountain site emphasizes the diverse ways people approached reorganization at the end of the Classic Mimbres.

Population Continuity and Immigration

Several lines of high and low visibility evidence may shed light on the composition of the Black Mountain phase population (Chapters Five, Six, and Seven). These include: the construction sequence of Locus 2 (discussed above), wall construction techniques in Locus 2, the life history of Black Mountain phase pottery, the history of practice of pottery from the Mimbres region (change or uniformity in production location, production techniques, use, and final deposition), and the history of practice of obsidian procurement locations throughout the region (Late Pithouse period to Cliff phase). These data suggest that although resident populations were re-creating, renegotiating, and transforming their identities and previous social practices, resident groups still acknowledged their history and earlier social practices. Some of the data hint at the possibility that migrant populations moved into the Black Mountain site and elsewhere in the
region (see discussion of Old Town in Chapter Five). If so, migrants would have participated in and contributed to the transformation of social organization.

**Evidence of Population Continuity**

The object life history of ceramics at LA 49 and in the Mimbres region more broadly provides evidence of population continuity (Chapter Six). Ceramic production and exchange were investigated through NAA data. These data suggest that Black Mountain site inhabitants continued to rely on clay sources (M4aA) that had been widely used during the Classic Mimbres phase. The long-term use of clay resources may show that some families or groups of potters who lived in the Mimbres Valley before A.D. 1150 may have had special claims to specific clay resources. Resident populations living at Black Mountain or other sites in the region who had claims to these sources continued to use them after the transition. Mimbres Valley resident potters from the Black Mountain site, with claims or ties to these long-term clay sources, may have continued to use the source after they moved to LA 49, traveling to the Upper and Middle Mimbres Valley to collect clays. Mimbres Valley resident potters living at other sites who had connections to resident groups at the Black Mountain site may have also exchanged finished pots to Black Mountain. Small resident Postclassic groups inhabited several sites throughout the Mimbres Valley. Some established new sites, such as Black Mountain, and others continued to occupy sites that had been inhabited for generations, such as Old Town. These groups may have continued Classic Mimbres phase economic, social, political, and historical connections even in the face of transformation. When considered alongside the multiple lines of evidence presented in this research, long-term use of clays may support population continuity.
The investigation of pottery production from the Late Pithouse period through the Black Mountain phase (Taliaferro 2014) suggests continuity in production practices and provides further evidence for population continuity. The final deposition of ceramics in burials also indicates that at least some Mimbres Valley residents remained in the valley. Burial practices (the use of killed bowls, typical of the Mimbres phase) continued into the Black Mountain phase and provide another line of evidence that resident populations remained in the region.

The history of practice of obsidian use (Chapter Seven) provides some evidence for continuity and reorganization in the Mimbres region. At the Black Mountain site and at other sites in the Lower Mimbres Valley, people consistently used southern obsidian sources (northern Mexico and the boot heel of New Mexico) from the Late Pithouse through the Cliff phase (Figure 7.2). The increased use of Nutt Mountain obsidian (east of the Mimbres Valley) during the Black Mountain and Cliff phases (after A.D. 1150) may indicate that resident populations remained connected to groups who had left the Mimbres Valley and moved to the Eastern Mimbres, near the Rio Grande, around A.D. 1150. As discussed in Chapter Seven, villages in the Lower Mimbres Valley increase their use of Mule Creek obsidian (a northern source, near the Upper Gila River valley) during the Black Mountain phase and continued to use Mule Creek through the Cliff phase. NAA analysis of ceramics found at the Black Mountain site also suggests connections to groups living in the Upper Gila. Complicating the analysis of obsidian resource procurement is the emergence in the late twelfth and early thirteenth centuries of two major regional systems, Salado throughout the southern Southwest and Casas Grandes to the south of Black Mountain. Research suggests that groups living in the Upper Gila during the Cliff phase were Kayenta immigrants who participated in the Salado phenomenon. Therefore, the
connections to groups in the Upper Gila at the Black Mountain site may indicate inhabitants of the Black Mountain site were linked to this event.

Thus, multiple lines of evidence support the conclusion that there was at least some continuity of populations in the Mimbres region after A.D. 1150 and into the Black Mountain phase. It seems possible and even likely that the Black Mountain site represents both residents and migrants. These data suggest that stability and continuity in some realms may accompany what appears to be radical change.

**Evidence of Immigration**

Some aspects of pottery production, burial practices, and obsidian procurement may indicate that migrants were also part of the transition that accompanied the Black Mountain to Cliff phase transition (Chapters Six and Seven). The examination of pottery production locations shows that people at the Black Mountain site were exchanging or procuring pottery from the Mimbres Valley (PR1, PR2) and the Upper Gila Valley (M5a, M5b). In most locations in the American Southwest, exchange between river valleys involved primarily painted wares, rather than corrugated/incised or plain wares. (e.g., Duff 2002; Glowacki 2006; Huntley 2004; Peeples 2011; Zedeño 1998) For example, in the Hohokam region, red-painted wares traveled up and down the Gila River and from the Gila River to the Salt River, while production and use of plain wares was far more localized (Abbott et al. 2007). Recent research in the Cibola and Mesa Verde regions also suggests that plain wares were made and used locally, while painted wares were exchanged over much greater distances (Duff 2002; Glowacki 2006; Huntley 2004; Peeples 2011).
The examination of ware groups (painted, corrugated/incised, and plain) indicates that people at the Black Mountain site exchanged nearly equal quantities of these three categories with villages in the Mimbres Valley and Upper Gila Valley. That is, as many plain wares as decorated wares came from these two distant sources (Table 6.8). Unusually high frequencies of plain wares from the Upper Gila Valley reaching the Black Mountain site could denote migrants and/or close personal ties between the Black Mountain site and distant Upper Gila populations.

Several large-scale NAA studies have been conducted in the Mimbres region (see Chapter Five). These projects have focused mainly on decorated painted ware to examine whether pottery was produced at the household level or by part-time or full-time specialists (but see Hegmon et al. 2000 for examination of plain wares using petrography). Speakman’s (2013:15) examination of around 3,600 NAA samples from the Mimbres region included only about 25% plain or corrugated wares from sites from throughout the sequence; thus, relatively few non-painted samples from Mimbres and post-Mimbres period sites were included. Consequently, it is unclear if the pattern seen at LA 49 (higher than expected frequency of plain and corrugated wares exchanged over long distances) is present at other Mimbres Classic or Postclassic site in the region.

The appearance of clay sources not exploited during the Classic Mimbres phase (PR1 and PR2) may be further evidence of the presence of migrant populations. These two clay sources are found in the Middle Mimbres Valley (Table 6.7), close to Old Town Ruin, which has a large Classic Mimbres phase component. Taliaferro (2014:381-382) suggests that Old Town was the production source for vessels produced with these clays (see Creel et al. 2002). This interpretation is supported by the appearance of raw clay from PR1 in one of the Black Mountain phase rooms at Old Town. Therefore, I have argued that the appearance of new clay sources,
used only during the Postclassic, could denote the appearance of migrants procuring new clay sources (Chapter Six). Mimbres phase resident populations in the Mimbres Valley presumably had claims to clay sources used before the transformation. The use of new clay sources may indicate migrant populations that did not have access to clays used during earlier periods and possibly controlled by resident groups.

The marked increase in cremation burials at other Black Mountain phase sites in the Mimbres Valley suggests either the appearance of new, migrant groups or Mimbres Valley resident populations resisting or rejecting the social practices of Classic Mimbres phase inhumation burials (Taliaferro 2014). Cremations were not an entirely new practice during the Black Mountain phase, but they became far more common during this period and indicate changing ideas about how to care for the dead. Both burial types are found throughout the region and both may have been in use at LA 49. This change in burial practices could represent the merging of migrant and resident Mimbres Valley ideologies (Chapter Six). There is evidence of a major burning event in the Locus 1 plaza that may have been related to cremation. Since this area was not excavated, it is unclear if people at the Black Mountain site cremated their dead. In fact, no cremations were encountered in the areas excavated. All three burials encountered at LA 49 were inhumations. Still, preliminary evidence indicates a shift in burial practices.

While southern sources were still used, the geochemistry of the obsidian artifacts at the Black Mountain site indicates a shift of focus toward resources to the north during the Black Mountain and Cliff phases when compared with earlier Mimbres phase patterns. Obsidian from these northern sources was likely procured via distribution networks associated with the Salado phenomenon near the end of the Black Mountain phase. I suggest that obsidian procurement is a form of shared knowledge passed on from generation to generation. Therefore, shifts in obsidian
exchange could represent the appearance of new populations at the Black Mountain site, possibly migrants from the Upper Gila. Research conducted by Archaeology Southwest indicates that, “Kayenta immigrants facilitated access to Upper Gila obsidian by groups in southeastern Arizona” (Clark et al. 2011:10). This may also be the case for groups in the Mimbres Valley. Therefore, the increased use of Mule Creek obsidian over time suggests, at the very least, growing connections between the Lower Mimbres Valley (Black Mountain) and the Upper Gila.

Evidence of Population Continuity and/or Immigration

Potters were probably making some ceramics at the Black Mountain site throughout the periods under study. There are several NAA compositional groups (G1, G2a, G2b, G3, G4, and G5) that are only found in the BMAP dataset, and therefore, could be local to the Black Mountain site. Since the Black Mountain site has no Classic Mimbres phase occupation and there is no Classic Mimbres phase occupation near LA 49, both resident and migrants groups at LA 49 may have been seeking and utilizing new clay resources. Based on current data (Creel and Speakman 2012; Speakman 2013), these sources were not used by any groups in the Mimbres Valley prior to the transition of A.D. 1150. However, since we have relatively little NAA data for the Lower Mimbres Valley, it is difficult to determine if new clays represent residents or migrants (Chapter Six).

If Mimbres Valley residents moved into the Black Mountain site from the Upper and Middle Valley, they likely would have exploited new sources close to Black Mountain. As suggested in Chapter Six, Postclassic migrants to the Mimbres Valley may not have had access to clay sources used by resident groups. However, since all people living at the Black Mountain site were “new” to the site, it is not surprising that Black Mountain site people (resident or
migrant) procured and used new clay resources. As discussed in Chapter Four, there was a small but significant population increase in the Lower Mimbres after A.D. 1150, therefore there may have been an increase in pottery production from local clays. It must be emphasized, again, that because we have less NAA data for the Lower Mimbres (Speakman 2013), it is difficult to interpret the appearance of previously undocumented clay sources at the Black Mountain site or relate their use to resident or migrant populations. New sources, which to date have been found mainly at Black Mountain, indicate production from those clays at the site and could represent either resident or migrant populations, or both.

**Future Research at the Black Mountain Site**

This dissertation was framed through previous research, which questioned whether cultural continuity or cultural change was responsible for the reorganization. While the reorganization of exchange networks and migration were the focal points of research, other social processes, such as changes in agricultural strategies, social interaction networks, or identity, gender roles, and ideology, could also account for the transitions and should be evaluated in future research. Investigation of these possibilities would benefit from additional excavation data. Since only four Black Mountain phase sites have been excavated (LA 49, Old Town, Montoya, and Walsh), at this point it is difficult to evaluate questions relating to social identity, gender roles, and ideology. As described below, more detail about intramural and extramural room features, wall construction techniques, architectural layout and organization, and definition of ceremonial architecture could help to determine if changes seen after 1150 were influenced by changes in social identity, gender roles, or ideology. Three key areas require future research.
For the Mimbres region after A.D. 1150, we need more accurate population histories. Detailed population estimates are key to unpacking the differences between migration and social reorganization, and therefore were a major focus of this research. The challenges of estimating prehistoric population in the Mimbres region necessitate a second look at how archaeology tracks migrants. While population increase may well indicate immigrants (see Cabana 2011; Cabana and Clark 2011; Clark 2011), we should not discount the possibility of immigration during periods of population decline. Investigation of transitions in the Mimbres region should build on previous research in archaeological migration studies and requires examination of both high and low visibility attributes in multiple artifact and architectural classes through time. Archaeology is well suited to contribute to migration studies because our data include both demographic data and multiple types of artifacts, analyzed over the long term.

One way to examine whether immigrants were moving into the Mimbres Valley is to investigate if there is an increase in the construction of new sites. This future research will involve collating site data from the Mimbres Foundation survey, New Mexico Cultural Resource Information System (NMCRIS), and more recent survey data. The number of sites inhabited during the Classic Mimbres, Terminal Classic Mimbres, Black Mountain, and Cliff phases will be recorded. The study will also record how many sites were also inhabited during the phases immediately preceding their occupation. These data will then be examined to see if there is a spike in new site construction during the Terminal Classic, Black Mountain, and Cliff phases in comparison to the Classic Mimbres.

Several factors are likely to complicate this analysis. First, several Black Mountain and Cliff phase sites were recorded as Animas phase (see Chapters Two and Three). Sites designated as Animas phase will need more detailed examination to determine whether they represent Black
Mountain or Cliff phase sites. This examination would benefit from additional survey data. As noted in Chapter Four, the population estimates provided by Blake and colleagues may underrepresent Black Mountain and Cliff phase architecture because at the time these phases were newly defined, Black Mountain and Cliff adobe architecture can be difficult to see during survey, and Black Mountain and Cliff phase may be obscured by alluvial deposition.

(2) More chronological precision is needed. This research refined the chronology of the Black Mountain phase at the Black Mountain site. Chronometric data suggest that at LA 49 the Black Mountain phase started in the late A.D. 1100s or early 1200s and ended around A.D. 1320. Since the Classic Mimbres to Black Mountain phase transition evidently was not uniform across space, chronometric data are needed from multiple sites to understand broader regional patterns and variations. The Black Mountain phase component at the NAN Ranch site (Agape Acres) has the potential to contribute to this ongoing research project because the arroyo cut running through the site has exposed roof beams and hearth features, both of which have the potential to add chronometric detail. At LA 49, chronological questions remain concerning the Cliff phase component (Locus 1). Only one date was recovered from Locus 1. Consequently, the chronology of Locus 1 is unclear. BMAP excavations suggest that there may be a Black Mountain phase room block beneath the Cliff phase occupation. Future research will address the occupational sequence of Locus 1, with the potential to help us refine the chronology of both the Black Mountain and Cliff phases in the Lower Mimbres Valley.

(3) This research utilized multiple lines of evidence (wall construction, ceramics, and obsidian) to investigate the processes and practices of social change. However, due to mechanical grading and looting at the Black Mountain site, BMAP was not able to record the configuration and layout of intramural and extramural room features, architectural layout and
organization, and definition of ceremonial architecture. I believe that such features remain intact in some areas of the site. Previous research has shown that intramural features are useful tools for investigating the dimensions of reorganization addressed here (Hegmon et al. 2006; Nelson and Hegmon 2001; Riggs 2005; Taliaferro 2014). We know that some intramural features, such as hearths, remain intact at LA 49. Future excavations at the Black Mountain site will focus on the documentation of these features and further detailing architectural layout and room organization.

To track possible changes in ideology it is key to determine and document ceremonial structures at Black Mountain phase sites. A decrease in the construction of public architecture and communal pit structures from the Late Pithouse period to the Classic Mimbres has been documented (see Creel and Anyon 2003; Shafer 1999, 2003). As noted in Chapter Five, this trend appears to continue into the Black Mountain phase. The Black Mountain phase Locus 2 architecture at LA 49 has no clear area of public architecture. Although there are pit structures in Locus 2, at this point it is difficult to determine whether they functioned as domestic or ceremonial architecture. So few Black Mountain phase sites have been excavated that it is impossible to speculate on the social organization and changes in ideology that may have occurred after 1150 (Shafer 2006:31). The large plaza in the Locus 1 Cliff phase pueblo provides evidence of public architecture for this later phase. Few ceremonial structures are seen at Animas phase sites in the Jornada Mollogon. The apparent decrease of ceremonial structures after 1150 in the southern Southwest may suggest broad ideological shifts and deserves further consideration.
Social Reorganization in the Mimbres Region

This research indicates that populations living in the Mimbres Valley during the Black Mountain phase may have been composed of several social groups, both resident and migrant. The study highlights the diverse ways in which the Black Mountain site community experienced and produced social reorganization during and after the Classic Mimbres phase. The Black Mountain site was not occupied during the Classic or Terminal Classic Mimbres phases, so in one sense all the occupants during the Black Mountain phase were immigrants.

*Community* was defined in this study as a group of people who live in close proximity, have a collective history (however shallow or deep), and regularly interact within interconnected social, economic, and political networks. *Migration* was defined as a relocation across regional, sub-regional, or community boundaries. If we contextualize the data from this study with these terms in mind, it is there is evidence to suggest that both *resident* and *migrant* populations lived at the Black Mountain site. Resident populations from Mimbres Valley communities were part of the Black Mountain site community, and were probably also at other Black Mountain phase sites in the Mimbres Valley. There is also tentative yet provocative evidence of migrant groups in the Black Mountain community. While at Black Mountain there are no unambiguous signs of migrant populations (e.g., perforated plates for Kayenta migrants; Lyons and Lindsay 2006), the data are consistent with the presence at the Black Mountain site of people with increasingly strong connections to groups and social phenomena outside the Mimbres Valley: Upper Gila, Salado, and ultimately Casas Grandes.

The dramatic population decline in the Mimbres region around A.D. 1150 makes it difficult to perceive the presence of migrant groups in broad-scale population reconstructions. The Black Mountain phase was a period of transition, a period when social identities and
affiliations were being renegotiated, re-created, and transformed. Thus, it will prove challenging to unravel the differences between resident groups who were rejecting old ways and reinventing their societies, and migrants who brought with them at least some practices from elsewhere. At this point, some of the strongest evidence of migration is the presence of pottery types such as Maverick Mountain and Roosevelt Red Wares, which elsewhere in the Mimbres region have been associated with migrant groups. Exchange with Kayenta migrants could account for the occurrence of the Roosevelt Red Wares, but at least some of these wares were made locally.

Research at the Black Mountain site to date highlights the difficulties, ambiguities, and uncertainties in tracking migrant populations and differentiating migration from other types of shifts in local economic and exchange networks. The research also suggests avenues and methods for clarifying this murky picture. There is preliminary evidence that populations new to the Mimbres Valley created a community at the Black Mountain site alongside long-term residents with deep historical connections to the region during and after the transition that took place around A.D. 1150. Continuity and change are not mutually exclusive features of historical processes, and both are evident in the reorganization of social practices and networks in the Mimbres Valley.

Perhaps continuity was not antithetical to the changes seen around 1150. The continuation of practices from the Classic Mimbres to the Postclassic periods and the immigration of new populations during the Postclassic, which are both informed by historical processes, may have informed the reorganization of social and economic practices and networks. It seems likely that all these practices and histories played a role in the reinvention or reformation of group identities—the central question of the Postclassic social reorganizations.
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Research Design

Over three seasons of excavation (2010 to 2012), the Black Mountain Archaeological Project (BMAP) had numerous research goals, which evolved during each season. Summaries of the research design for each season are provided below, along with brief descriptions of how the research goals were met, and discussion of variation between the work proposed and the work performed.

