A TOWERING ENIGMA:
AN EXAMINATION OF LATE PUEBLO II AND PUEBLO III TOWERS IN THE
NORTHERN SAN JUAN REGION
by
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This thesis entitled:  
A Towering Enigma: An Examination of Pueblo II and Pueblo III Towers in the 
Northern San Juan Region 
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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.
One of the most impressive structural elements of ancestral Puebloan culture is the masonry tower, a structure most commonly found during the Pueblo III (A.D. 1150-1300) period of northern San Juan region occupation. This time period was associated with dramatic and significant social changes that characterized the decades before the ultimate depopulation of the region in the 1300s. The following thesis research explores both the variability in construction and context of towers in order to better understand how they functioned during this time period. This work combines primary tower research collected in southeastern Utah with previous studies of towers in southwestern Colorado. The results are a new understanding of towers in southeast Utah as well as a series of reformulated definitions for towers as an architectural feature class which encompass the variability and similarities present in tower construction and context. These definitions contribute to our ability to address the possibilities of tower function.
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Chapter 1

Towers of the northern San Juan region

The masonry tower, an architectural phenomena of the late Pueblo II (1075-1150) and the Pueblo III (A.D. 1150-1300) periods of the ancient American Southwest is one of the most enigmatic architectural components of the Ancestral Pueblos of the northern San Juan region. They are associated with dramatic and significant social changes that characterized the decades before the ultimate depopulation of the region in the 1300s. My research explores the physical and ideological role of towers during this turbulent time period, comparing primary tower research that I conducted in southeastern Utah with previous studies of towers in southwestern Colorado and Hovenweep National Monument. The importance of this research is understanding how towers relate to the larger context of the late Pueblo II and Pueblo III periods of the northern San Juan region. The construction of towers represents a concrete example of the larger social world and the work presented here takes a step towards understanding the variability of towers in different parts of the northern San Juan region and addresses how they might have functioned.

My primary research goal is to assess the range of tower variability in a study area of southeast Utah and to understand how this variability can inform us about tower function. I describe and analyze the variability in towers using a series of construction, context, and locational attributes. I use these data to produce a more refined definition of towers that encompass the variation evident across the region from a construction and contextual perspective. This thesis also uses tower attributes
to best address how towers might have functioned. While I recognize that I cannot say precisely how towers functioned, I can use the attributes presented in this thesis to suggest that certain functions fit the data better than others.

A secondary goal is to address intraregional variation in tower construction and use across the northern San Juan region. I compared towers in southeast Utah with a sample of towers from southwest Colorado and Hovenweep National Monument. There has been no systematic consideration of towers that spans the northern San Juan region and this thesis attempts to consolidate some of the published tower data from across the northern San Juan region. In southeast Utah, I recorded data on 40 towers located at 15 different sites. This sample is compared with published data on 53 towers from four sites in southwest Colorado excavated and recorded by Crow Canyon Archaeological Center as well as six excavated sites from Hovenweep National Monument which straddles the border between Colorado and Utah. The combined data sets contain 93 towers from a total of 25 different sites. The comparison between these two data sets suggests that towers share certain construction attributes and are found in similar proportions at different site sizes, contexts with other architecture, and locations on the landscape.

This chapter introduces the towers of the northern San Juan region as unique architectural features whose function has been poorly understood. I briefly describe my study area and tower data set and establish the relevance of tower research in southeastern Utah as adding to the cumulative knowledge of the prehistoric landscape of the northern San Juan region. I also describe tower distributions, both spatially and
temporally, across the northern San Juan in order to illustrate the geographic and social context in which these structures were constructed.

The distribution of towers in the Southwest is restricted to southwestern Colorado, southeastern Utah, and northwestern New Mexico, an area that has been defined as the northern San Juan region. The northern San Juan region is geographically bounded by the Abajo Mountains and the Great Sage Plain to the North, the San Juan Mountains to the East, the San Juan River to the South, and the Colorado River to the West (Adler 1996; Varien 2000).