The questions asked in the research design and the data collected in the project are linked and should be viewed as pieces of the larger question concerning social transitions in the Mimbres Valley around A.D. 1150 and 1250/1300. Data from LA 49 are used to address the questions below from several perspectives.

Research Questions 2010:

BMAP 2010 had three research questions. The proposed research addressed these questions using a suite of methods including geophysical survey, test excavations, and laboratory analysis.

1) Are there intact deposits at the site that could help archaeologists understand how the Black Mountain site (LA 49) fits into the population shifts and social reorganization that were occurring through the region after A.D. 1130? Do intact deposits support National Register eligibility?

2) What is the cultural affiliation and temporal assignment of the various components/features identified at Black Mountain (Locus 1, 2, and 3)?

3) Are there additional site components/features that were not documented in the original 1976 survey? If so, what is the cultural and temporal nature of these components/features?

Research Design 2010:

Question 1: The project conducted a limited testing program because there was no visible evidence of cultural deposits exposed in arroyo cuts or the road bed that cuts through the southern portion of the site. Grading seems to have impacted 80% to 90% of the Black Mountain (Locus 2) and Cliff phase (Locus 1) areas of architecture. We could not determine eligibility without testing. Limited test excavations were conducted in areas of the site likely to produce sufficient information to make a definitive recommendation for site eligibility to the state and national registers. This program was conducted according to test excavation standards set by the Cultural Properties Review Committee (4.10.16 NMAC).

Excavation units for the limited testing program were recorded based on the 40 m grid system Archaeology Southwest recorded this grid during the creation of the topographic map. The standard test excavation unit size of 50 cm-by-50 cm was too small to view archaeological deposits at this disturbed site, so test excavation units were expanded to 1 m-by-2 m units. At times, even the 1 m-by-2 m units did not allow for a detailed understanding of the stratigraphy; however, they did assist in the development of research questions for future work at the site. We
set up 8 excavation units and excavated 6 of these units (Units 2, 3, 4, 6, 7, and 8; see Figures 1.1, 5.2, and A.2). Excavations employed arbitrary levels of 10 cm until natural strata were defined. We maintained 10 cm control within natural strata. Sediments removed from all hand-excavation units were passed through a ¼-inch screen. Excavations were recorded on standard site forms. Artifacts from test units were collected and bagged according to artifact type. The excavation unit locations and context data were recorded on the bags. Artifact types collected included: faunal remains, ceramics greater than the size of a quarter, flaked stone and worked lithic materials, lithic tools, charcoal and burned corn (not from thermal features), flotation samples, ground stone, and all worked and unworked obsidian. We also collected numerous pollen samples from several pit features. Excavation unit locations were chosen based on survey and topographic anomalies from our mapping data. During survey, we noticed numerous unnatural rises on the landscape. The 20 cm topographic map notes areas of topographic anomalies (Figure 1.1), in other words, areas that did not represent natural topography.

Questions 2 and 3: Once the outer limits of the site were defined, controlled surface collections were procured using 10-m diameter “dog leashes.” These dog leashes were laid out on the 40 m site grid and numbered DL 1 to DL 48 (Figure 1.1). (Note that there is no DL 40 due to a numbering error.) A chaining pin was placed on the 40 m grid point, and a tape was used to string a 5-m radius around the grid point. The edge of the dog leash was marked with chaining pins. The crew collected diagnostic ceramics, diagnostic lithics, and obsidian from within the dog leash. These artifacts were bagged according to location and artifact type. The crew members also filled out a dog leash collection form for each unit. These data provided medium-resolution surface distribution maps of ceramic, artifact types, and artifact densities and have allowed for the definition of horizontal stratigraphy of temporal components.

We also collected isolated finds of obsidian, turquoise, and diagnostic ceramics and lithics. These artifacts were given UTM coordinates to mark their locations on the site. Although collection of turquoise was not included in the original survey permit, we decided to collect turquoise in the field because it can be sourced and will thus contribute to the research goals of understanding population shifts and social reorganization after AD 1130 at the Black Mountain site.

GPS mapping was conducted by the Center for Desert Archaeology from Tucson, Arizona. Mike Brack used a Sub-centimeter-precision real-time kinematic GPS to map the site. The topographic map showed unnatural, topographic anomalies. These anomalies highlighted areas of possible architecture and were used to place some of the test excavation units.

Research Questions 2011:

We had three research questions during the 2011 season:

1) What is the chronology (beginning and end) of the Black Mountain phase at the Black Mountain site?

2) During the 2010 season, we noted that the Locus 1 (Cliff phase) room block was built over earlier occupations. It is presumed that this room block was built over Black
Mountain phase structures, but this assumption needs to be confirmed. What cultural affiliation and temporal assignment does this second occupation represent?

3) What are the changes in material culture between the Classic Mimbres period and the Black Mountain phase?

Research Design 2011:

Question 1: During 2010 and 2011, the crew collected numerous datable materials that were obtained from individual samples as well as soil flotation samples. The crew collected 26 individual floral samples. Dr. Karen Adams identified the floral species. Putsavage collected numerous datable materials from the float samples. They were sent to Dr. Karen Adams for species identification.

BMAP also utilized geophysical mapping to gain a better understanding of the complex occupational history, architectural layout, and stratigraphy of the site. Magnetometry work was conducted over the entire area of Locus 1 of the site and a portion of Locus 2 that did not contain vegetation. This work was conducted in collaboration with Dr. Darrell Creel of the University of Texas, Austin (UT), and Texas Archaeological Research Laboratory (TARL). As shown in Figure 1.5, there is a relatively close correspondence between the SE edge of the Locus 1 Cliff phase room block and a linear, strong magnetic anomaly. Ground truthing of the geophysical mapping was conducted during 2011 (in Unit 10 for a “hot spot”) and 2012 (Trenches A and B).

Question 2 (Changes to the 2011 Research Design): BMAP did not conduct excavations in the Locus 1 room block of the site during the 2011 season due to the limited crew size and geophysical mapping activities. Work conducted in the Black Mountain section of the site quickly yielded datable materials and detailed information on the complex stratigraphy of the site, so we decided to focus work on Locus 2 (Black Mountain phase room block) during 2011. Understanding the complex occupational history of the Locus 1 room block is an important research focus, one that could greatly change our understanding of the Black Mountain phase occupation of the site. Excavation in this area was a focus of the 2012 season.

Question 3: During the 2011 season, the crew successfully collected material culture (ceramics, obsidian, and architectural data) from controlled contexts in Locus 2. These collections will be compared to Classic Mimbres phase collections (see below under Research Questions 2012 for detailed methodology of this study).

Research Questions 2012:

Three basic research questions guided excavation in 2012:

1) What is the extent of architecture and approximate population of the Black Mountain site?

2) What is the chronology of the Black Mountain site (and phase)? What is the chronology of the Locus 1 and 2?
3) Does the Black Mountain site represent an abrupt abandonment of the Mimbres region followed by a replacement of new populations, a continuous occupation accompanied by social reorganization, or some other scenario?

**Research Design 2012:**

*Question 1:* In order to understand the extent of architecture at the Black Mountain site (LA 49), the project created a 20 cm contour map and conducted geophysical survey (magnetometry) on limited areas of the site during 2010 and 2011 (Figures 1.4 and 1.5). To fully define the extent of architecture and the scale of the transformation, we placed test units to ground truth the survey. During 2011 excavations, we conducted geophysical survey using a magnetometer in collaboration with Dr. Creel of the University of Texas, Austin, and TARL. Preliminary, in-field interpretations from geophysical data were ground truthed during 2011 and 2012.

In 2011, we expanded one 1-x-2-m test unit (Unit 8) that exposed an adobe wall segment on Locus 2 (Black Mountain phase room block). This area of excavation was further expanded in 2012. Excavations uncovered three occupational surfaces and numerous datable annuals from well-controlled contexts.

*Question 2:* From 2010 to 2012, the crew collected numerous datable materials obtained from individual samples as well as soil flotation samples. Dr. Karen Adams identified the floral species from the individual samples as well as the float samples.

BMAP also utilized geophysical mapping to gain a better understanding of the complex occupational history, architectural layout, and stratigraphy of the site. Magnetometry work was conducted over the entire area of the Locus 2 room block and a portion of the Locus 1 room block that did not contain vegetation. This work was conducted in collaboration with Dr. Creel and TARL. As shown in Figure 1.5, there is a relatively close correspondence between the SE edge of the Locus 1 (Cliff phase) room block and a linear, strong magnetic anomaly. During 2012, we ground truthed this anomaly as well as other anomalies on the magnetometry R map (Figure 1.5). Ground truthing allowed for a better estimate of the size of the Locus 1 room block. We also placed numerous excavation units in Locus 1 and 2 to understand the multiple occupation levels in both of these areas of architecture. These data helped to refine the chronology of the Black Mountain site.

*Question 3:* To reconstruct and characterize the demographic transformation, the project investigated three data classes: (A) ceramic compositional and technological attributes, (B) obsidian procurement and circulation, and (C) household size and configuration. These analyses build upon previous studies in the Mimbres region for Classic and Postclassic assemblages and sites. Through comparison of these data classes, which were excavated from contexts with stratigraphic information, the project investigated whether these processes represent a replacement of new populations, a continuous occupation accompanied by social reorganization, or some other scenario. These data have helped to refine the scale, chronology and nature of the transformation seen in the Mimbres region.
Summary of Survey and Field Excavations, 2010 to 2012

LA 49 Unit and Datum Locations:
Because the project started excavations in 2012 by expanding from Unit 12 (from the 2011 season) and defining walls, the crew had to place several unit datums in this area of excavation. We wanted to be able to link the cmbd among the units (9, 12, 13, 14, and 15). Therefore, when a new unit datum was placed in this area the crew strung out a line level to place the new datum so that each unit datum would roughly articulate. Although there is likely a small margin of error between unit datum numbers 8, 12, and 13, the cmbd for these unit datums is comparable (Figure A.1).

<table>
<thead>
<tr>
<th>Table A.1 LA 49 Datum Locations</th>
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<tbody>
<tr>
<td>Unit 8 (mapped in 2010)</td>
</tr>
<tr>
<td>SE 101 deg 35 min; dist = 14.86 m</td>
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<tr>
<td>SW 109 deg 06 min; dist = 15.19 m</td>
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<td>Unit 10</td>
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<td>SW 320 deg 07 min; dist = 16.28 m</td>
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<td>SE 325 deg 41 min; dist = 17.42 m</td>
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<td>Unit 11</td>
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<td>SW 274 deg 28 min; dist = 14.26 m</td>
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<tr>
<td>SE 282 deg 30 min; dist = 13.91 m</td>
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<tr>
<td>Datum Elevations</td>
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<tr>
<td>HI over central datum = 142.5 cm; datum elevations below HI:</td>
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<tr>
<td>Datum 8, 12, and 13 = 107 cm</td>
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<tr>
<td>Datum 10 = 192.5 cm</td>
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<td>Datum 11 = 156 cm</td>
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<td>Unit Number</td>
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<td>2 (Locus 1)</td>
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<td>3 (Locus 1)</td>
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<tr>
<td>Trench A (Locus 1)</td>
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<td>Trench B (Locus 1)</td>
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<tr>
<td>Trench C (Locus 2)</td>
</tr>
<tr>
<td>Trench F (Locus 2)</td>
</tr>
</tbody>
</table>
Figure A.1 Site datum locations.

All coordinates
UTM Zone 13 metric grid values
NAD83(CORS96:2002)/NAVD88(Geoid 2003)
Basis of coordinates is an OPUS solution
Computed from 8:30 (18255 epochs) of static
L1/L2 GPS data at DAI Pt 5434 on 5/25/2010
Overall RMS=0.016 m
Combined scale factor at DAI Pt 5434=1.00031694
Ground adjustment factor at DAI Pt 5434=0.99968316

0.5 m Interval Contours

DAI Pt 5182
E 225140.309 m
N 3581561.413 m
Ortho-Ht 1382.050 m
90-epoch RTK position
1/2" rebar with alum cap set flush

DAI Pt 5181
E 225233.485 m
N 3581529.561 m
Ortho-Ht 1383.337 m
90-epoch RTK position
1/2" rebar with alum cap set flush

DAI Pt 5180
E 225313.042 m
N 3581537.243 m
Ortho-Ht 1382.050 m
90-epoch RTK position
1/2" rebar with alum cap set flush

DAI Pt 5434
OPUS solution
E 225341.803 m
N 3581509.611 m
Elip-Ht at ARP 1358.903 m
Ortho-Ht at ARP 1383.409 m
Unmonumented

Black Mountain Site
Luna County, NM
Geodetic Control

Desert Archaeology, Inc. 2011
**Unit 2 (Locus 1):**

Excavated by Kellam Throgmorton, Jessica Hedgepeth, and Hannah Jane Carmack from May 28 to June 1, 2010. Unit 2 is a 1x2 m unit that runs north-south along its long axis. The unit was placed on the highest portion of a rise on the east side of the three-sided Locus 1 plaza. This rise seemed likely to contain architecture. Profiles were drawn of the west and east unit faces.

All depths cm below Unit 2 datum.
Level 1: 25-30 nominal; Stratum I
Level 2: 30-41 nominal; Strata I and II
Level 3: 41-55 nominal; Stratum II
Level 4: 55-60 nominal; Stratum II and floor/cultural surface
Level 5: 60-72 nominal; Stratum III
Level 6: 72-80 nominal; Strata III and IIIa
Level 7: 80-90 nominal; Strata III and IIIa
Level 8: 90-100 nominal; Strata III and IV

Strata based on east profile face, as west profile contains a large amount of rodent disturbance.
Stratum I: Hard compacted, caliche rich, adobe melt.
Stratum II: Grayish-brown, silty sand with small, (less than 1 cm) angular and rounded gravels.
Small adobe blobs near bottom of stratum.
Stratum III: Grayish, brown silty sand. Fewer small gravels than Stratum II.
Stratum IIIa: Lens of Stratum III with higher level of gravels.
Stratum IV: Whitish (very light brown), silty, sandy clay. Few gravels, but increase in gravels with depth. Feature 2 excavated into Stratum IV.

Note: Room/Feature 1, located in the SE corner of the unit, was only excavated to 60 cmbd because the area was too small (50 cm-by-70 cm) to go deeper.

**SUMMARY:** Unit 2 was highly disturbed by rodents, modern looting, and grading. The disturbance is evident because we found pieces of modern glass throughout the unit. We found the neck of a glass bottle in Level 1 and found fragments of glass throughout the upper two levels of the unit. In spite of these stratigraphic issues, Unit 2 provides good evidence of intact deposits at the site. It appears that there are at least two (OS 1E and OS 2E, described in more detail in Unit Summary for Unit 17), but possibly three, occupations represented in Unit 2. The latest occupation is associated with the adobe wall and wall corner found in the SE area of the unit (Levels 1 to 3, Figures 5.3 to 5.7). At the base of this adobe wall, there were two cimentos/wall footer stones. About 10 to 15 cm below the base of the wall was a cultural surface, possibly a floor (Level 4, Figures 5.5 and 5.6). Because of the 10 to 15 cm of fill between the base of the wall and the floor, it is clear that these two features are not associated with each other and probably represent two different occupational periods. The floor, first noted about 60 cmbd U2 in Level 4, was patchy and did not continue through the entire unit. The third and earliest possible occupation is represented by the pit feature (Feature 2), which is cut by the west profile face in Level 7 (Figures 5.6). The west profile face of the unit suggests that part of the west half of Unit 2 was open sometime in the past. It seems likely that a looter’s pit was dug into that half of the unit and left exposed. It may have been filled in again during the grading episode at the site. In this area, we found more historic glass and other evidence of modern fill.
**Unit 3 (Locus 1):**

Excavated by Kellam Throgmorton and Jessica Hedgepeth from May 26 to May 28, 2010. Unit 3 is 1x2 m and runs north-south along its long axis. The unit was placed on the highest portion of a rise on the west side of the three- or four-sided Locus 1 plaza. This rise seemed likely to contain architecture. Profiles were drawn of the east and west faces.

All depths cm below Unit 3 datum.

Level 1: 18-32 nominal; Strata I, II, and V
Level 2: 32-41 nominal; Strata II and V
Level 3: 41-53 nominal; Strata III, IIIa, and VI
Level 4: 53-60 nominal; Strata IV and VI
Level 5: 60-60 nominal; stopped at very beginning of Level 5 due to high concentration of disarticulated human remains

Strata based on east profile face.

Stratum I: Loose aeolian sand and area disturbed by roots.
Stratum II: Silty sand, light brown and dry (10Y/R 5/3 or 5/4). Has some charcoal and caliche. Numerous gopher holes, roots, and a few graves. Beginnings of adobe melt present in the lower portion of the stratum. May represent redeposited fill and/or disturbance from pot hunting and road grading.
Stratum III: Loamy sand, light brown. Large chunks of adobe and increased charcoal flecks in northern half of unit. Appears to be intact cultural deposits.
Stratum IIIa: Loamy sand, reddish-brown lens.
Stratum IV: Loamy sand, reddish, with some charcoal flecks, small pieces of caliche, and higher level of artifacts. Adobe wall is still slightly melted but no longer seems ephemeral. Appears to be intact cultural deposits.
Stratum V: Similar to Stratum II except a for a ridge of whitish, harder packed material which probably represented adobe wall melt. May represent redeposited fill and/or disturbance from pot hunting and road grading.
Stratum VI: Loamy sand with evenly distributed pieces of caliche, charcoal, and higher level of artifacts.

Note: Strata II, III, IIIa, and IV are to the south of the adobe wall, while Strata V and VI are to the north of the adobe wall. Variations between similar strata could represent different depositional sequences between two different rooms.

**SUMMARY:** In Unit 3, the 2-m profile face runs north-south. The unit has an adobe wall running east-west on the southern side of the unit. The base of the wall is about 35 cm wide and is narrower at the top. The adobe first appears in Level 1, and the wall is definable in Level 2. There are numerous chunks of adobe in the unit. There is a noticeable difference between the stratigraphic levels on the north and south sides of the adobe wall. North of the adobe wall are more gravelly debris and adobe chunks. The south side contains fewer inclusions with more clearly defined strata but it also contains more rodent disturbance. Stratum II seems to be disturbed by redeposited materials from grading or looting. This redeposited area has a low artifact density, but we did encounter disarticulated human remains in these strata and stopped excavation. Strata III and IV seem to be intact cultural deposits.
**Unit 4 (Locus 2):**

Excavated by Steve Lekson and Hannah Jane Carmack from May 31 to June 3, 2010. Unit 4 is 1x2 m and runs east-west on the edge of a possible looter’s pit and room block architecture. Because of the small rise and the fact that looters frequently dig in wall corners, it seemed likely that this unit would contain a wall or wall corner. Profiles were drawn of the north and east faces.