In order to compare tower types and uses across the large expanse of the northern San Juan, it is necessary to sub-divide this region. In this study I use the terms established by Glowacki (2006) to define distinct sub-regions within the larger northern San Juan region (see figure 1.2). Glowacki (2006:16-18) identifies five sub-regions, three of which are pertinent to this study. While I define all five below, I will focus on Mesa Verde Proper, McElmo-Monument and the West Mesa Verde sub-regions throughout the rest of this research project.
1. The **Totah** sub-region includes a portion of northwest New Mexico located north of the San Juan River.

2. The **Mesa Verde Proper (MVP)** sub-region encompasses the geographic questa in southwest Colorado known as Mesa Verde and includes within its boundary, Mesa Verde National Park.

3. The **McElmo-Monument (NM)** sub-region encompasses the area between Mesa Verde Proper and the Utah state boundary line. Included in this sub-region are the tower sites in southwest Colorado recorded by Crow Canyon Archaeological Center including Sand Canyon, Yellow Jacket, Castle Rock and Woods Canyon Pueblos. This sub-region also includes Canyon of the Ancients Monument land where the tower sites of Hovenweep National Monument are located.

4. The **West Mesa Verde** sub-region is in southeast Utah and includes Comb Ridge and encompasses the entire southeast Utah study area.

5. The **Lower San Juan** sub-region stretches west of the West Mesa Verde region to the western edge of the northern San Juan region at the Colorado River. This sub-region encompasses the western edge of my southeast Utah study area along the eastern flanks of Cedar Mesa.
Although the widespread distribution of towers in the northern San Juan region indicates a related social sphere, they are most common in southwestern Colorado and on Mesa Verde Proper (Glowacki 2006; Lipe and Ortman 2000). The disproportionate density of towers in Mesa Verde Proper and the McElmo-Monument sub-regions and the lower densities in the rest of the region implies some type of Mesa Verdean cultural core during the Pueblo III period whose western periphery extends into southeastern Utah.

Towers are found in a variety of geographic locations and in different associations with site types and site architecture. Furthermore, tower construction varies from East to West across the prehistoric landscape. The imposing towers of Mesa Verde National Park and Hovenweep National Monument differ significantly from those found in Southeastern Utah. As discussed in Chapter Five, towers vary in size, shape and context. They are found as components of large and small sites, can be detached, integrated with domestic architecture or site enclosing walls or attached

Figure 1.2: “GIS Map of the Northern San Juan region with the subregions” (from Glowacki 2006: Figure 2.2).
to kivas. Given the considerable variability of towers observed in the northern San Juan region it is no wonder the term ‘tower’ has been used as a catchall category for structures with an uncertain or ambiguous function.

I have focused on southeastern Utah because it will benefit our overall understanding of northern San Juan region archaeology by expanding our view, both conceptually and geographically, of the fringes of the prehistoric Mesa Verde cultural region. Furthermore, although there has been considerable archaeological research conducted in southeast Utah, there has been little emphasis on towers themselves other than to record their presence on the landscape (Bond et al. 1992; Cameron 2009; Firor et al. 1998; Hurst 1992, 2004, 2006, in prep.; Till in prep; Westfall et al. 2003).

Figure 1.3: Southeastern Utah tower juxtaposed with Hovenweep National Monument tower.
Analytical approach

In the southeast Utah dataset, I recorded twenty attributes that characterize all 40 towers. I calculated the frequencies and percentages of each attribute and discuss the patterns presented, explanations of outlier examples and, in some cases, how tower construction data compares with other contemporary Puebloan architecture. I use the southwest Colorado and Hovenweep dataset to compare how tower attributes in other sub-regions of the northern San Juan region relate to those in southeast Utah. The published data for southwestern Colorado and Hovenweep included a limited number of tower attributes so these conclusions are valuable but not as comprehensive as the southeast Utah data.

After exploring the possible combinations of attributes, I present five comparisons of tower attribute data that best illustrate the patterns in tower data using tower construction and association with other site architecture as the bases for comparison. I approached these comparisons with the assumption that the patterns demonstrated through the data could be used to imply notions of function. I chose to use cross tabulations for analysis because it demonstrated patterns more clearly than other statistical formulas. For example, because of my small sample size, the results from a chi square were insignificant and important data patterns were lost. In Chapter Six, I summarize these patterns with new effective definitions of towers that illustrates their variety and suggests how paired attributes relate to possible functions.
What is a tower?

Southwest archaeologists have identified an incredible variety of structures under the label of towers. “The term tower has been used in Southwestern archaeology to refer to structures that are of varying sizes and shapes, are located in a variety of settings, and were probably constructed for different purposes and uses” (Kuckelman 2003). This quote exemplifies the inherent vagueness by which archaeologists identify and define towers in the archaeological record and demonstrates that our conception of towers may in fact obscure a considerable amount of functional variability. This section discusses the difficulty in identifying and defining towers on the landscape.

The definitions currently used to identify towers are not based on a well-developed criteria but are instead inferred from what researchers think *should* represent a tower. For example, because towers are *often* found at canyon rims, isolated piles of stones perched canyon rims or drainage edges are usually recorded as towers. Other times, researchers in the field call ambiguous structures ‘possible’ towers, ‘unfinished circular or square structures’ or ‘circular rubble mounds’. This type of non-specific generalization (Clark 1978) is risky because by generalizing, it fails to adequately define a particular feature category. This is illustrated by the use of non-specific descriptors when discussing towers such as ‘typical’, ‘rare’, ‘possible’, ‘probable’, ‘common’, and ‘frequent’. While generalizations can be useful in grouping similar types of features, there has been little effort to evaluate whether we should even have a “cohesive definition” that encompasses the variability found in the archaeological record. In order to accurately discuss towers, our conceptual
terminology must be well constructed and accurately reflect the archaeological record.

**Social context of a tower**

Changes in pueblo layout, emphasis on canyon rim orientation, efforts to restrict access to important resources, and evidence for ritual transformation all point to changes in ancestral Puebloan social organization during the late Pueblo II and Pueblo III periods (Glowacki 2006, 2010; Lipe and Varien 1999). The development and proliferation of towers during the late Pueblo II and Pueblo III periods may have been an important component of the changing social contexts of the northern San Juan region.

Towers were first constructed in the Pueblo II period years, although they are most commonly found in association with Pueblo III period sites (Varien 1999). The Pueblo III period was a time of unsettled climatic conditions and intense social strife and towers may have been part of a response to these challenging conditions. The Pueblo III period (A.D. 1150-1300) of ancestral Puebloan occupation in the northern Southwest was a time of changing population dynamics with a marked population increase and a settlement pattern tending towards aggregated communities (Lipe and Varien 1999; Varien et al. 2007). With the collapse of the Chaco regional system, the ancestral Puebloan super-power of the Pubelo II period, and the rise of Aztec as the new political powerhouse, the social context of the post-Chaco world (Pueblo III) included increased warfare and minimal trade with groups outside the region (Lipe
Environmental downturn undoubtedly had harsh effects on farming and domestic water supplies. The aggregation of many sites during the Pueblo III period around permanent water sources suggests a heightened protection of such resources (Lipe and Ortman 2000:107). The frequent appearance of towers during this time period has caused scholars to argue that their presence was the result of unstable social conditions of the northern San Juan region.

**Explaining towers**

Numerous hypotheses have been offered to explain why towers were increasingly built during the later years of ancestral Puebloan occupation of the northern Southwest. Most of these hypotheses have assigned all towers to a single function. Although I propose no new functions for towers in this thesis, I intend to look at how well proposed tower functions relate to the construction and contextual attributes I have collected in the field. The discussion below traces the different functions that have been proposed for towers. In later chapters, some of these functions (defense, territory/resource monitoring, boundary making, food processing, food storage, and social identity) will be revisited and assessed in relation to attributes of tower construction and location.