All depths cm below Unit 4 datum.
Level 1: 8-25 nominal; Stratum I
Level 2: 25-35 nominal; Strata II and III
Level 3: 35-45 nominal; Strata III, IV and V
Level 4: 45-55 nominal; Strata IV and V
Level 5: 55-65 nominal; in 60 cm x 50 cm test in NE corner of unit: stratum V; Auger test in NE corner of unit to caliche at 100 cm bd: Stratum V

Stratum I: Compacted silty, light brown sand O/A horizon. Abundant small caliche fragments, possibly redeposited.
Stratum II: Intrusive pit into Stratum III. Not recorded as a feature. No horizontal definition during excavation, noted and recorded in N face profile. Possible looter’s pit.
Stratum III: Consolidated silty sand, gray-brown upper B horizon. Less compacted than Stratum I.
Stratum IV: Lens of medium brown silty sand; ashy, relatively uncompacted/loose, abundant small charred vegetal fragments, no artifacts.
Stratum V: Excavations terminated at 65 cm, continuation to caliche at 100 cm observed in small auger test. Very compact, reddish-tan, silty sand. Stratum V may constitute local sterile but lies above caliche. Caliche: pink-white, clayey sand. Very limited exposure, ca. 5 cm diameter.

Artifacts moderately abundant in Strata I and III, density decreasing with depth. Charred vegetal fragments but no artifacts in Stratum IV. No artifacts or charred vegetal fragments in excavated portion of Stratum V. Fill from auger test was screened, no artifacts or charred vegetal fragments. Feature 3 was the designation assigned to an amorphous, poorly defined depression (ca. 50 cm diameter x 8 cm deep) defined by an intrusion of Stratum IV in center of Unit 4, Stratum V at base of Level 3. Subsequently, we determined that Feature 3 was almost certainly a southern extension of Stratum IV into a natural or artificial and irregular depression in Stratum V. Charred vegetal fragments (probably denoting Stratum IV) were observed in the central part of the unit in Levels 3 and 4, probably indicating that Stratum IV extended partway into Unit 4. Stratum IV was not observed in south face profile of unit. Feature 3 could be dismissed as an accident of excavation except that a clear concentration of small cobbles (ca. 10 cm) occurred in the Feature 3 depression. Several were stained with charred vegetal fragments, but none were fire-cracked. Similar cobbles were not observed in Stratum IV in profile or elsewhere in Levels 3 and 4. There was no indication of firing or thermal alteration in the depression that constituted Feature 3, which could best be described as an irregular pit of unknown function. As with other Stratum IV, no artifacts were observed. Three bags of Stratum IV from Feature 3 were recovered for flotation.

**SUMMARY:** Unit 4 was essentially a “dry hole” (relatively few artifacts compared to Units 6 and 7), but two stratigraphic observations should be noted. Unit 4 was unusual for the layer/lens
of otherwise sterile Stratum IV with abundant charred vegetal fragments—far more than observed in any other layers of Units 4, 6, and 7. This could represent a natural burning event (grass fire), but the possibility of Feature 3 being real (suggested by the concentration of small cobbles in this feature, but absent in other portions of Stratum IV) may indicate a cultural origin of Stratum IV. Unit 4 was otherwise notable for the depth of the C horizon (Stratum V) above caliche; 50+ cm of sterile fill may indicate a large depression or pit feature in this area. (cf. relatively thin C horizons in Units 6 and 7).

**Unit 6 (Locus 2):**

Excavated by Steve Lekson and Hannah Jane Carmack from May 26 to May 28, 2010. Unit 6 is 1x2 m and runs east-west on a possible back dirt pile from a looter’s pit. Steve LeBlanc communicated that the Mimbres Foundation had uncovered valuable information from looter back dirt piles because looters are not concerned with datable material or small ceramic sherds that can help with relative dating. Profiles were drawn of the north and east faces. Somewhat idiosyncratic designations of stratigraphic units on profiles; labeled differently on N and E profiles.

All depths cm below Unit 4 datum.
Level 1: 10-25 nominal; Stratum I
Level 2: 25-35 nominal; Strata I and III
Level 3: 35-45 nominal; Stratum II
Level 4: 45-55 nominal; Stratum II; sterile at 49-58

Stratum I: Loose, silty, light brown sand O/A horizon (Unit 1 N, Units 1, 3 and 4 E); heavily disturbed/bioturbated, numerous rodent galleries. Possibly redeposited looter spoil.
Stratum II: Compacted silty gray-brown sand B horizon (Unit 2 N, Unit 2 E).
Stratum III: Compacted clayey silt lens, probably water-laid (Unit 2 N only; note that Stratum III lies between 1 and 2).
Sterile: Variegated C horizon, beginning of caliche; sloping from NE to SW, 50 to 58 nominal; compacted clayey sand grading E to W from pink-white to red-tan, abundant cobble and pebble inclusions. Fragment of thin water-laid lenses at E end of unit capping sterile. Contact between Stratum II and sterile was very sharp and well defined.

Artifacts moderately abundant in Strata I and II. Artifact density decreasing with depth. Artifacts throughout Strata I and II. No features, no evidence for structures. Water-laid lens capping sterile superficially resembled similar lenses in Unit 2, recorded as floors; unit was reopened 5/31 for inspection by Throgmorton and Putsavage, who agreed that Unit 6 “surface” was not similar to Unit 2 floor.

**SUMMARY:** Unit 6 was unremarkable, but may provide a “baseline” for extra-architectural deposition in this area of the site. While Units 4, 6, and 7 each had different stratigrapies, it is my guess that Unit 6 represents a likely soil profile for the area. Note, however, the differences between caliche in Units 6 and 7: in the latter, a layer of fist-sized caliche-coated cobbles marked the transition from B to C (caliche) horizons.
**Unit 7 (Locus 2):**

Excavated by Steve Lekson and Hannah Jane Carmack from May 28 to May 31, 2010. Unit 7 is 1x2 m and runs east-west in the midden that sits at the south edge of the Black Mountain room block. This unit was excavated in the hope of recovering dates and a stratified sample of pottery from the midden. Profiles were drawn of the south and west faces. Idiosyncratic designations of stratigraphic units on profiles; south and west differ. Unit 7 datum is 1.44 m above site datum 3; DAI Pt 5182; E 225140.309 m, N 3581561.413 m; Ortho-Ht 1382.530 m.

All depths cm below Unit 7 datum.
Level 1: 8-25 nominal; Strata I and II
Level 2: 25-35 nominal; Strata II and upper III
Level 3: 35-45 nominal; Stratum III; 50 cm x 50 cm test in SW corner of unit

Stratum I: Thin, very loose compacted, silty, light brown sand O/A horizon (Unit 1 S and “D” and 1 W).
Stratum II: Consolidated silty sand gray-brown B horizon (Unit 2 S and Units 2 and 3 W); abundant artifacts decreasing with depth. Moderately disturbed by rodent galleries.
Stratum III: Excavations terminated at 50 cm. Unit 3 S, undesignated W. 30-35 cm layer of reddish-tan, very consolidated, silty sand with abundant 5-7 cm caliche-coated small cobbles with very few artifacts (and those probably from rodent disturbance). This grades quickly at about 35+ cm into heavily caliche-cemented pink-white clayey sand with abundant small (3-5 cm) pebbles. Very hard; pick bounced off this sediment, terminating excavation.

SUMMARY: Unit 7 located within a possible midden (15 m E-W x 15 m N-S) defined by high surface density of artifacts and slightly darker ashy soil. Midden appears to be a thin mantle of dense artifacts (Strata I and upper II) above a thin B horizon resting on a dramatic caliche/sterile (Stratum III). Straightforward stratigraphy, no indications of features or structures.

**Unit 8 (Locus 2):**

Excavated by Kellam Throgmorton and Natasha Johnson from June 3 to June 5, 2010, and backfilled on June 5, 2010. Unit 8 is 1x2 m and runs east-west on a small rise in the Black Mountain phase portion of the site. About a week and a half into the project, Throgmorton and Putsavage noticed a rise which was likely attributable to architecture. The topographic map also showed that this area was a topographic anomaly and likely contained architecture. Profiles were drawn of the south and north unit faces and of the east face of the adobe wall.

All depths cm below Unit 8 datum.
Level 1: 19-32 nominal; Stratum I
Level 2: 32-40 nominal; Strata I and II
Level 3: 40-50 nominal; Strata II, III, and IV
Level 4: 50-62 nominal; Strata III and IV
Level 5: 62-70 nominal; Stratum V

Strata based on north profile face.
Stratum II: Silty sand with clay and blobs of adobe.
Stratum IV: Hard lens of compacted mud.
Stratum V: Hard, yellowish layer with higher clay content.

SUMMARY: Unit 8 provides evidence of at least two occupation periods. There is a looter’s pit cutting through the southern half of the unit. There are two adobe wall segments running north-south through the unit (Levels 2 to 4; Figure A.2). The looter’s pit cut the southern edge of these adobe walls. The long axis of the 1x2 m unit runs east-west, so these segments run the short axis of the unit. The west adobe wall is not very substantial. The wall only extends 10 to 15 cm and is only about 15 cm thick. The east adobe wall extends a bit deeper, 20 to 25 cm, but is also only about 10 to 15 cm thick. There is a possible floor in the east quarter of the unit at the base of Level 4. It appears that this floor articulated with the wall, but we are unsure if this compacted soil actually represents a floor. As with units and walls in Locus 1, these wall segments could represent wall footers or the very lowest portion of walls. Although we did not find cimentos in these wall segments, their shallow depth and thin width suggest the cultural floor in this section of the site may have been destroyed by the grading. The walls seem unreasonably close to each other, with only about 1 m between them. A looter’s pit has truncated both walls on the south end of the unit and distributed the sediments on the south side of the unit. In Level 5, there were two ashy lenses and two possible pit features. Since these features and lens were about 10 cm below the base of the adobe walls, we believe they represent a second occupation period.

Unit 9 (Locus 2):

Excavated by Nicholas Damp from June 14 to June 23, 2011. Unit 9 started off as a 2x2m unit. Once we encountered the east-west wall (Wall A) in the center of the unit, we divided Unit 9 into two sections, north and south of the wall. Unit 9 is directly north of Unit 8 (Figure A.3).

Unit 9 North:

Excavated by Nicholas Damp from June 14 to June 23, 2011. This unit was placed in order to define the north-south wall (Wall B) found in Unit 8. Unit 9 was a 2 x 2 m unit placed to the north of Unit 8. Unit 9 was placed to the north of Unit 8 because there was disturbance from a looter’s trench to the south of Unit 8.

All depths cm below Unit 8 datum.
Level 1: 13-20 nominal; Stratum I
Level 2: 20-30 nominal; Stratum I
Level 3: 40-43 nominal; Strata I and II. Occupation surface OS 1W is not present but stratigraphic change occurs at 43 cmbd, which likely represents where OS 1W used to be.
Level 4: 43-50 nominal; Strata II and III
Level 5: 50-60 nominal; Strata III, IV, and V
Level 6: 60-65 nominal; Stratum V. OS 2W at 64-65 cmbd. Unit 9 excavation was split into north and south sections at Level 6.
Level 7: 65-80 nominal; Stratum VI
Level 8: 80-90 nominal; Stratum VII. OS 3W at 90 cmbd (caliche floor of pithouse).

Strata based on west, north, and south (E-W wall) profile faces (Figure A.3).
Stratum I: Loose, gravelly, disturbed overburden, modern fill from grading activities. Base of Stratum I is sheet wash (about 40 to 43 cmbd U8) that settled where OS 1W used to be. It seems that OS 1W was destroyed by grading and/or looting.
Stratum II: Sheety wash and adobe melt deposited by wind or wash events mixed with wall fall and roof fall.
Stratum III: Hard, compact soil (with fewer gravels than Stratum I) clustered between adobe wall fall. Likely represents adobe melt.
Stratum IV: Loose gravelly fill with rodent disturbance and roof fall. Cultural fill.
Stratum V: More compact than Stratum IV, with gravelly fill. Adobe wall melt.
Stratum VI: Loose, gravelly, cultural fill. Possibly cultural fill placed into base of pithouse to construct OS 2W.
Stratum VII: Beginning of sterile and pithouse A floor (OS 3W).
SUMMARY: Excavations of Unit 9N quickly showed that there was an adobe wall running east-west (Wall A) though the middle of the unit (Figure 5.4, A.3a). Because of Wall A, Putsavage decided to record the two rooms (A and D) in Unit 9 separately. Therefore, Unit 9 North records room A and Unit 9 South records room D. The project split the unit into north and south after Level 5. At about 43 cmbd U8 datum, the crew encountered numerous silty lens and roof fall. Along Wall A there was a small amount of white plaster that had melted down the wall. Although there was no occupational surface/floor present, the wall plaster stopped around 43 cmbd U8 datum. Additionally, the roof fall and silty lens suggested that prehistorically there was a floor at 43 cmbd. This surface corresponded stratigraphically to occupational surface 1 (OS 1), which was the plastered floor found in Units 12 and 14 (Figure A.3a). At about 64 to 65 cmbd U8 datum, there was another cultural surface/floor. The soil was hard and compact when compared to the strata above. Although this floor was not as well prepared as the plaster floor found in Unit 14, there was roof fall (burned reeds and chunks of adobe) above the surface. This floor corresponded stratigraphically to occupational surface 2 (OS 2) found in Unit 12 (Figures A.3a, 5.3, and 5.4). Below OS 2, the crew encountered the corner of a pithouse. The pithouse had a white plaster floor and a possible hearth/pit feature (Feature 9.6) in the SW corner (Figures 5.3, 5.4, and A.5).
Figure A.3a  Locus 2 2011 units, showing multiple OS 1 to 3.

Figure A.4  Locus 2 (Black Mountain phase) of site Rooms A to D and Walls A, B, and C, 2011.
Unit 9 North, showing Feature 9.6 and Occupational Surface 3 West.

**Unit 9 South:**

Excavated by Kellam Throgmorton from June 14 to June 23, 2011.

Level 1: 13-20 nominal; Stratum I
Level 2: 20-30 nominal; Strata I and VII
Level 3: 40-43 nominal; Stratum VII; OS 1W at 43 cmbd
Level 4: 43-50 nominal; Strata VII and VIIIa
Level 5: 50-60 nominal; Strata VIIIa
Level 6: 60-68 nominal; Stratum VIII, OS 2W at 64-68 cmbd (split unit into north and south portions at Level 6)
Level 7: 68-80 nominal; Stratum VIII; Sterile
Level 8: 80-90 nominal; Stratum VIII; 50 x 50 cm placed in south side of Unit 9S (just south of E-W Wall) to be sure sterile is not a lens of caliche. Found it was sterile. Not see in profile as 50 x 50 cm excavation was not along profile.

Strata based on west profile of Units 8 and 9 south of Wall A. See west profile of Units 8 and 9 for more detail on numbering (Figure A.6).

Stratum I: Loose, gravelly, disturbed overburden, modern fill from grading activities. Base of Stratum I is sheet wash (about 40 to 43 cmbd U8) that settled where OS 1W used to be. It seems that OS 1W was destroyed by grading and/or looting.

Stratum VII (same as II in 9N): Sheety wash and adobe melt deposited by wind or wash events mixed with wall fall and roof fall.
Stratum VIIIa (same as III in 9N): Hard, compact soil (with fewer gravels than Stratum I) clustered between adobe wall fall. Likely represents adobe melt. Charcoal flecking.
Stratum VIII: Hard, compact, clayey, orange-colored, with few gravels. Beginnings of sterile.

SUMMARY: A cultural surface was found at around 43 cmbd U8 datum on the south side of Wall A (OS 1). There was less roof fall than on the north side of Wall A, but the surface was compact. There were also a few flat-lying artifacts. At about 68 cmbd U8 datum, the crew encountered another cultural surface/floor (OS 2). On the south side of Unit 9 and Wall A, this surface sat directly above sterile. Possible remnants of the floor can be seen in the west profile face of Unit 8 and Unit 9 South, but the floor was not easily visible during excavation. Two possible postholes were found in this surface (Features 9.2 and 9.3). Although Feature 9.2 was likely a posthole, shovel marks were seen at the base of the feature after it had been excavated. It appears that looters dug into this feature. This level of Unit 9 South was highly disturbed by rodents and looters. These site formation processes could explain why the floor was not easily visible during excavation.

Figure A.6 West Profile, Units 8 and 9.

**Unit 10:**

Excavated by Jakob Sedig and Steve Lekson from June 14 to June 22, 2011. Unit 10 was 1x2 m and placed because of a magnetometer “hot spot” located by TARL.

All depths cm below Unit 10 datum. Based on North and East profiles.
Level 1: 4-15 nominal; Stratum A
Level 2: 15-27 nominal; Stratum A, B, D
Level 3: 27-30 nominal; Stratum B, C, D
Level 4: 30-38 nominal; Stratum B, C
Level 5: 38-47 nominal; Stratum B, G
Level 6: 47-63 nominal; Stratum B

Stratum A: Disturbed overburden and modern fill from grading activities. Contains loose, sandy soil and small rocks and pebbles.
Stratum B: Sheet trash and sheet wash as well as adobe melt. Mix of wash, wind, and rain events as well as deterioration of the pithouse, which brought in cultural materials, adobe melt, and small gravels.
Stratum C: Sheet wash and ponding deposits. This wash entered the pithouse after it was abandoned. Numerous fine lenses from wash and wind events. Very small gravels and fine sands.
Stratum D: Sheet wash and ponding deposits. Second layer of wash that entered the pithouse after it was abandoned. Numerous fine lenses from wash and wind events. Small gravels and fine sands, higher amount of gravels than Stratum C.
Stratum F: Caliche that has leached into sheet trash. Beginnings of sterile mixed with some cultural materials. On north profile the area where some of the pithouse bench was excavated prehistorically can also be seen.

SUMMARY: Dr. Creel speculated that the “hot spot” could represent a burned structure or hearth, although there was no evidence of burning on the modern ground surface. The top levels of the unit were hard-packed and in the beginning the crew believed this could represent some type of cultural surface (possibly a plaza). However, there were adobe chunks scattered through this hard-packed area, and in the lower levels, Sedig found a shotgun shell cartridge at about 44 cmbd U10. There was no evidence of rodent disturbance in the area where the shell casing was found, so Sedig concluded that this area could represent soil disturbed when the site was mechanically graded. In the western half of the unit, excavations hit sterile at about 40-45 cmbd U10 datum. As excavations continued, Sedig and Lekson determined that this section of the sterile had been dug into by the prehistoric occupants and represented the edge of a semi-subterranean room (possibly a pithouse) (Figure A.7). There was a hearth (Feature 10.1) located on the bench of the pithouse and dug into sterile, and the crew collected soil samples from the hearth. The hearth was not in good shape and would not have been suitable for an archaeomagnetic date. This hearth was likely the magnetometer “hot spot.” Interestingly, all of the ceramics (Playas Red Incised and early El Paso Polychromes) from this unit date to the Black Mountain phase, and no earlier (Late Pithouse or Classic Mimbres period) ceramics were excavated from the unit. Therefore, Putsavage concluded that this pithouse dates to the Black Mountain phase and likely represents expedient housing built just before the construction of the Locus 2 (Black Mountain phase) room block.

Features: Feature 10.1 was a hearth that was dug into the caliche bench of the pithouse. The hearth was circular (about 25 cm diameter). The top of the hearth was at 57 cmbd U10 and the base of the hearth was at 88 cmbd U10. The hearth was in poor shape, so no archaeomagnetic date was taken. Fill was removed from the hearth and collected as a soil sample. The center of the hearth was located 30 cm south of the north profile face and 57 cm east of the west profile face.
Unit 11 (Locus 2):

Excavated by Katy Putsavage from June 16 to June 17, 2011. Unit 11 was 1x2 m and placed on a rise 12 m west of Unit 10 (where the magnetometer located the “hot spot”). Since this rise was one of the highest points in Locus 2 of the site, Putsavage believed this could represent another area of architecture.

All depths cm below Unit 11 datum.
Level 1: 12-29 nominal; Strata I and II
Level 2: 29-40 nominal; Strata II and III

Strata based on south profile face.
Stratum I: Small gravels, loose compaction. Overburden from grading.
Stratum II: Small gravels, medium compaction. Mix of overburden and caliche leaching into soil from bedrock.
Stratum III: Loose, dark soil with high artifact density. Likely midden area north of the Locus 2 room block.

SUMMARY: At the Black Mountain site, architecture is frequently uncovered within the first 10 to 15 cm of soil below modern ground surface. One of our research goals during the summer of 2011 was to uncover architecture and define rooms and intramural features. Because no architecture was uncovered in the upper levels of Unit 11, the unit was terminated and attention was shifted to units where architecture had been uncovered. The eastern half of the unit appears
to be the beginning of sterile due to the high concentration of white cobbles and reddish-orange soil. The western half of the unit contained dark, soft fill with a high concentration of artifacts, charcoal flakes, and small to medium cobbles of vesicular basalt. The western half of the unit could represent cultural fill or midden, although the modern ground surface does not show signs of a midden deposit. It seems likely that the rise by Unit 11 represents a natural rise in the caliche/sterile (similar to the rise seen in Trench A).

**Unit 12 (Locus 2):**

Excavated by Kellam Throgmorton, Katy Putsavage, Lena Baker, and Dean Hood from June 21 to June 31, 2011. Unit 12 was 2x2 m and placed east of Unit 9 to chase the E-W wall (Wall A).

All depths cm below Unit 12 datum.
Level 1: 20-41 nominal; Strata I, II, III, and VI; OS 1W 39 cmbd
Level 2: 41-50 nominal; Strata I, II, III, IV, V, and VI
Level 3: 50-60 nominal; Strata I, IV, V, VI, and VIII
Level 4: 60-69 nominal; Strata I, V, VI, VIII, IX, and X (OS 2W 66 cmbd visible in north and east profiles)
Level 5: 69-75 nominal; Strata VII and X

Based on north profile face (Figure A.8).
Stratum I: Loose, sandy soil. Overburden from grading.
Stratum II: Adobe melt.
Stratum III: Sheety wash from rain and wind events. Deposits sitting just above OS 1W.
Stratum IV: Sheety wash from rain and wind events. Deposit in disturbed area below OS 1W.
Stratum V: Remnants of OS 1W. Adobe and plaster.
Stratum VI: Adobe melt and wall fall.
Stratum VII: Adobe hearth associated with OS 2W.
Stratum VIII: Ashy, loose soil sitting just above OS 2W. Cultural fill.
Stratum IX: Plaster floor (OS 2W).
Stratum X: Sterile.

SUMMARY: Unit 12 was placed east of Unit 9 to define the east-west adobe wall. Excavation in Unit 12 was started during 2011 and finished in 2012. At about 40 cmbd U12S, along the south profile face of the unit and south of the east-west wall (Wall A), Putsavage and Throgmorton encountered a segment of the white plaster/caliche. This segment extended about 30 cm north into the unit and ran about 1½ m east-west along the south profile (OS 1; Figures A.3a, 5.3, and 5.4). This appeared to be a white plaster/caliche surface/floor. Unit 14 was opened in order to follow this feature, as there was very little of the floor (OS 1) remaining in Unit 12. At about 65 cmbd U12, the crew encountered a cultural surface/floor (OS 2). In the NE corner of Unit 12, the flooring material (OS 2) was smoothed into the SW corner where Walls A and C meet. There was also a small segment of floor (OS 2) remaining in the NE corner of the unit. Unlike the white plaster floor on the south side of Wall A (OS 1), OS 2 was a hard, compact surface, which appears to have been created by continuous use. Sitting just above this floor was a large stone standing upright and sitting on top of a flat stone slab (Feature 12.1). It appears that the large upright stone fell from the roof, and the flat slab may have been a roof entrance cover that fell into the room when the ceiling collapsed. In the center of the north profile face, there was a large
chunk of adobe melt which appears to be wall fall. In the NE corner of the unit along the north profile face, there was a hearth (Feature 12.2; Figure A.10). Putsavage removed ash and a float sample from the hearth, but left the hearth intact. The hearth was encountered on the second-to-last day of excavation and was not fully excavated. During the 2012 season, Gray Hein visited the site to take archaeomagnetic samples from the hearth (Feature 12.2).

Figure A.8 Unit 12, North Profile.

Unit 13 (Locus 2):

Excavated by Jakob Sedig from June 22 to June 27, 2011. Excavated by Dean Hood and Lonnie Lubeman on May 29, 2012. Unit 13 was 1x2 m. Excavation in Unit 13 was started in 2011 and finished in 2012. Excavation was continued in 2012 in an effort to trace Wall B (north-south wall) and find the corner of Room A. The unit was placed to chase Wall A, so there was little area present in the unit to see the OS. There was no clear evidence of OS 1W

All depths cm below Unit 13 datum.
Level 1: 15-31 nominal; Strata I and II
Level 2: 31-40 nominal; Strata I, II, IV and V
Level 3: 40-50 nominal: Strata II, IV, V, and VI
Level 4: 50-60 nominal; Strata II, IV, VI, and XI
Figure A.9  OS 1 West (Feature 12.1).

Figure A.10  Hearth (Feature 12.2).

Level 5: 60-70 nominal; Strata II, IV, VII, VIII, and X; last level in 2011, beginning of OS 2W
Level 6: 70-86 nominal; Strata II, III, IV, and IX; first level in 2012
Level 7: 86-94 nominal; Strata II and IV; possibly OS 3W and eastern edge of Pithouse A
Pithouse floor was not in good shape and not visible in profile, but was seen during excavation.
See plan view for Unit 13, Level 7.

Based on west profile face from 2012.
Stratum II (B): Sheet wash wind and wash events.
Stratum III (C): Roof fall and room fill.
Stratum IV (D): Adobe melt/wash.
Stratum V (E): Adobe melt/wash. More gravels than Stratum IV.
Stratum VI (F): Adobe melt/adobe wall fall.
Stratum VII (H): Adobe melt and roof fall.
Stratum VIII (I): Adobe/plaster floor (OS 2W).
Stratum IX (J): Adobe/plaster floor (OS 2W).
Stratum X (K): Roof fall.
Stratum XI (L): Roof fall and sheety wash from wind and water events.

SUMMARY of 2011 Excavations: Unit 13 was placed north of Unit 9 in order to further expose the north-south wall (Wall B) found in Unit 9. In the southern half of Unit 9, the adobe wall was well preserved, but looters had destroyed the wall in the northern half of the Unit 13. Sheety sediments seen in the west profile face of Unit 13 and aluminum foil found in Level 4 support the interpretation that there was disturbance from looters in the northern half of Unit 13. Along the north profile face, there was wall fall. However, due to the disturbance in this area of the unit, it is unclear if the flat-lying stones and adobe are in fact a wall fall or disturbance caused by looting activities. The adobe surrounding these flat-lying stones was melted and chunky, making interpretation of the flat-lying rocks difficult. In the NW corner of the unit, there was a cluster of fire-cracked rock. The occupational surfaces (OS 1, 2, and 3) were not encountered in Unit 13. Due to the evidence of looting in this unit, any cultural surfaces were likely destroyed.

SUMMARY of 2012 Excavations: Two additional levels were excavated during 2012 (Levels 6 and 7). In 2011, we believed there could be a cross wall at the north end of Unit 13. There was some evidence of OS 3 along the west profile. However, due to the disturbance in the unit, it was unclear if OS 3 was still intact. Excavations were terminated at about 90 cm below U13 because sterile soil was encountered.

Unit 14 (Locus 2):

Excavated by Kellam Throgmorton, Will Russell, and Garrett Trask from June 24 to June 29, 2011. Unit 14 was 1x2 m and placed to the east of Unit 8 and south of Unit 12 in order to define the floor/cultural surface (OS 1) uncovered in Unit 12.

All depths cm below Unit 12 datum.
Level 1: 19-37 nominal; Strata I, II, and IV
Level 2: 37-46 nominal; Strata II and IV; first evidence of sheety wash above OS 1W, surface OS 1W was not visible in south profile
Level 3 (Surface A): 41-47 nominal; Strata II, III, IV, and VI; OS 1W, surface A at 42-45 cm below
Level 4 (Surface B): 42-50 nominal; Strata II, IV, and VI; OS 1W, surface B at 47-49 cm below (not visible in south profile)
Level 5 (Surface C and below): 47-68 nominal; Strata II, IV, V, VI, VII, and VIII; OS 1W, surface C at 49-50 cm below

Based on south profile.
Stratum I: Loose, sandy soil. Overburden from grading.
Stratum II: Sheety wash and wind deposits. Natural fill in the center of Room C that washed in as the structure of Room C was collapsing.
Stratum III: White plaster of OS 1W, surface A.
Stratum IV: Ponding deposits/room fill from structure collapse and wind events.
Stratum V: Cultural fill placed prehistorically between construction of OS 1W surfaces.
Stratum VI: Cultural fill placed prehistorically between construction of OS 1W surfaces.
Stratum VII: Plaster of OS 1W, surface B.
Stratum VIII: Beginning of caliche/sterile.

The floor/cultural surface (OS 1) continued in Unit 14 (41 to 49 cmbd U12). Looters dug around the exterior of room C; therefore, the floor did not make contact with any of the adobe wall segments. The floor had been remodeled three times (OS 1 A, B, and C; Figure A.9). Each floor was made of white plaster and had dark cultural fill between the plaster surfaces. There was some looting in the unit, and it appears that intramural features had been looted and destroyed. However, there was one posthole (Feature 14.2) that remained mostly intact. This surface did not contain any adobe wall segments.

*Features:* Feature 14.1 was the three floors found between 42 to 50 cmbd U12. Feature 14.2 was in the NE corner of Unit 14 and was possibly a posthole but was not lined or collared. It cut through OS 1W (surfaces A, B, and C). Posthole contained loose fill, likely roof fall. Fill contained a large amount of burned reed and organics.

**Unit 15 and 15 North (Locus 2):**

Unit 15 was excavated by Nicholas Damp from June 24 to June 30, 2011. Unit 15 and 15N were excavated by Delton Estes, Lena Baker, and Jessica Hedgepeth from May 20 to May 26, 2012. Unit 15 was 2x2m and was opened in 2011 and finished in 2012. Unit 15 North was the portion of Unit 15 north of Wall A.

All depths cm below Unit 8 datum.
Level 1: 20-30 nominal; Strata I and II
Level 2: 30-42 nominal; Strata II and IV
Level 3: 36-46 nominal; Strata V and VII (beginning of season 2012 datum had to be reset so measurements about 4 cm above 2011)
Level 4: 46-52 nominal; Strata V and VII
Level 5: 52-62 nominal; Stratum VI
Level 6: 62-72 nominal; Strata V, VII, and VIII
Level 7: 72-82 nominal; Strata V, VII, and VII
Level 8: 82-90 nominal; Strata VII and IX

Based on west profile 2012.
Stratum I: Sands blown in from modern wind events.
Stratum II: Disturbed overburden, modern fill from grading activities. Contains loose sandy soil and small rocks and pebbles. Loose gravels.
Stratum III: E-W adobe wall.
Stratum IV: Sheet wash from wind and rain events with small gravels. OS 1W was not present in this part of Room A, but the sheety wash likely represents deposits that settled on OS 1W after abandonment (see plan views Level 2 and 3).
Stratum V: Adobe melt/wash.
Stratum VI: Plaster floor (OS 2W).
Stratum VII: Room fill with larger pebbles.
Stratum VIII: Caliche/sterile prehistorically excavated to create Pithouse A. Also found below Stratum IX. Cultural fill with small gravels and numerous organics was also present in this stratum. This is not seen in the west profile but was excavated and likely represents culturally deposited fill used to create OS 2W.
Stratum IX: Plaster floor of Pithouse A.

SUMMARY 2011: Unit 15 was placed to the west of Units 8 and 9 in order to define the east-west wall in Unit 9. Unit 15 was opened at the end of the 2011 season, and Damp was only able to complete two 10 cm excavation levels in 2011. There was a large amount of adobe melt in the upper two levels of the unit. Occupational surface 1 (OS 1), which started in the other units at 43 cmbd, was encountered in this unit at 36 cmbd (44 cmbd from 2011 datum U8). Several sheety lenses were found throughout the unit at 40 to 42 cmbd (2011 U8). Sheety lenses were also found above OS 1W in the other rooms (A-D) and units (8, 9, 12-15). During 2011, we believed this sheety wash was the floor, but we found small remnants of the OS 1W just below this sheety wash, 36 cmbd (44 cmbd U8 2011).

SUMMARY 2012: During the 2012 season, we used the western profile face of Unit 9 to guide excavation. Excavations in 2012 showed that OS 1 could be seen in the northern profile face of Unit 15 but was not encountered during excavation. Starting in Level 4 (36 cmbd to 52 cmbd), only the portion of the unit north of the east-west wall was excavated because we wanted to focus on defining Room A (Figures A.3a and A.4). OS 2W was encountered at 63 to 65 cmbd. There was little remaining of OS 2, but the surface was easily noticeable in the north profile stratigraphy. There was evidence of roof fall (large amount of burned material and reeds) and wall fall in the fill between OS 1 and 2. We also recovered numerous dendro samples between OS 1 and 2. These samples seem to come from undistributed cultural fill (no rodent disturbance). After Level 2 only the section of Unit 15 north of the wall was excavated. This section was designated Unit 15N.

Features: Feature 15.1 was a possible surface (OS 1) and was uncovered in 2011. During excavation in 2012, it was determined that Feature 15.1 was not OS 1, but did represent that sheety wash often found just above occupation surfaces at the site. Feature 15.2 was a depression in the east-west wall of Unit 15 (Figure A.11). It is unclear what this hole or depression represents. The hole was 42 cmbd at the lowest depth and could represent a posthole associated with OS 1. Feature 15.3 was a hole in the caliche floor (OS 3). This is possibly a posthole. There was no evidence of the post. We do not believe it is a looter’s pit because the fill above the posthole is not disturbed.
Figure A.11 Feature 15.2 in Wall A.

Unit 16 (Locus 2):
Excavated by Garrett Trask and Will Russell from June 28 to June 29, 2011. Excavated by Chris Caseldine, Dean Hood, and Steve Lekson from May 22 to May 26, 2012. Excavations continued to gain more information about the semi-subterranean room. Unit 16 was 1x1.5 m.

All depths cm below Unit 10 datum. Based on North and East profiles from 2012.
Level 1: 7-28 nominal; Strata A, B
Level 2: 28-36 nominal; Strata B, C
Level 3: 36-40 nominal; Strata B, C
Level 4: 40-60 nominal; Strata C, D, E, G
Level 5: 60-70 nominal; Strata D, G
Level 6: 70-75 nominal; Strata D, G

Stratum A: Disturbed overburden and modern fill from grading activities. Contains loose sandy soil and small rocks and pebbles. Same as Stratum A in Unit 10.
Stratum B: Sheet wash as well as adobe melt. Mix of wash, wind, and rain events as well as adobe melt and medium to small gravels. In Unit 10 profiles Stratum B was combined with Stratum A.
Stratum C: Sheet wash and ponding deposits. A few thin lenses from wash and wind events. Small gravels. Same as Stratum D in Unit 10.
Stratum D: Sheet wash and ponding deposits. This wash entered the pithouse after collapse. Numerous fine lenses from wash and wind events. Very small gravels and fine sands. Same as Stratum C in Unit 10.
Stratum E: Sheet trash and sheet wash. Mix of wash, wind, and rain events as well as deterioration of the pithouse that brought in cultural materials, adobe melt, and small gravels.
Stratum F: Caliche that has leached into upper strata. Could also be the remnants of an architectural feature in the pithouse that deteriorated. Same as Stratum F in Unit 10.
Stratum G: Sheet trash and sheet wash. Same as Stratum B in Unit 10.
Stratum H: Caliche/sterile.

SUMMARY 2011: Unit 16 was placed to the north of Unit 10 to define the edge of the semi-subterranean room (pithouse) located in the northern half of Unit 10. Unit 16 (1.5x1 m) was placed 20 cm east of Unit 10 NW corner and runs 1.5 m north (Figure A.12). The edge of the pithouse was located at 42 cmbd U10. It runs north-south and continues in Unit 16. The northern edge of Unit 16 did not hit the corner of the semi-subterranean room so we are unsure of the size of the room at this time. We also encountered the more densely packed soil that was seen in Unit 10 at about 30 to 40 cmbd U10. As in Unit 10, it appears that this fill is hard, compact fill, which could have resulted from adobe melt and puddle events. This surface does not represent a cultural surface. Numerous chunks of adobe were also found in this hard, compact fill. This adobe melt could be remains of the walls of the semi-subterranean room or could have washed down from the Locus 2 room block, which is slightly upslope from the semi-subterranean room. Unit 16 was excavated to Level 4 (60 cmbd U10) in 2011.