Defense appears as an early and common explanation (Fewkes 1923; Riley 1950; Schulman 1950) as well as the possibility of prehistoric signaling among numerous sites (Morely and Kidder 1917; Ellis 1991). Archaeologists have also proposed that towers served as storage facilities (Mackey and Green 1979; Winter
Plog (1974) elaborated on this idea and suggested that towers may have served to integrate the villages as places where food was stored and redistributed. Towers have also been argued to be astronomical observation points (Molloy 1969), and structures used for ceremonial purposes (Lancaster and Pinkley 1954; Van Dyke and King 2010).

While towers may have functioned in some or all of the practical capacities proposed by researchers, it is also important to explore the possibilities that towers played a larger social role for the ancestral Pueblo people. Recently archaeologists have begun to view architecture and landscape as reflexive elements of the social world and thus including towers in their research of the social (Van Dyke 2004).

“Buildings and spaces both create and reflect ideas about peoples and their societies, worldviews and ideologies. Because being in the world is reflexive, and because architecture is part of material expression of the social, it is possible for archaeologists to use architecture to access elements of the builders’ beliefs, ideas, and worldviews” (Van Dyke and King 2010:14).

The variety of functions proposed by scholars have been based on a vague collection of tower attributes. The towers presented in this thesis will be used to evaluate function to identify a range of functions that would be appropriate for the towers in the southeast Utah data set. For example, sturdy towers with thick walls would be good for defense or food storage while tower construction may not have played as an important role for communication, religious or astronomical purposes. Data from excavated towers can also be used to assess tower function and their characteristics compared with surface data from other towers to see how well they fit with proposed functions. While it may not be possible to come up with a completely
clear set of criteria that would distinguish these different functions, the consideration of these attributes should allow me to suggest a range of functions appropriate for the towers in the southeast Utah data set.

**Organization of thesis**

Each chapter in this thesis builds on the previous one and investigates the variability and distribution of tower attributes, culminating in Chapter Six which contains a summary of my analysis of tower variability, a reassessment of tower definitions and functions, and an evaluation of where future tower research should focus.

Chapter Two reviews the natural landscape and environment of the northern San Juan region and in particular the sub-region of southeastern Utah. In order to provide a context for understanding the development and use of towers, I describe the social landscape of the northern San Juan region during the late Pueblo II and Pueblo III periods. I summarize our current state of knowledge of the challenging environmental conditions of the Pueblo III period, the changing demographic patterns, and the apparent social upheaval that characterized this period. Chapter Two outlines the history of tower research in the northern San Juan and reviews previous research as well as dominant theories of tower function.

Chapter Three presents my analytic methods. This chapter deals with the size and variation of my data set as well as my methods of data collection. It details the importance of the recording methods involved for each of the individual attributes.
that I collected during fieldwork and subsequent data analysis. This chapter also discusses how the attributes introduced can be used to assess a range of different tower functions that will be analyzed in Chapters Five and Six. The last section of this chapter discusses the weaknesses in my dataset, including missing data, problems with sample size, data set biases, and inconclusive evidence.

Chapter Four discusses the 15 individual tower sites and 40 towers that were recorded in the southeastern Utah study area. It gives a brief synopsis of each site, provides tower construction and attribute data, and discusses how the towers are associated with the natural and material landscape by examining the context and distribution of towers within different site types and site locations. Furthermore, it considers the distribution of towers across the natural landscape with particular emphasis on environmental settings and access to resources.