SUMMARY 2012: After backfill was removed from Unit 16, excavation continued in Level 5 (60 cmbd U10). Levels 5 and 6 were excavated in 2012. Caliche/sterile was hit in Level 6 at 70 to 75 cmbd U10. The fill just above caliche/sterile had a higher artifact density than previous levels. The crew extended Unit 16 to the north during the 2012 season in an attempt to define this structure and determine if it is a semi-subterranean room, a kiva, or some other architectural feature. Excavations were terminated in Unit 16 because we hit caliche/sterile. This caliche was prehistorically excavated to create the base of a semi-subterranean room or pithouse. Since all of the ceramics in this unit (as well as Units 10, 19, and 20) date to the Black Mountain phase, it seems that this pithouse was created before the room block was constructed. Due to the grading in the 1970s, this pithouse structure is in poor condition. The grader redeposited the top layers of fill and may have pushed some adobe construction materials from the room block into the upper layers of fill. This also seems to be the case in Units 10, 19, and 20, as there are large chunks of adobe found in the disturbed stratum (Stratum A).
Features: Feature 16.1 was uncovered during the 2011 season. At first we believed this was a posthole prehistorically excavated into the cultural surface at (38 cmbd U10). However, in 2012 we decided that the hard compact soil in Units 10 and 16 were redeposited fill and not a surface. Therefore what had been identified as Feature 16.1 turned out not to be a feature. Feature 16.2 was a posthole or pit feature prehistorically excavated into the caliche bench of the pithouse. Beginning depth was 42 cmbd U10 and end depth was 70 cmbd U10. Fill was light orange and loose. We do not believe this was a hearth because the soil in the fill was not ashy.

Unit 17 (Locus 1):

Excavated by Sean Dolan, Megan Smith, and Lonnie Lubeman from May 20 to May 26, 2012. Unit 17 was opened to further define the east-west wall in Unit 2 (from the 2010 excavations), the occupational surfaces, and to refine the complex stratigraphy found in Unit 2. Unit 17 was 2x2 m and was placed directly east of Unit 2.

All depths cm below datum 2.
Level 1: 17-28 nominal; Strata I and IIa; possible cultural surface (OS 1E) near base of level
Level 2: 28-38 nominal; Strata IIa, IIb, and III
Level 3: 38-48 nominal; Strata IIb and III
Level 4: 48-58 nominal; Strata III, IV, and V
Level 5: 58-63 nominal; Strata V and VI
Level 6: 63-73 nominal; Strata V and VI
Level 7: 73-91 nominal; Strata V, VI, and VII

Based on east profile (Figure A.13).
Stratum I: Disturbed overburden/modern fill from grading activities. Contains loose sandy soil and small rocks and pebbles.
Stratum IIa: Adobe wall fall.
Stratum IIb: Second layer of adobe wall fall. It appears there may have been a prehistoric cultural surface (OS 1E at 26 cmbd) between these Strata IIa and IIb, but this is not seen in profile and was difficult to see during excavation. We believe there was a cultural surface/floor because of the flat-lying adobe wall fall.
Stratum III: Medium compacted fill with small gravels (less than 5 cm) and some mixing from disturbed overburden (Stratum I). Charcoal flecking.
Stratum IV: Plaster floor (OS 2E at 48 cmbd U2).
Stratum V: Loosely compacted, sandy fill with no gravels.
Stratum VI: Medium compacted cultural fill with small gravel (less than 5 cm), charcoal flecking.
Stratum VII: Caliche/sterile.

SUMMARY: Like Unit 2, Unit 17 was disturbed by rodents. At about 26 cmbd U2, wall fall was encountered in the southern portion of Unit 17. This wall fall sits on top of about 10 cm of natural fill just above OS 1E (Figures A.13 and A.15). There are numerous chunks of adobe on the northern side of the east-west wall. These chunks appear to be adobe melt or wall fall, but because of the grading, it is difficult to tell (Figure 1.8). OS 1E was found at 48 cmbd U2 (Figure 5.4). The floor (OS 2E) was difficult to see during excavation but was recognized by two flat-lying manos and numerous adobe chunks lying on top of the occupation surface. OS 2E was found at 59 to 63 cmbd. This is the occupation surface seen in the east profile face of Unit 2. The floor was not well preserved because of rodent disturbance, but there is evidence of the floor on the north and south sides of the east-west wall. On the south side of the east-west wall there was a large sherd (FN 98) lying flat just above the floor at 55 cmbd (Figure A.14). The southern portion of the unit (south of the east-west wall) was not excavated beyond 62 cmbd (Level 5) because it became difficult to work in the narrow space.
Figure A.13 Unit 17, east profile.

Sterile was reached at 79 to 80 cmbd. Along the SE edge of the east-west wall there appeared to be rodent disturbance. When we excavated the east-west wall, we discovered that this was a location where the caliche/sterile soil dropped off. This area could be a pithouse, but since we were excavating in a small space it was difficult to clearly see the profiles and determine why the caliche dove sharply. During the 2010 season, we found a pit feature (Feature 2.2) at the base of Unit 2, so there is evidence for a pithouse component beneath the Locus 1 room block.

The east-west wall in Unit 17 was likely built during two events because the eastern portion and western portion have different end depths. There is a slight dip in the wall about 35 cm west of the east profile. This depression extends about 30 cm to the west. OS 1E and 2E do not articulate with the western portion of the east-west wall. OS 3E does not articulate with any excavated walls. Unit 17 was opened to gain a better understanding of the complex stratigraphy found in Unit 2 during the 2010 season; however, we now have more questions about this stratigraphy. It appears that there are at least three occupation surfaces with a possible pithouse sitting beneath these three surfaces. Again it is important to remember that the upper surface (OS 1E) may be a result of the grading. Wall fall would have been leveled by the grader and, therefore, could represent prehistoric floors.
Figure A.14 Plan view, Units 2 and 17.

Figure A.15 East stratigraphic profile of Unit 17 showing OS 1 East and wall fall from Cliff phase occupation.
**Unit 17 Southeast (Locus 1):**

Excavated by Dean Hood and Lena Baker on June 6, 2012. Unit 17SE is 0.5x1 m opened to explore a possible pit feature in the SE corner of Unit 17.

All levels cm below datum 2. Starts at Level 5 because it was a continuation of excavation in Unit 17, but in a smaller area (0.5 x 1m). Unit 17 ended at Level 7, but this area was beneath the E-W wall. Excavation was started at 60 cm bd U2, which was Level 5 in Unit 17.

- **Level 5:** 60-70 nominal; Stratum II
- **Level 6:** 70-80 nominal; Stratum II
- **Level 7:** 80-90 nominal; Strata II, IV, and V
- **Level 8:** 80-100 nominal; Strata II, IV, and V
- **Level 9:** 100-110 nominal; Strata II, III, IV, and V
- **Level 10:** 110-120 nominal; Strata III, IV, and V
- **Level 11:** 120-123 nominal; Strata III, IV, and V

Based on east profile (Figure A.16).

- **Stratum I:** Disturbed overburden/modern fill from grading activities. Contains loose sandy soil and small rocks and pebbles (excavated as part of Unit 17).
- **Stratum II:** Medium compacted, sandy, cultural fill with small gravel (less than 5 cm).
- **Stratum III:** Medium compacted cultural fill with small gravel (less than 10 cm).
- **Stratum IV:** Adobe melt.
- **Stratum V:** Caliche/sterile.

**SUMMARY:** Unit 17SE was a pit structure directly below the Wall Cut 1. The unit had few artifacts compared to the upper levels of Unit 17. There was loose sandy fill throughout. It appears that this pit feature may be the edge of a pithouse (Pithouse C; Figure A.17). Because of the small area of excavation, it was hard to define what this pit feature was, but based on the 2010 excavation in Unit 2, there is evidence for three periods of occupation in this area of Locus 1. The edge of the caliche had a steep slope and there were artifacts in the fill of Pithouse C. We believe this pithouse was dug into caliche. No diagnostic sherds came out of this unit, so it is unclear when the pithouse was constructed. It is also possible that Pithouse C may represent natural erosion processes. Further excavation is needed to clarify either interpretation.
Figure A.16 East profile, Unit 17SE.

Figure A.17 Pithouse C.
Unit 18 (Locus 2):

Excavated by Kathryn Putsavage, Jessica Hedgepeth, Lena Baker, Dean Hood, and Audrey Pazmino from May 23 to May 28, 2012. Unit 18 was 1x1 m opened to chase the north-south wall (Wall B) to try and find the corner of Room A. The unit is just north of Unit 13 (Figures A.18 and 5.4).

All depths cm below datum 13.
Level 1: 19-32 nominal; Strata I, II, IV, and XII
Level 2: 32-42 nominal; Strata II, IV, V, and XII
Level 3: 32-50 nominal; Strata II, IV, V, VI, VII, and XII
Level 4: 50-60 nominal; Strata IV, VI, VII, X, XI, and XIII
Level 5: 60-72 nominal; Strata IX, X, XI, and XIII

Based on west profile.
Stratum I (A): Disturbed overburden/modern fill from grading activities. Contains loose sandy soil and small rocks and pebbles.
Stratum II (B): Medium compacted fill with small gravels (less than 5 cm) and some mixing from disturbed overburden (Stratum I).
Stratum IV (D): Adobe wall fall and melt.
Stratum V (E): Ponding deposits from wind events with small gravels.
Stratum VI (F): Fill (likely disturbed overburden from grading activities) found between adobe wall fall.
Stratum VII (H): Adobe melt and wall fall.
Stratum VIII (I): Adobe/plaster floor (OS 2W).
Stratum X (K): Roof fall.
Stratum XI (L): Roof fall and sheety wash.
Stratum XII (M): Medium compacted fill with small gravels (less than 5 cm) and some mixing from disturbed overburden (Stratum I).
Stratum XIII (N): Caliche/sterile.

SUMMARY: There was a large amount of adobe melt, roof fall, and wall fall in the upper levels of Unit 18 (Levels 1 to 3). The north-south wall (Wall B), was located at 40 cmbd but the NE corner of Room A was not found. None of the occupation surfaces were encountered. At about 42 cmbd there was a noticeable change in soil stratigraphy. Since OS 1 occurs around 43 cmbd, it is likely this stratigraphy change is representative of the floor. Excavations were terminated at 64 to 72 cmbd (Level 5) because it was clear that the NE corner of Room A was further north. We decided to focus excavation on finding the NE corner of Room A so the room’s size could be estimated.
**Figure A.18** Units in Locus 2 (Black Mountain phase room block).

**Unit 19 (Locus 2):**

Excavated by Chris Caseldine, Johnny Schue, and Audrey Pazmino from May 23 to May 25, 2012. Unit 19 was 0.75x1 m.

All depths cm below Unit 10 datum.
Level 1: 13-50 nominal; Strata A, B, C, D, E

Stratum A: Disturbed overburden/modern fill from grading activities. Contains loose sandy soil and small rocks and pebbles.
Stratum B: Sheet wash and ponding deposits. This wash entered the pithouse after it was abandoned. Numerous fine lenses from wash and wind events. Very small gravels and fine sands. Same as Stratum C in Unit 10.
Stratum C: Sheet trash and sheet wash as well as adobe melt. Mix of wash, wind, and rain events as well as deterioration of the pithouse that brought in cultural materials, adobe melt, and small gravels. Same as B in Unit 10.
Stratum D: Looter’s pit. Also seen in west profile of Unit 20.
Stratum E: Caliche that has leached into sheet trash. Beginnings of sterile mixed with some cultural materials. On the north profile it is also possible to see an area where some of the pithouse bench was excavated prehistorically. Same as Stratum F in Unit 10.

SUMMARY: Unit 19 was excavated to further explore the pithouse feature uncovered in Units 10 and 16. While removing backfill from Unit 10 (1x2 m) at the beginning of the 2012 season, we had trouble locating the western edge (1 m) of Unit 10. The removal of backfill overshot the western edge of Unit 10. Once we had access to the transit, we were able to locate the NW and SW corners of Unit 10 and realized that we had overshot the western profile. Units 19 and 20 were created to further explore the pithouse and clean up the western profile face. Unit 19 was excavated in one level because a majority of the unexcavated dirt had been removed from the unit before it was created. All the backfill dirt from Unit 10 and the dirt excavated from Units 19 and 20 before the units were created was screened (¼ inch) once we realized we had likely overshot the west profile. Units 19 and 20 further exposed the caliche bench of the semi-subterranean pit structure. There was a layer of dense, compact soil sitting just above the caliche bench (45 to 50 cmbd U10). This soil was similar to the compact soil found in Unit 10 (Levels 3-6, Stratum B) and also likely represents sheet trash and cultural materials washed into and around the pit structure after abandonment.

Unit 20 (Locus 2):

Excavated by Chris Caseldine and Johnny Schue from May 25 to 27, 2012. Unit 20 was 1x1.5m.

All depths cm below Unit 10 datum. Strata based on west profile (Figure A.19).
Level 1: 10-23 nominal; Strata A, B, D
Level 2: 23-31 nominal; Strata B, D
Level 3: 31-38 nominal; Strata B, D, F
Level 4: 38-60 nominal; Strata B, C, D, F, E

Stratum A: Disturbed overburden/modern fill from grading activities. Contains loose sandy soil and small rocks and pebbles.
Stratum B: Sheet wash and ponding deposits. This wash entered the pithouse after it was abandoned. Numerous fine lenses from wash and wind events. Very small gravels and fine sands. Same as Stratum C in Unit 10.
Stratum C: Sheet trash and sheet wash as well as adobe melt. Mix of wash, wind, and rain events as well as deterioration of the pithouse that brought in cultural materials, adobe melt, and small gravels. Same as Stratum B in Unit 10.
Stratum D: Looter’s pit. Also seen in west profile of Unit 20.
Stratum E: Caliche that has leached into sheet trash. Beginnings of sterile mixed with some cultural materials. On the north profile it is also possible to see an area where some of the pithouse bench was excavated prehistorically. Same as Stratum F in Unit 10.
Stratum F: Sheet wash and ponding deposits.

SUMMARY: Unit 20 was excavated to further explore the pithouse feature uncovered in Units 10 and 16. While removing backfill from Unit 10 (1x2m) at the beginning of the 2012 season, we had trouble locating the western edge (1 m) of Unit 10. The removal of backfill overshot the western edge of Unit 10. Once we had access to the transit, we were able to locate the NW and
SW corners of Unit 10 and realized that we had overshot the western profile. Therefore, Units 19 and 20 were created to further explore the pithouse and the possible cultural surface at 36 to 38 cmbd U10 (Level 3) and to clean up the western profile face.

There was a hard compact surface at 36 to 38 cmbd U10. There were also flat-lying artifacts (two sherds of Playas Red Incised) and non-artifact construction-sized cobbles/rocks on this surface. The surface was in the best condition on the eastern edge of Unit 20. It is unclear if this surface was culturally constructed or a result of natural formation and deposition processes. Caseldine believed there was plaster on the surface, but when compared to the cultural surfaces in the Locus 2 room block (OS 1 to 3), the surface in the semi-subterranean pit structure was not well prepared. This surface could also be adobe melt from the exterior wall of the semi-subterranean pit structure. If the pit structure’s exterior west wall was constructed near the edge of the caliche bench and Feature 16.1 is a posthole that supported the exterior wall of the structure, adobe would have melted into the pit structure as well as onto the caliche outside of the pit structure. The area in Unit 20 where Features 20.1 to 20.4 (the possible oven and pit features) appear could have been an extramural work area for the pit structure.

The bench that was uncovered in Units 10 and 16 continued west in Units 19 and 20 (see above). This bench was at 45 cmbd U10. The caliche was excavated prehistorically to create the base of
the pit structure and postholes were excavated into the bench to create the exterior wall of the structure. We did not uncover a corner of the pit structure, so we have no estimate of its size.

Features: Feature 20.1 is a collection of cobble-sized rocks with loose fill between the rocks. The west profile cuts through this feature. The feature is 11 cm south of the north profile and 69 cm west of the east profile. The beginning depth is 31 cmbd U10 and end depth is 65 cmbd U10, but the feature was not excavated beyond the caliche. A depression, likely a rodent run, surrounds the northern edge of the rocks. Soil in this depression was flecked with charcoal, and a corn cob was found in the soil. The southern edge of the cobbles is dug into the caliche. The feature is similar to an oven, but there was little evidence of burning and the cobbles were not fire-cracked. Features 20.2 to 20.4 are a number of unknown pit features. Fill in these features was very similar to the surrounding matrix but was loosely compact. These features could also be rodent runs or looters’ pits. Feature 20.2 was 27 cm in diameter with beginning depth 45 cmbd U10 and end depth 66 cmbd U10. Feature 20.2 was 13 cm south of north profile and 24 cm west of east profile. Feature 20.3 was 30 cm in diameter, beginning depth 45 cmbd U10, end depth 66 cmbd U10. Feature 20.3 was 70 cm east of west profile and 100 cm south of north profile. Feature 20.4 was 15 cm in diameter, beginning depth 48 cmbd U10, end depth 77 cmbd U10. Feature 20.4 was 140 cm south of north profile and 100 cm east of west profile. Feature 20.5 turned out not to be a feature.

Unit 21 (Locus 2):

Excavated by Lena Baker and Delton Estes from May 27 to May 30, 2013. Unit 21, which was 1x2m, was opened to the west of Unit 15 to follow the southern wall of Room A. Only the northern portion of the unit was excavated beyond Level 1, since the unit was excavated to find the SW corner of Room A, which was in the center of Unit 21.

All depths cm below datum 8.
Level 1: 19-30 nominal; Strata I, II, and III
Level 2: 30-40 nominal; Strata II, III, and IV
Level 3: 40-50 nominal; Strata II, III, and IV; OS 1W at 42 cmbd not visible in profile
Level 4: 50-60 nominal; Strata II, III, and IV
Level 5: 60-65 nominal; Strata IV and V; OS 2W Floor at 62-65 cmbd
Level 6: 65-76 nominal; Strata VI
Level 7: 76-82 nominal; Strata VII and VIII

Based on west profile.
Stratum I: Disturbed overburden, modern fill from grading activities. Contains loose sandy soil and small rocks and pebbles.
Stratum II: Adobe melt/wall fall.
Stratum III: Fill from wind and collapse of Room A. OS 1W was not present in this part of Room A, but the sheety wash likely represents deposits that settled on OS 1W after abandonment.
Stratum IV: Adobe melt/wall fall.
Stratum V: Plaster floor (OS 2W).
Stratum VI: Beginning of caliche/sterile that was excavated prehistorically to create Pithouse A. Also room fill with larger pebbles (not seen in profile).
Stratum VII: Caliche/sterile prehistorically excavated to create Pithouse A.
Stratum VIII: Plaster floor of Pithouse A (OS 3W).

SUMMARY: In Unit 21, the E-W wall (Wall A), which was 20 to 35 cm wide, was encountered at 23 cmbd. We also found the SW corner of Room A. OS 1W was encountered at 42 cmbd U8. There was wall and roof fall in the fill just above the surface. Not much of the floor remained. At 50 cmbd there was compact sheety wash, which we first thought was a surface. However, a floor was found at 62 cmbd (OS 2W), and it seems likely that this compact sheet wash sat above the floor. This floor was in the best condition in the SW corner of Room A. Directly beneath this floor (OS 2W) was a turtle shell (Feature 21.1). The shell was turned face up and there was floor plaster in the shell. There was a bench at 78 cmbd. The floor of the pithouse was at 95 cmbd. At first we thought the bench was sterile, but further excavation showed that the pithouse was below the sterile. This bench was associated with the pithouse (Pithouse A). The bench was not found in any other location in the pithouse, so it is unclear if it continued around the entire exterior and served as the edge of construction or if it was located only along the western edge of the pithouse. As in other parts of Room A, the walls associated with the upper two floors are built directly on top of the edge of the pithouse. Along the west profile the wall was built about 75 cm west of the edge of the bench.

Features: Feature 21.1 was a turtle shell sitting subfloor just below OS 2W. The shell was facing up and there was floor plaster inside the shell.

Unit 22 (Locus 2):

Excavated by Sean Dolan from June 5 to June 8, 2012. Unit 22 was 1x2 m and was opened to find the NE corner of Room A. Unit 22 was just north of Unit 18 and continued to chase Wall B north. No profiles were drawn since the level was all stratum I: overburden and disturbed soils from road grading.

All depths cm below datum 13.
Level 1: 23-34 nominal; Stratum I
Level 2: 34-44 nominal; Stratum I
Level 3: 44-54 nominal; Stratum I

Stratum I: Overburden and disturbed soils from road grading.

SUMMARY: Unit 22 was terminated after three 10-cm levels at 52 to 54 cmbd. There was no evidence of OS 1W, but there was also no evidence of looting. Wall B cut very close to the west profile face of Unit 22, so it was very difficult to determine if the NE corner of Room A was present. We stopped excavation in the unit because there was no evidence of the NE corner of Room A by Level 3, and we had uncovered the top of the wall. Since the goal was to find the NE corner of Room A (so room size could be estimated) and there was evidence of large adobe chunks (possibly the east-west wall), we decide to open a new unit.
**Unit 23 (Locus 2):**

Excavated by Audrey Pazmino, Johnny Schue, and Kathryn Putsavage from June 6 to June 11, 2012. Unit 23 was 1x2 m opened just west of Unit 22. It was opened to find the NE corner of Room A.

All depths cm below datum 13.
Level 1: 15-30 nominal; Strata I and II
Level 2: 30-44 nominal; Strata II and III
Level 3: 44-52 nominal; Stratum II
Level 4: 52-67 nominal; Strata II and IV

Based on west profile.
Stratum I: Silty sand and loose, small gravels (less than 5 cm). Modern wind-blown deposits.
Stratum II: Ponding deposits from wind and rain events and building collapse, with wall fall.
Stratum III: Sheety wash from wind and rain events. Likely sitting on top of where OS 1W used to be. OS 1W not seen in Unit 23 or in profiles.
Stratum IV: Sheety wash and some plaster floor (OS 2W).

SUMMARY: Five coursings of wall fall (lying flat) were found in the upper levels (1 and 2) of Unit 23 (Figure A.20). This wall fall was lying flat with its base at about 40 to 43 cmbd. Although no occupation surface was preserved beneath the wall fall, it seems likely that the wall fall was lying on top of OS 1W. OS 2W was encountered at about 60 to 63 cmbd. OS 2W was plaster, about 2 cm thick. There was a large amount of roof fall on top of OS 2W. The roof fall contained burned reed and one medium-sized roof beam. Numerous dendro samples were collected from this beam and were submitted for tree ring analysis to the University of Arizona lab. There was a hearth (Feature 23.1) located in the SW corner of the unit. The hearth was round (about 44 x 32 cm, from 67 to 77 cmbd) and dug into the plaster floor (OS 2W). The hearth was encountered on the last day of excavations so was not fully excavated. Unit 23 was in the NE corner of Room A. Excavations in Unit 23 were terminated at 67 cmbd because the season ended.

**Features:** Feature 23.1 is a hearth associated with OS 2W. We encountered the hearth on the final day of excavation and were not able to collect archaeomagnetic data. The hearth was 44 cm N-S and 32 cm E-W, with a beginning depth of 67 cmbd U13 and end depth 77 cmbd U13. (Since only a small portion of the hearth was excavated, this is not the actual end depth.) The hearth was in the SW corner of Unit 23, on the south profile face and cut by the west profile face. The hearth soil matrix was oxidized soil mixed with flecks and small pieces (less than 5 cm) of charcoal. No ash was encountered in the upper levels of the hearth. Future research at the site may benefit from an archaeomagnetic date. No soil sample was collected because there was very little charcoal in the upper levels of the hearth. Charcoal was only seen at the end of the level, and since the hearth was not further excavated, we did not collect soil. Either this represents the very upper layer of the hearth, or the hearth is ephemeral.
Figure A.20  Adobe wall fall marking location of OS 1W in Unit 23.

**Unit 24 (Locus 2):**

Excavated by Chris Caseldine and Lena Baker from June 9 to June 10, 2012. Unit 24 was 1x2 m, with the long axis running north-south. It was opened directly west of Trench C-5 and C-6 and was 3.5 m south of the SE corner of Unit 8.

All depths cm below C-4.
Level 1: 22-45 nominal; Strata I, IIa to IId, III, IV
Level 2: 45-54 nominal; Strata I, IIa to IId, III, IV

Based on west profile.
Stratum I: Disturbed overburden, modern fill from grading activities. Contains loose sandy soil and small rocks and pebbles.
Strata IIa to IId: Adobe melt/wall fall. Represents different areas of wall fall; adobe melt/wall fall is slightly different in each.
Stratum III: Roof/wall fall fill from the collapse of Locus 2 room block with ponding deposits from wind.
Stratum IV: Roof/wall fall fill from the collapse of Locus 2 room block with ponding deposits from wind.

SUMMARY: A large amount of adobe was found in Trench C-5, and we thought this could be an extramural feature sitting just outside the Black Mountain phase room block and possibly in the plaza. We also wanted to test whether this was the southern exterior wall of the Locus 2 room block. We uncovered a wall in Trench C-6, which we believed was the actual exterior wall, but we needed to test this. Since there was such a large amount of adobe in the profile of Trenches C-5 and C-6, we extended a 1x2m unit (Unit 24) to make sure the wall in C-6 was the exterior. The adobe chunks that we saw in the west profile face of Trench C-6 are wall fall that fell from what we believe is the exterior wall of the Locus 2 room block found in C-6. They were lying on top of a hard-packed surface that sat at about 40 to 43 cmbd C-4. This surface could be associated with OS 1W, but it seems more likely that it represents a compact occupation surface outside the room block. The floors that we found intact at OS 1W were covered with thick, white plaster. Areas where OS 1W was no longer intact were covered with layers of sheety wash and compact natural sediments. This occupational surface is not naturally created and was more compact than the natural surface found in the interior of rooms where OS 1W had once been. Unit 24 had numerous large pieces of two Playas Red Incised vessels. These may have been two vessels sitting on or near the exterior wall at the time of abandonment and may have fallen when the wall collapsed after deoccupation.

**Unit 25 (Locus 2):**

Excavated by Sean Dolan from June 10 to June 10, 2012. Unit 25 was 1x1 m directly north of Unit 23. No profiles were drawn since the level was all Stratum I: overburden and disturbed soils from road grading.

All depths cm below Unit 13 datum.
Level 1: 20-40 nominal; Stratum I

SUMMARY: Unit 25 was opened to find the NE corner of Room A. Unit 25 is incorporated into part of Trench F, which was also opened to find the NE corner of Room A and to follow Wall B. Trench F had one area, about 75 cm north of the southern profile where there was a higher density of adobe on the west side of Wall B. After excavating the first level, it was clear that this was the NE corner of Room A. Since this was the final day of excavation, Unit 25 was terminated after one level. No profiles were drawn for the unit as there was not enough depth to show varied stratigraphy. The only stratum seen in Unit 25 was the upper level of soils disturbed by the grading activities.

**Trench A (Locus 1):** Excavated by Audrey Pazmino, Jessica Hedgepeth, Chris Caseldine, and Dean Hood from May 20, 2012 to May 23, 2012. Trench A was opened to ground truth the magnetometry data collected in 2011. Trench A was excavated in natural levels and broken up into 5 sections each 0.5 x 2.5 m. Trench A-1 was the northernmost section. The trench sections were then labeled sequentially with A-5 the southernmost section. The entire length of Trench A
was 0.5 x 12.5 m, with the long axis running north-south. We wanted to see if the anomaly along the southeastern edge of the Locus 1 room block seen in the magnetometry map was the edge of the room block (Figure 1.5). We believed this anomaly could be the edge of architecture in Locus 1 and needed to ground truth the anomaly. We now believe the anomaly is a natural caliche bench because no architecture was encountered during excavation and the caliche has a higher elevation where the anomaly is seen on the magnetometry map. Based on excavations, it appears this anomaly consists of sheet trash washed out of the Locus 1 Cliff phase room block directly north and west of Trench A. The area of sheet trash is only slightly downslope from the Locus 1 Cliff phase room block. Soils were “dirty” dirt similar in color to midden dirt. There was not an extremely high density of artifacts in the trench (much lower than in Trench B), and the artifact density dropped off fairly quickly (by 47 cmbd A-1, 52 cmbd A-4 there were few artifacts). Based on the soil color, quick drop-off in artifact density, and location of Trench A (slightly downslope from the Locus 1 Cliff phase room block), it seems likely that this area represents sheet trash.

Because we did not encounter any architecture, we decided to take soil to test whether the anomaly seen in the magnetometry map was a rise in the caliche bedrock. Based on the elevations of architecture below modern ground surface in Units 2 and 17, if architecture were present we would have uncovered it by 46 cmbd A-1. Since we did not encounter architecture, we believed the anomaly on the magnetometry map could be a rise in elevation in the caliche bench. To test this, we took soil cores (N-S) in the center of Trench A. Seven cores were taken. These cores show that the caliche bench starts to rise about 250 cm south of the north profile of Trench A (the beginning of Trench A-2). Trench A-2 is also where we encountered caliche at 47 cmbd A-4. The higher elevation of the caliche bedrock also supports the conclusion that this is an area of sheet trash and not any type of architecture. No profiles were drawn for the unit as there was not enough depth to show varied stratigraphy.

Table A.3 All Soil Core (SC) locations cm south of north profile of Trench A, Level 2

<table>
<thead>
<tr>
<th>Core #</th>
<th>SC1 Location 50 cm</th>
<th>SC2 Location 150 cm</th>
<th>SC3 Location 250 cm</th>
<th>SC4 Location 450 cm</th>
<th>SC5 Location 550 cm</th>
<th>SC6 Location 650 cm</th>
<th>SC7 Location 750 cm</th>
</tr>
</thead>
<tbody>
<tr>
<td>cmbd A-4</td>
<td>78</td>
<td>97</td>
<td>69</td>
<td>61</td>
<td>72</td>
<td>Rocks in area could not core</td>
<td>86</td>
</tr>
<tr>
<td>Caliche present?</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
<td>n/a</td>
<td>Y</td>
</tr>
</tbody>
</table>

All depths cm below A-1.
Trench A-1: Level 1: 9-49 nominal

All depths cm below A-4.
Trench A-2: Level 1: 8-49 nominal
Trench A-3: Level 1: 18-51 nominal
Trench A-4: Level 1: 18-46 nominal
Trench A-5: Level 1: 27-46 nominal
**Trench B (Locus 1):** Excavated by John Schue, Audrey Pazmino, Megan Smith, Sean Dolan, Steve Lekson, Lena Baker, and Chris Caseldine from May 27 to May 30, 2012. Trench B was excavated to ground truth an anomaly on the magnetometry map. Trench B was 0.75 x 15 m with the long axis running 43 degrees west of north. Angle of the trench was offset by 43 degrees so that the trench might hit the anomaly at a 90-degree angle. The trench was placed on the southern edge of the western arm of the Locus 1 Cliff phase room block (Figures 1.3 and 1.5). Trench B was excavated in 20-cm arbitrary levels and was broken into three 0.75 x 5-m sections. B-1 was the southeasternmost section. The trench sections were then labeled sequentially, with B-3 the most northwestern section. This trench encompasses what we believe to be the exterior wall of the western arm of the Locus 1 Cliff phase room block and a shallow midden just south of the western arm of the room block. We also used the soil core to test the depth of caliche in Trench B. Based on excavation, it appears that the anomaly along the south portion of the western arm of the architectural mound on the magnetometry represents the edge of architecture. However, since a similar anomaly on the magnetometry map along the southern edge of the eastern arm of the room block represents a rise in the caliche/sterile, we wanted to confirm that the caliche was not just below the end of our excavation depths.

All depths cm below B-1.
Trench B-1:
Level 1: 10-32 nominal
Level 2: 32-50 nominal

All depths cm below B-2.
Trench B-2:
Level 1: 26-84 nominal

Trench B-3:
Level 1: 19-44 nominal
Level 2: 44-67 nominal
Level 3: 67-87 nominal

Based on west profiles of B-1 to B-2. Strata listed below represent road grading and natural formation processes and cultural formation processes from the dumping of trash south of the Locus 1 Cliff phase room block. See profiles for more detail. This area of the site does not appear to have been graded.

Stratum I: Overburden and modern wind-blown deposits.
Stratum II: Silty, moderately loose compaction with pea- to pebble-sized gravels.
Stratum III: Moderately hard compaction, silty loam, fewer small gravels (less than 5 cm).
Stratum IV: Moderately hard compaction, silty loam, fine gravels with higher concentration of burned animal bone. May represent beginning of midden area.
Stratum V: Hard compaction, silty loam, fine gravels.
Stratum VI: Moderately loose compaction, silty loam, fine grain- to pebble-sized gravels.
Stratum VII: Hard compaction, silty loam, fine grain- to pebble-sized gravels.
Stratum VIII: Hard compaction, silty loam, fine grain- to pebble-sized gravels.
Stratum IX: Hard compaction, sandy silty loam, fine to pea-sized gravels.
Stratum X: Loose compaction, sandy silty loam, fine to pea-sized gravels.
Stratum XI: Loose compaction, sandy silty loam, pebble-sized gravels and moderately high pebble density (higher than Stratum V).
Stratum XII: Moderately loose compaction, silty sandy loam, fine to pea-sized gravels.
Stratum XIII: Hard compaction, sandy silty loam, fine to pebble-sized gravels.

Based on the west profile of B-3, this area of the site does not seem to have been impacted as much by the grading, but there is some evidence of grading. What is left of the wall is flat on top. Adobe melt is usually seen on the top of walls. Putsavage suspects the grading caused the flat-topped walls. These strata are different from B-1 and B-2 because a majority of excavation in B-3 was done north of the exterior wall. Therefore, the strata from this profile represent cultural formation processes (Figure A.21).

Stratum I: Overburden and disturbed soils from road grading, loose sand with small pebbles (less than 2cm).
Stratum II: Overburden and disturbed soils from road grading, loose sand with more small pebbles than Stratum I.
Stratum III: Medium compaction. Fewer pebbles than Strata I and II. Likely represents cultural fill of the Locus 1 Cliff phase room block below occupation surface A (OSa). This stratum is north of the exterior wall of the Locus 1 Cliff phase room block (inside the Locus 1 Cliff phase room block).
Stratum IV: Adobe melt and room fill.
Stratum V: Hard, compact, with no pebbles. Cultural fill sitting just below occupation surface B (OSb).
Stratum VI: Adobe wall. South exterior wall of the west arm of the Locus 1 Cliff phase room block.
Stratum VII: Plaster floor (OSa at 41 cmbd B-2).
Stratum VIII: Plaster floor (OSb at 65 cmbd B-2).
Stratum IX: Possible floor (OSc at 80 cmbd B-2).
Stratum X: Base of unit (87 cmbd B-2) and beginning of caliche/sterile.

**Table A.4 All Soil Core (SC) locations meters north of southern profile of Trench B.**

<table>
<thead>
<tr>
<th>Core #</th>
<th>SC1 Location</th>
<th>SC2 Location</th>
<th>SC3 Location</th>
<th>SC4 Location</th>
<th>SC5 Location</th>
<th>SC6 Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caliche present?</td>
<td>N</td>
<td>N</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>cmbd</td>
<td>90 B-1</td>
<td>126 B-1</td>
<td>184 B-1</td>
<td>141 B-2</td>
<td>106 B-2</td>
<td>100 B-2</td>
</tr>
</tbody>
</table>
Figure A.21 West profile, Trench B-3.

Trench B-1: Excavated by Audrey Pazmino and John Schue on May 26, 2012. All depths cmbd B-1. There was a higher density of artifacts (10 to 15 per bucket) and large sherds (5 to 10 cm) in the southern half of Trench B-1. Soil in the area was also darker and more midden-like. There was an area of adobe melt in the NE corner of Trench B-1. At first we believed this was a wall, but it quickly dried out and was easily removed the following day. There was no further adobe melt or wall underneath the adobe melt so we concluded that it was not a wall. Excavation in Trench B-1 was terminated at 50 cmbd B-1 when we started to uncover the beginning of caliche/sterile.

Trench B-2: Excavated by John Schue, Sean Dolan, and Megan Smith on May 27, 2012. All depths cmbd B-2. Artifact density was much lower than in the southern half of Trench B-1. Only about 5 artifacts per bucket, and ceramic sherds were less than 1 cm in size. No architectural features were seen in Trench B-2. Excavation in Trench B-2 was terminated when we hit the beginnings of sterile/caliche at 84 cmbd B-2.

Trench B-3: Excavated by John Schue, Sean Dolan, and Megan Smith from May 28 to May 29, 2012. Excavated by John Schue and Audrey Pazmino from June 5 to June 6, 2012. Excavated to examine the construction of the E-W wall found at the southern edge of the western arm of the Locus 1 room block. All depths cmbd B-2. About 150 cm south of the north profile of Trench B-3, we encountered an adobe wall less than 10 cm below modern ground surface. The wall was puddled adobe. This appears to be the southern exterior wall of the western arm of the Locus 1 room block. On the exterior (south) of the wall there was an area that may be wall fall. It was not given a feature number in the field, but upon examining the photos post-field, I believe this may be a bin/mealing bin similar to Feature 8.1 (Figures A.22 and A.23). This bin was an extramural
feature and may have been associated with OS A. There was also a portion of a floor at 41 cmbd B-2 (OSa). The floor was north of the adobe wall and was only seen in the NW corner of Trench B-3. Two shell beads were found at this level. Although OSa was not present where the beads were found, these beads would have sat just above the floor in the center of the excavation area if it were still present. The artifact density was low in the first level of Trench B-3. Once the wall was uncovered (starting in Level 2), we only excavated the area north of the wall, since our goals were to understand the architecture, determine the depth of the adobe wall, and retrieve datable materials and diagnostic ceramics. We also encountered disarticulated human remains just south of the exterior wall and terminated excavation in this area. At 65 cmbd B-2 we encountered a cultural surface that butted up to the adobe wall (OSb). This surface was also visible in the eastern profile near the wall, but was ephemeral. There was another possible floor at 80 cmbd B-2 (OSc). This surface was less compact and a different color than the surfaces at 41 or 65 cmbd B-2. Excavations were terminated at 87 cmbd B-2. We believed we were close to the beginning of sterile because of the color change (more orange) in the soil.

Figure A.22 Outer wall of Cliff phase room block.
Trench C (Locus 2): Excavated by Chris Caseldine, Audrey Pazmino, Lena Baker, Sean Dolan, and John Schue from May 29 to June 5, 2012. Trench C was placed south of the Locus 2 room block to understand the relationship between the shallow midden and area of sheet trash south of the room block and the southern edge of architecture (southern exterior wall). Trench C was 0.75x25 m, with the long axis running N-S. The trench was excavated in 10- and 20-cm arbitrary levels unless cultural features were uncovered (see Trench C-6 level forms and depths below). The trench was divided into six sections. Sections C-1 to C-5 were 0.75x5m (long axis N-S) and C-6 was 0.75x3.4m (long axis N-S) because the northern profile of trench C-6 met up with Unit 14. Trenches C-2 and C-4 were not excavated because we were nearing the end of the season, and the adobe wall found in Trench C-6 seemed to be the exterior wall of the Locus 2 room.
block. The trench skips alternating 5m sections in order to reach the southern edge of architecture and save time at the end of the season. In Trench C-5, there was no evidence of a floor or other cultural surface. Based on the size of rooms in the Locus 2 room block (5x6m), we would likely not have found another wall, since the wall found in Trench C-6 was about 5.5m north of the edge of Trench C-4. C-4 was also north of the area of sheet trash and was not producing many artifacts that could help with dating the Locus 2 room block. Therefore, because of time constraints we focused our efforts on other areas in the Locus 2 room block.

All depths cm below C-1.
Trench C-1:
Level 1: 16-40 nominal: Strata I, II, and II
Level 2: 40-51 nominal; Strata II and III

All depths cm below C-2.
Trench C-3:
Level 1: 6-33 nominal; Strata I, II, and III

All depths cm below C-3.
Trench C-5:
Level 1: 0-40 nominal
Level 2: 2-40 nominal; Strata I and II
Level 3: 33-43 nominal; Strata II, II, IV, V, and VI

All depths cm below C-4.
Trench C-6:
Level 1: 24-41 nominal; Strata I and II
Level 2: 40-60 nominal: Stratum II
Level 3: 60-70 nominal; Strata II and IV

Based on west profile C-1, C-3, and C-5.
Stratum I: Disturbed overburden, modern fill from grading activities. Contains loose sandy soil.
Stratum II: Medium compact, a few small gravels (less than 5 cm).
Stratum III: Very compact, beginnings of sterile/caliche.
Stratum IV: Adobe wall fall.
Stratum V: Adobe melt/wall fall.
Stratum VI: Possible cultural surface of extramural activity area.

Trench C-1: Excavated by Chris Caseldine, Audrey Pazmino, and Lena Baker from May 29 to June 3, 2012. All depths cmbd C-1. Artifact density was higher and ceramic sherds were larger (more than 5 cm) in the middle section (N-S) of Trench C-1. There was also an area of hard, compact soil near the middle (N-S) of the trench at about 235 cm north of the southern profile. This compact soil is likely natural sediments that have washed and blown on top of the shallow midden, or it could be an area of compact due to heavy foot traffic outside of the room block.

Trench C-3: Excavated by Chris Caseldine, Audrey Pazmino, and Lena Baker on June 3, 2012. All depths were cmbd C-2. Artifact density was higher in the northern section of the trench, but
lower than in Trench C-1. There was another possible area of hard, compact soil in the northern portion of the trench. This area of compact soil started about 90 cm south of the north profile and continued into the north profile (Figure A.24). This area of compact soil is likely natural sediments that were washed on top of the caliche/sterile. Once this compact soil was removed, artifact density dramatically decreased and the beginnings of caliche/sterile were seen. In both Trenches C-1 and C-3, the midden area was very shallow and had a lower artifact density when compared to the midden in Trench B. It seems that this midden area was created through discarding of trash from the Locus 2 room block. Southwest of Trench C, there is an area about 400 m² of higher artifact density and darker ashy soil. This area was excavated in 2010 (Unit 7) and revealed an area of shallow midden deposits (about 25 to 30 cm in depth below modern ground surface). The excavations in Trenches C-1 and C-3 had lower artifact densities than Unit 7. Although the soils were dark and ashy when compared to the surrounding soil, they were not as dark as the soils in Unit 7. Therefore, it appears that this shallow midden just south of the Locus 2 room block was not a heavily used midden. It is unlikely that a large amount of trash would have washed out of this area because the area south of the Locus 2 room block is very flat (see Figure 1.3). Since the Locus 2 room block had an extended occupation with evidence of three occupation surfaces (OS 1W to OS 3W) and numerous remodeling events, it seems likely that the midden for the Locus 2 room block was spread around the room block with higher artifact densities on the surface just south of the room block. Trash thrown to the north of the room block has likely washed down the slope and into the drainage north of the Locus 2 room block.

_Trench C-5:_ Excavated by Sean Dolan and John Schue from May 30 to June 4, 2012. All depths were taken cmbd C-3. Trench C-5 had an area with adobe melt between 200 and 270 cm south of the north profile. It seems likely that this area of adobe melt/slump was wall fall from the Locus 2 room block or architectural fall from the possible patio area. This area of adobe fall/slump was further excavated in Unit 24. In Unit 24 there was additional adobe melt/fall and the remains of three Playas Red Incised vessels. Based on excavations in Unit 24, it seems this area was an extramural activity area just south of the Locus 2 room block (see Unit 24 Summary). There was also a possible posthole about 110 cm south of the north profile. This possible posthole was not given a feature number because it seems unlikely it was a posthole. The edges of the pit are uneven and there were no organic sediments in the fill of the feature. If it was a posthole it could have been a post supporting the roof of an exterior patio on the southern edge of the Locus 2 room block. This possible posthole was about 170 cm south of the exterior wall of the Locus 2 room block (Trench C-6). There was an area of hard, compact soil surrounding the posthole that could have been an extramural work area. It was unclear what was going on in this area and there were no other features associated with the area. Level 3 in Trench C-5 was only excavated in the northern 2.5 m of the trench. In the northern portion of the western profile (from about 30 to 55 cm south of the north profile) of Trench C-5, it appears there is a floor/cultural surface (52 cmbd C-3; Figure A.25). This surface sits just below the base of the adobe wall fall/slump in the western profile and could represent the floor of an extramural activity area or an extramural patio surface.
Figure A.24  Trench C-3, Level 1, hard surface at north end, looking west.

Figure A.25  Trench C-5, Level 3, west profile, northern section. Adobe wall fall and possible extramural surface.

*Trench C-6:* Excavated by Sean Dolan and John Schue from June 3 to June 5, 2012. All depths cmbd C-4. Trench C-6 is 0.75x3.4m (long axis N-S). Trench C-6 was opened to connect Trench C to Unit 14 and the major area of excavation in the Locus 2 room block. We also wanted to find the exterior wall of the Locus 2 room block. Not all of the sections of Trench C had been excavated, but since no architecture or floors had been uncovered in C-5, we believed that the
exterior wall was likely contained in C-6. This hypothesis was also based on the slight rise just north of the northern profile of C-5. We encountered the top of an adobe wall in C-6 at 36 cmbd C-4. The wall runs E-W and is 260 cm south of the north profile of C-6 (where C-6 and Unit 14 meet) and about 420 cm south of the E-W wall, which runs through Units 9, 12, and 15.

In C-6, there was an area of caliche from 120 to 230 cm north of the E-W wall. This area was not bedrock/sterile as it started at 30 cmbd C-4 and was above OS 1W (43 cmbd U8) in room C (Units 12 and 14). Note the difference between U8 and C-4 datums. The caliche was not seen in either Unit 12 or Unit 14. At the southern edge of this caliche area we uncovered articulated human remains. The distal femur and proximal tibia of an adult were uncovered first. There was no patella associated with these remains. We also found part of a rib, phalanges, and ulna. Once we realized they were human remains, we stopped excavation in the area. Because we did not excavate the burial, it is difficult to tell if it was a primary or secondary burial. Additionally, because the burial was so close to modern ground surface (only 4 to 6 cm below modern ground surface), it is likely that grading disturbed the burial. The articulation of the femur and tibia could suggest a burial in a flexed, upright position. Because the caliche cap was so close to the burial there was also the suggestion that the caliche was culturally deposited prehistorically and could be a cover or cap for the burial or the remnants of a floor that was disturbed by the grading. During the Mimbres Classic, burials in the Mimbres region were frequently sub-floor, in a flexed, upright position (Shafer 2003). Since the burial was not excavated and there is likely to be damage from grading, it is challenging to reach any firm conclusions about the burial. No photos were taken of the human remains, but the burial location is marked on the plan view map for Trench C-6, Level 1. We stopped excavation in this area and therefore Trench C-6, Level 2 was only excavated in the southern 1.3 m of the 0.75x3.4m trench.

We uncovered a second burial just north of the E-W wall in Trench C-6. When this burial was first encountered, it was unclear if it was human. This was a primary burial of an infant. The individual was in a flexed position and faced north (away from the E-W wall), and there were other animal bones (possibly a rabbit) just north of the individual. Once we determined the burial was human, excavations were stopped and none of the animal bones associated with the burial were collected. No further excavation was conducted in this trench once the infant was uncovered because we determined the location of the exterior wall. There was a possible floor and pit feature south of the E-W wall (Figure A.26). The floor was at 70 cmbd C-4.
Figure A.26 Trench C-6, Levels 3 and 2, looking down and west across wall.

*Trench F (Locus 2)*: Excavated by Sean Dolan from June 8 to 9, 2012. Trench F was north of Unit 22. We decided to start a trench because it was only a few days from the end of the season and we wanted to find the third corner (NE corner) of Room A in order to estimate room size. Estimation of room size will better help us to estimate the number of rooms contained within the architectural area of the west room block. Unit 25 is incorporated into part of Trench F, which was also opened to find the NE corner of Room A and to follow Wall B. Trench F had one area, about 75 cm north of the southern profile, where there was a higher density of adobe on the west side of Wall B. Unit 25 was opened to see if this area of adobe was the NE corner of Room A. No profile was drawn because Trench F was only 43 cmbd U13 (excavated one level). Once the possible NE corner was seen, the trench was terminated. After opening Unit 25, we realized that the NE corner of Room A was in Trench F, but we needed to open Unit 25 to clearly define this corner.

*Rooms and Pithouses*

Below is a brief summary of the rooms and pithouses excavated. Since these rooms and pithouses were defined through the excavation of numerous individual units, these summaries provide an overview of the stratigraphy in each room. Please read the unit summaries for more detailed descriptions of the stratigraphy.
**Room A (Locus 2):** Room A is in Locus 2 (Black Mountain phase room block). Units 9N, 13, 15, 18, 21, 22, 23, 25, and Trench F were excavated to define the size of Room A. Based on the location of the SW, SE, and NE corners of Room A, the room is 5m by 6m and about 30 m². Room A contains three occupation surfaces (OS 1W, OS 2W, and OS 3W). The occupation surfaces were not present in all of the units (13 and 18) but there was stratigraphic evidence in each unit that the floor did exist prehistorically. There was a hearth (Feature 23.1) in Unit 23 and associated with OS 2W. OS 3W was the plaster floor of Pithouse A.

**Room B (Locus 2):** Room B is in the Locus 2 (Black Mountain phase room block). Units 12N, 13, 18, and 22 contain parts of Room B. The northern portion of Unit 12 exposed the largest area of Room B. This area uncovered one occupation surface (OS 2W). OS 1W was not apparent in Unit 12N. There was evidence in the north profile of Unit 12 of OS 1W even though it was not seen during excavation. There was evidence of OS 1W in Unit 12S (Room C), discussed further below. OS 2W was just above sterile in Unit 12N. This floor appeared at 64 cmbd U12. OS 2W in Unit 12N contained a hearth (Feature 12.2). There was no evidence of OS 3W in Room B (Unit 12N).

**Room C (Locus 2):** Room C is in Locus 2 (Black Mountain phase room block). Units 8, 9S, 12S, 14, and Trench C were excavated to define Room C. These excavation units uncovered two occupation surfaces (OS 1W and OS 2W). OS 1W was located in Units 12S and 14. This occupation surface showed three remodeling events (OS 1WA, OS 1WB, and OS 1WC). These three remodeled floors were thickly plastered and separated by dark cultural fill and were noted as Feature 14.1. OS 2W was seen in the profiles of Unit 14 but was not apparent during excavation. OS 2W was directly above sterile in Units 12S and 14.

**Room D (Locus 2):** Room D is in Locus 2 (Black Mountain phase room block). Units 8, 9S, 15S, and 21 contain Room D. In Unit 8, there was a portion of Wall B that appeared to be floating above fill, did not articulate with OS 2W, and was offset from Wall B (the north-south wall dividing Rooms A and B). At the end of the 2012 season, it was determined that Wall B had fallen to the west and prehistorically was in line with Wall B. In Units 9S and 12S there was evidence of the base of Wall B. Wall B was likely toppled by the looting and mechanical grading. A mealing bin (Feature 8.1) was found in Room D along the western profile of Unit 8. The mealing bin was adobe and was associated with OS 1W. OS 1W was not found in Unit 8, but the profiles show stratigraphic evidence of the floor. Room D was severely disturbed by looting, which may have damaged OS 1W. There was one looter’s pit (Feature 8.3) that we believed was a posthole. Once the feature was excavated we uncovered shovel marks at the base of the pit and determined it was a looter’s pit. There was also evidence of a looter’s pit in the southern profile of Unit 8.

**Pithouse A (Locus 2):** Pithouse A is located below Room A and Units 9, 13, 15, 18, and 21. Although we did not encounter the plaster floor in Units 13 and 18, there was stratigraphic evidence to support the existence of the pithouse in these units. Units 22, 23, 25, and Trench F also likely contain Pithouse A, but since these units were excavated at the end of the season to define the corners of Room A these units were not fully excavated to the level of OS 3W (about 90 cmbd U8). The edge of the pithouse appears to sit directly under the walls of Room A, so Pithouse A is also about 30 m². The pithouse contains OS 3W, which is the plaster floor of the
pithouse. A Carretas Polychrome was found on OS 3W. All of the ceramics from this floor and fill above the floor date to the Black Mountain phase. Therefore, it appears that this pithouse was constructed before the Locus 2 room block was constructed and it may represent an expedient house constructed while the room block was being planned.

**Pithouse B (Locus 2):** Pithouse B is located just north of the Black Mountain phase (Locus 2) room block. Units 10, 16, 19, and 20 were excavated to define the pithouse. Excavation did not uncover any of the corners of Pithouse B and unlike Pithouse A, there was no evidence of room structure built on top of Pithouse B. Due to the mechanical grading, defining the pithouse was challenging. Based on excavation, it appears the pithouse had an extramural activity area just west of the pithouse (Units 19 and 20). This area contained what may be an oven (Feature 20.1) and numerous pit features whose purpose is unknown (20.2, 20.3, and 20.4). The pithouse was prehistorically excavated into sterile soil. There is a natural rise in this area of the site because the B horizon sits closer to modern ground surface. There is a bench on the western edge of the pithouse. This bench was also excavated into sterile soil and then the pithouse was further excavated into sterile to construct the main living area. There was a hearth (Feature 10.1) on the bench of the pithouse and numerous pit features that appear to be postholes (Features 16.1 and 16.2). The ceramics found in the pithouse all date to the post-Mimbres period. It appears this pithouse was constructed before the Locus 2 room block was constructed and it may also represent an expedient house constructed while the room block was being planned.
APPENDIX B

CERAMIC CODE SHEET, CERAMIC DECORATIVE AND TECHNOLOGICAL ATTRIBUTES, TEMPER GROUPS, AND CERAMIC TOTALS
This section presents the code sheet for the ceramic decorative and technological attributes recorded on sherds in this study.

**SITE**  
Site Number (LA49 = Black Mountain site)

**UNIT**  
Unit Number: Trenches are identified by letter (A, B, C, etc.); excavation units are identified by number (1, 2, 3, etc.); surface collection units (dogleashes) are identified by letter and number (e.g., DL1, DL2); and isolated finds are labeled ISO with Northing/Easting in the comments column.

**LEVEL**  
Level Number (10 cm arbitrary levels)

**LOCUS**  
Five loci are identified at the Black Mountain site (Eastern/Cliff phase, Western/Black Mountain phase, Pithouse component, Dogleash surface collection units, and Isolated Finds). These loci were not assigned in the field but were used to facilitate sorting during analysis.

1. Cliff phase component  
2. Black Mountain phase component  
3. Pithouse component  
4. Dogleash surface collection unit (These are dogleashes not associated with a specific occupation period, between the pueblos/pithouses.)  
5. Isolated find

**FN**  
Field Number (FN) was assigned to each artifact bag in the field once the level was completed and is a unique identifier for each bag of artifacts (bulk and individual).

**LOT**  
Sequential number assigned to each sherd or refit. Lot number is composed of FN and sequential number. For example, from field number 100, the first lot is 100.1, followed by 100.2, 100.3, etc.

**DEC/UND**  
Record decorated or undecorated (utility) ware  
0. Indeterminate  
1. Undecorated  
2. Decorated

**TYPE**  
Ceramic Ware and Type. Note that codes for sherds that can only be identified at the ware level end in 00 (e.g., 2100 = Cibola Gray Ware) and that many type names are informal. When in doubt, only the ware code is entered.

**01 Cibola White Wares**  
0100 Undifferentiated Cibola White Ware  
0101 Undifferentiated, unpainted  
0102 Undifferentiated, painted  
0110 La Plata B/w
0111 White Mound B/w
0112 Kiatuthlanna B/w
0113 Red Mesa B/w
0114 Gallup B/w
0115 Chaco B/w
0116 Chaco/McElmo B/w
0117 Escavada B/w
0118 Puerco B/w
0119 Corrugated Reserve B/w
0120 Reserve B/w
0121 Tularosa B/w
0122 Pinedale B/w
0123 Klageto B/w

06 Rio Grande Carbon Painted White Wares
0600 Undifferentiated Rio Grande Carbon Painted White Ware
0601 Casa Salazar B/w
0602 Vallecitos B/w
0603 Santa Fe B/w
0604 Galisteo B/w
0605 Magdalena B/w

07 Rio Grande Mineral Painted White Wares
0700 Undifferentiated Rio Grande Mineral Painted White Ware
0701 Socorro B/w
0702 Chupadero B/w
0703 Jemez B/w
0704 Corrugated Chupadero B/w

09 Undifferentiated Wares
0900 Undifferentiated White Ware, painted
0901 Undifferentiated White Ware, no paint
0902 Undifferentiated Brown Ware
0903 Undifferentiated Red Ware
0904 Undifferentiated Gray Ware
0905 Undifferentiated Brown Ware, painted

10 White Mountain Red Wares
1000 Undifferentiated White Mountain Red Ware
1001 Undifferentiated Polychrome
1002 Undifferentiated, unpainted
1011 Puerco B/r
1012 Wingate B/r
1013 Wingate Polychrome
1015 Wingate B/r Corrugated (B/r int, corrugated ext)
1016 St Johns B/r
1017 St Johns Polychrome
1018 Springerville Polychrome

11 Playas Red Wares
1100 Undifferentiated Playas Red
1101 Playas Red Plain
1102 Playas Red Incised
1103 Playas Red Punctate
1104 Playas Red Cord marked

12 Mimbres Painted Wares
1200 Undifferentiated Mimbres White Ware
1201 Mogollon R/b
1202 Three Circle R/w
1203 Mimbres Boldface B/w (Style I)
1204 Mimbres Transitional B/w (Style II)
1205 Mimbres Classic B/w (Style III)
1206 Mimbres Red washed

13 Salado Polychromes/Roosevelt Red Wares
1300 Undifferentiated Salado Polychrome
1301 Maverick Mountain Polychrome (Tucson Polychrome)
1302 Tucson Polychrome
1303 Pinto Polychrome
1304 Gila Polychrome
1305 Tonto Polychrome
1306 Cliff Polychrome
1307 Nine Mile Polychrome
1308 Cliff W/r
1309 Tonto R/b (Maverick Mountain R/b and Gila R/b)

14 Chihuahuan Polychromes
1400 Undifferentiated Chihuahuan Polychrome
1401 Babicora Polychrome
1402 Carretas Polychrome
1403 Dublan Polychrome
1404 Villa Ahumada Polychrome
1405 Escondido Polychrome
1406 Ramos Polychrome
1407 Ramos Black
1408 Ramos B/w
1409 Madera B/r

15 Jornada Mogollon Wares
1500 El Paso Painted (too small a sherd to tell if bi/polychrome)
1501 El Paso Bichrome
1502 El Paso Polychrome
1503 Three Rivers R/t
1504 Lincoln B/r
1505 El Paso B/br

**35 Yellow Wares**
3500 Undifferentiated Hopi Yellow Ware
3502 Hopi Yellow Ware, unpainted
3505 Jeddito Br/y
3506 Sityaki Polychrome

**50 General Corrugated Wares**
5001 Plain Ware
5002 Plain Ware, micaceous
5003 Plain Ware, smudged
5004 Plain micaceous, smudged
5005 Plain Corrugated
5006 Plain Corrugated, smudged
5007 Indented Corrugated
5008 Indented Corrugated, smudged
5009 Smeared Corrugated
5010 Smeared Corrugated, smudged
5015 Neckbanded Corrugated
5016 Neckbanded Corrugated, smudged
5017 Clapboard Corrugated
5018 Clapboard Corrugated, smudged
5020 Zoned Corrugated
5021 Zoned Corrugated, smudged
5022 Patterned Corrugated
5023 Patterned Corrugated, smudged
5024 Incised Corrugated
5025 Incised Corrugated, smudged

**90 Undifferentiated and Unidentifiable Wares**
9100 Unidentified by analyzer (potentially identifiable by someone else)
9200 Undifferentiated Ware (unique, or potentially new, type)
9999 Unidentifiable Ware (due to size, damage, etc.)

**TREAT/I**  Interior Surface Treatment

0. Indeterminate. Cannot identify due to burning, size, or uncertainty of treatment.
1. Unpolished. Temper protrudes, no effort at modification.
2. Scraped. Scraping marks, scratches, drag lines where temper protrudes.
3. Slipped and polished. Reflects some light and fine layer of clay on the surface.
7. Fugitive Red
15. Other (Note in comments.)
95. Surface missing. Surface spalled, eroded, or abraded away. Also used for items with no interior surface (e.g., figurines).
99. Surface does not exist. Example: handle has only one surface.

**TREAT/E**  Exterior Surface Treatment

0. Indeterminate. Cannot identify due to burning, size, or uncertainty of treatment.
1. Unpolished. Temper protrudes, no effort at modification.
2. Scrapped. Scraper marks, scratches, drag lines where temper protrudes.
3. Lightly Polished. No temper protruding, but does not reflect light.
7. Fugitive Red
8. Corrugated
9. Incised
10. Punctate
11. Cord marked. Modified by pressing a cord into the clay.
12. Finger indented.
15. Other (Note in comments.)
40. Clapboard Corrugated Wide (> 10 mm)
41. Clapboard Corrugated Narrow (< 10 mm)
42. Indented Corrugated
43. Zoned Corrugated
44. Obliterated Corrugated
45. Incised Corrugated
46. Scored Corrugated
47. Tooled (engraved) Corrugated
48. Punctate Corrugated
49. Plain Corrugated
50. Neckbanded wide (> 10 mm)
51. Neckbanded narrow (< 10 mm)
52. Indented neck corrugated
53. Zoned neck corrugated
60. Indeterminate Corrugated
80. Applique
81. Basket Impressed
95. Surface missing. Surface spalled, eroded, or abraded away.
99. Surface does not exist. Example: handle has only one surface.

**POL/I**  Polishing Interior. Reflects at least some light (has luster), may be poor or streaky to fine and shiny.
1. Not Polished
2. Streaky, or striations visible
3. Low luster
10. High luster
95. Surface missing or Indeterminate

**POL/E**

Polishing Exterior: Same codes as Polishing Interior.

**SLIP/I**

Slipped Interior. Has a layer of fine clay on the surface. Slip is usually of contrasting color to paste; may be thin and watery or thick and visible in cross section. Most are also polished.

1. Self slip
2. Thin slip: temper visible
3. Thick slip: no temper visible
4. Crackled slip: thin
5. Crackled slip: thick
6. Fugitive Red Slip
10. Not slipped
95. Surface missing or Indeterminate

**SLIP/E**

Slipped Exterior: Same codes as Slipped Interior.

**#CORR**

Number of corrugations/ 3 cm². Corrugated sherds > 3 cm² only.

**SOOT**

Sooting. Recognized as gritty black deposit or carbon residue.

0. Indeterminate
1. Present on exterior only
2. Present on interior only
3. Present on both surfaces
4. Present on edge or edges only
10. None

**FORM**

Form or Vessel Shape

0. Indeterminate
1. Bowl
2. Jar
3. Seed Jar
4. Ladle
5. Scoop
6. Figurine/Effigy Vessel
7. Pitcher
8. Worked Sherd
15. Other (Note in comments.)
PART  Part of vessel represented

0. Indeterminate
1. Rim
2. Neck
3. Body
4. Handle
5. Base
6. Handle and body
7. Neck and body
15. Other. (Note in comments.)

RIM FORM  Refers to general form of the rim in cross-section. Each rim will be drawn and photographed.

0. Indeterminate
1. Flared
2. Incurved
3. Straight Collar
4. Straight Rim
5. Other (Note in comments.)
6. Fillet rim
99. No rim

RIM DIA  Rim Diameter. Measured only for rims > 3 cm. Rims < 3 cm noted as n/a.

RIM LEN  Rim Length

SIZE  Size of sherds measured in 2 cm\(^2\) increments. Anything under 2 cm\(^2\) will not be analyzed because of size but will be counted and may be useful for NAA.

VWT  Vessel wall thickness (cm). Refers to the thickness of the thickest portion of the sherd. This is measured using the digital calipers. Do not measure this variable on rim or base sherds. Average of 3 measurements.

DOC  Direction of coils. Only measured for basal sherds.

0. Indeterminate
1. Clockwise
2. Counterclockwise
99. Not applicable

MOD  Modification. Indicates use or changes after firing.

0. Indeterminate
1. One ground edge
2. Two or more ground edges
3. Flaked edge or edges
4. Drill (repair) hole
5. Abraded
6. Use-wear
15. Other. (Note in comments.)
99. None

PT
Paint Type

0. Indeterminate
1. Organic: blurry edges; often has watery appearance; usually flat back; soaks into clay body; no surface relief
2. Mineral: usually dense; may be crackled or blistered; hard edges; often sits on surface; often a brown or reddish brown or warm black
3. Mineral Red
4. Mineral/organic: often brown but soaked into clay body and somewhat blurry at edges; parts may sit on surface or be crackled
5. Kaolin White clay paint
6. Matte Polychrome
7. Glaze Polychrome
8. Glaze/Sub-Glaze
99. Absent

PASTE
Paste color. Munsell color of most oxidized version of paste (lightest color).

SC/E
Surface/Slip color. Munsell color of slip or background color exterior.

SC/I
Surface/Slip color. Munsell color of slip or background color interior.

TEMPER
Temper type determined through analysis with binocular microscope.

COUNT
Number of sherds in provenience that are identical in all attributes.
### Table B.1 Description of Macroscopic Temper Groups

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<tr>
<th>Temper Groups</th>
<th>Description</th>
<th>Type Coll #</th>
<th>Comments</th>
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<td>1a</td>
<td>Rounded to sub-rounded, moderate sort, medium sand, white, clear, moderate luster. Uncommon inclusions: sub-angular, poor sort, coarse sand, black and red.</td>
<td>80.1</td>
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<tr>
<td>1b</td>
<td>More angular and more white than 1a. Very little to no black and red.</td>
<td>202.3, 202.4</td>
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<tr>
<td>2a</td>
<td>Sub-angular to sub-round, poor sort, coarse sand, white, clear, gray, tan, low luster. Uncommon inclusions: sub-angular to angular poor to very poor sort, coarse sand, black, pink.</td>
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<tr>
<td>2b</td>
<td>Very similar to 2a. Coarse to very coarse; white has an orange tint.</td>
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<td>3a</td>
<td>Sub-rounded to sub-angular, moderate sort, medium sand, white with black center, low luster. Uncommon inclusions: sub-angular, tan/pink, clear.</td>
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<tr>
<td>4a</td>
<td>Sub-angular to sub-round, moderate sort, fine sand, mica, black, tan, red, brown, white, high luster.</td>
<td>80.5</td>
<td>Very similar to 1a and 1b.</td>
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<tr>
<td>4b</td>
<td>Like 4a but no red inclusions.</td>
<td>202.5</td>
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</tr>
<tr>
<td>5a</td>
<td>Sub-rounded, well sorted, fine to very fine sand, mica, black, white, red, tan, clear, moderate luster. Possible self-temper.</td>
<td>80.13, 202.1, 202.2</td>
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<td>Code</td>
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<tr>
<td>5b</td>
<td>Sub-rounded, moderate sort, fine to very fine sand, black, low luster. Uncommon inclusions: sub-rounded to rounded, very poor sort, very fine, tan, white. Possible self-temper.</td>
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<td>Difference between 5s could be because of lower firing temp. 5b very similar to 4a. Recheck at end.</td>
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<tr>
<td>6a</td>
<td>Sherd temper with various background noise.</td>
<td></td>
<td>&quot;Other&quot; group. Put all Chupadero in here. There is variation among the Chupadero but since they are not key to my question will not be examined in depth.</td>
</tr>
<tr>
<td>6b</td>
<td>Sherd temper with various background noise.</td>
<td></td>
<td>Other groups for St. Johns, like Chupadero will group all together.</td>
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<tr>
<td>6c</td>
<td>Sherd temper. Sub-angular, well to moderate sort, medium to coarse sand, clear, white, tan/orange, black, moderate luster. Uncommon inclusions: red.</td>
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<td>Possible local temper group with sherd.</td>
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<td>7a</td>
<td>Sub-rounded, moderate sort, medium to fine sand, gray, white, tan, white and black modeled, low luster. Uncommon inclusions: sub-round to round, very fine, black.</td>
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<td>Sub-round to round, fine to very fine, moderate to well sorted, white, gray, tan. Uncommon inclusions: medium sand, white, orange (possibly clay inclusions).</td>
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<td>Similar to 4 but orange inclusions could be difference in clay prep. Re-examine this group at end.</td>
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### Table B.2 Ceramic Types per Level in Locus 1

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*Note:* All units were combined because ceramic totals were low if examined by individual excavation unit. Levels 1 to 3 represent the Cliff phase occupation. Levels 4 to 9 represent the possible Black Mountain phase occupation beneath the Cliff phase occupation.
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### Table B.4 Ceramic Types from Dogleash Collection Unit in Locus 3
(Late Pithouse Component)

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Note: All ceramics are from surface collections.
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APPENDIX E

STATISTICAL ANALYSIS OF NAA DATA (MAHALANOBIS DISTANCE) AND WARE GROUP (CHI-SQUARE)
MAHALANOBIS DISTANCE CALCULATION FOR SPECIMENS PROJECTED AGAINST TWO OR MORE GROUPS.

Reference groups from Creel et al. (2002), Speakman (2013), and Taliaferro (2014):

1       M5A
2       M5B
3      M49A
4       PR1
5       PR2

Variables used:
La  Lu  Nd  Sm  U  Yb  Ce  Co  Cr  Cs  Eu  Fe  Hf  Rb  Sc  Ta  Tb  Th  Zn  Zr  Al  Ba  Dy  Mn  Na

The following specimens are in the file KP_M5A

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Table E.1  Frequency data of Black Mountain Site Ware Groups with Production Location in the Mimbres (Local) and Upper Gila (Non-local) (Decorated wares combined)

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<th>Location</th>
<th>Decorated (Painted and Corrugated /Incised)</th>
<th>Plain ware</th>
<th>Totals</th>
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<td>Mimbres</td>
<td>99 (38%)</td>
<td>42 (16%)</td>
<td>141 (54%)</td>
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<tr>
<td>Upper Gila</td>
<td>75 (28%)</td>
<td>48 (18%)</td>
<td>123 (46%)</td>
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<td>Totals</td>
<td>174 (66%)</td>
<td>90 (34%)</td>
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Table E.2  Frequency Data of Black Mountain Site Ware Groups with Production Location in the Mimbres (Local) and Upper Gila (Non-local) (“Utilitarian” wares combined)

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<th>“Utilitarian” (Plain/Corrugated/Incised)</th>
<th>Totals</th>
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<td>46 (17%)</td>
<td>95 (36%)</td>
<td>141 (54%)</td>
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<tr>
<td>Upper Gila</td>
<td>43 (16%)</td>
<td>80 (30%)</td>
<td>123 (46%)</td>
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<td>Totals</td>
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Table E.3  Frequency Data of Black Mountain Site Ware Groups with Production Location in the Mimbres (Local) and Upper Gila (Non-local): Locus 1 (Cliff phase room block)

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<td>20 (20%)</td>
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<td>51 (50%)</td>
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<tr>
<td>Locus 1 Upper Gila</td>
<td>23 (23%)</td>
<td>28 (27%)</td>
<td>51 (50%)</td>
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APPENDIX F

CODE SHEET FOR OBSIDIAN DATA
This section presents the code sheet for the obsidian data recorded in this study.

**SITE**

Number code for each site

1. Black Mountain site (LA 49)
2. Janss
3. Walsh
4. Montoya
5. Stailey
6. Dissert
7. Kipp Ruin (LA 153465)
8. Joyce Wells
9. 76 Draw
10. LA 176740
11. LA 173885
12. Galaz
13. Old Town
14. Swartz
15. Badger Ruin (LA 111395)
16. Jackson Fraction (LA 111413)
17. Florida Mountain site (LA 18839)

**UNIT**

Unit Number: Trenches are identified by letter (A, B, C, etc.); excavation units are identified by number (1, 2, 3, etc.); surface collection units (dogleashes) are identified by letter and number (e.g., DL1, DL2); and isolated finds are labeled ISO with Northing/Easting in the comments column. This data is only available for Black Mountain (LA 49).

**LVL**

Level Number (10 cm arbitrary levels)

**LOC**

Five loci are identified at the Black Mountain site (Eastern/Cliff phase, Western/Black Mountain phase, Pithouse component, Dogleash surface collection units, and Isolated Finds). These loci were not assigned in the field but were used to facilitate sorting during analysis.

1. Cliff phase component
2. Black Mountain phase component
3. Pithouse component
4. Dogleash surface collection unit (These are dogleashes not associated with a specific occupation period, between the pueblos/pithouses.)
5. Isolated find

**REG**

Designates region within the Mimbres Valley

1. Upper and Middle Mimbres Valley
2. Lower Mimbres Valley

504
PER  Designates the time context in which the obsidian was found.

1. Cliff phase
2. Black Mountain phase
3. Classic Mimbres period
4. Late Pithouse period
5. Mixed context (Note in comments the combination of periods to which the obsidian could be assigned.)
6. Unknown (Designates obsidian found in areas where it is unclear from context in which period the obsidian was used.)
7. Pithouse/Classic period (At some sites both occupations are present and it is unclear which context the samples are from.)

ATL ID  Catalogue number assigned to museum collections or Field Number (FN) assigned to each artifact bag in the field once the level was completed; a unique identifier for each bag of artifacts (bulk and individual).

ANID  Assigned Unique IDs are sequential numbers assigned to each obsidian piece that was analyzed using XRF. This is a combination of three letters (to designate site) and three numbers to provide a unique ID. For example, obsidian from the Black Mountain site is assigned BMS001, BMS002, BMS003, BMS004, etc. The ANID are only given to obsidian that were sourced by the University of Missouri Research Reactor (MURR).

BMS – Black Mountain site (LA 49)
JAN – Janss
MON – Montoya
STA – Stailey
DIS – Dissert

SRC LOC  Source location of X-Ray Fluorescence (XRF) anaylsis. An asterisk (*) next to source means that the source location could change with more data.

100 Mule Creek Sources
101 Mule Creek – Antelope Creek
102 Mule Creek – North Sawmill
103 Mule Creek – Mule Mountains
104 Mule Creek San Fransico/Blue
105 Cow Canyon
106 Gwynn Canyon

200 Southern Sources
201 Antelope Wells
202 Sierra Fresnal
203 Los Jaguëyes
204  Nutt Mountain

300  Rio Grande Sources
301  Mount Taylor
302  Jemez – Obsidian Ridge
303  Jemez – Polvadera Peak
304  Jemez – Cerro del Medio
305  Jemez – El Rechuelos
306  Jemez – Cerro Toledo
307  Jemez – Valles Grandes

400  Unassigned

**SRC NET**  Source Network. Source networks are divided into four socioeconomic exchange networks.

M – Mule Creek Network (Mule Creek sources, Cow Canyon, and Gwynn Canyon)
S – Southern Network (Antelope Wells, Sierra Fresnal, Los Jaguëyes)
N – Nutt Mountain
R – Rio Grande Network (Jemez sources and Mount Taylor)
U – Unknown

**SAM DESC**  Sample description notes the type of flaked stone. This is not available for all samples because some of the data provided by other researchers did not include this information.

0. Unknown
1. Flake
2. Biface
3. Core
4. Projectile Point
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