Chapter Five compares both the published tower data and the data from the southeastern Utah data set. The first half of the chapter focuses on southeast Utah sample by presenting the individual attributes presented in Chapter Three. These attributes have been grouped into meaningful categories that pertain to tower construction, tower height, and the relationships between towers and their associated site as well as the landscape. Next I analyze cross tabulations between different attribute categories in order to establish tower types based on patterns in construction and context and used to assess variability in towers. The latter half of the chapter focuses on tower data collected from excavations at Hovenweep National Monument, and sites in southwest Colorado. I analyze patterns in the data from southwest
Colorado and Hovenweep and then compare them to the patterns demonstrated by the southeast Utah sample.

Chapter Six concludes this thesis by summarizing my analysis and discusses how the newly formulated definitions for towers best address possible tower functions. The concluding pages also address the need for future tower research in southeastern Utah. Utah remains at the periphery of the northern San Juan region and it represents a rich and unexplored region that can be used to better understand the social landscape of the northern San Juan region including spheres of interaction and the circulation and exchange of ideology, politics and religion.
Chapter Two

Landslapes of Tower Research

The Pueblo III period, when towers were the most common, was a time of climatic and social changes, some of which may have resulted in the construction of towers. Environmental degradation and social turbulence during the late 1100s and 1200s have been well documented by archaeologists (Glowacki 2006; Kuckelman 2000, 2002, 2003, 2007, Lipe 1992, 2002, Lipe and Ortman 2000; Lipe and Varien 1999). Here, I describe the overarching patterns of environmental and social change in the Pueblo III period in the northern San Juan region within which towers developed. The later half of the chapter discusses previous tower research and the sites used in my southwest Colorado and Hovenweep database.

The natural environment affects the entire scope of culture including subsistence productivity and the availability of natural resources, the demography and distribution of sites on the landscape, regional interaction and community organization (Varien 2002:174). Given the encompassing effects of the environment on culture, the discussion of the environment is used as a foundation for delving into the social landscape of the Pueblo III period.

The Pueblo III period suffered from a highly variable climate, with major droughts, although these were interspersed with overall favorable climatic conditions (Van West and Dean 2000). The western sub-regions of the northern San Juan region, including southeastern Utah were drier than the eastern portions of the region and as a result, people living in the western northern San Juan were more susceptible to
environmental changes causing them to take more drastic actions as responses to periodic droughts (Glowacki 2006:21). A particularly difficult drought between 1130 and 1180 A.D. set into motion social responses that triggered emigration and appears to have prompted increased aggregation into larger settlements (Varien et al. 2004). Another major drought in the 1270s caused increased aggregation and by the end of this drought period, the entire northern San Juan region was depopulated.

**The natural environment of the northern San Juan region**

The geology of the northern San Juan region is varied and contains a large selection of Cretaceous, Jurassic, and Triassic sandstone, siltstone and conglomerate formations (Sears 1956). The variable geology of the region has significant impacts on resource procurement as it effects productivity of agricultural yields and the availability of natural resources. The differences in geologies compounded by the varying elevation across the northern San Juan have created localized environments that have profound effects on the variability of natural resources and agricultural productivity.

The variation in geography and elevation across this portion of the American Southwest results in localized temperature ranges, differences in annual rainfall, and diverse vegetation communities and animal habitats. Adams and Peterson (1999:14-18) recognize seven separate biotic communities that occur in various combinations throughout southwest Colorado. These vegetation zones include sagebrush-saltbrush, grasslands, gamble oak scrubbrush, pinyon-juniper woodland, pine-douglas fir forest,
spruce-fir forest and alpine tundra. In general, the pinyon-juniper woodlands are found in the rocky soils of mesas and uplands, contrasted from the sagebrush and other shrubbery found in the deeper soils of lower elevations and the deciduous forests found at the highest elevations (Van West and Dean 2000:20).

Because of significant variability in elevation, temperature in the northern San Juan region varies considerably. With average elevations ranging well above 1,500 m, the Colorado Plateau is relatively cool although temperatures frequently register over 100 degrees Fahrenheit in some areas during the summer months. Similarly, the coldest winter month can produce temperatures down to -20 degrees Fahrenheit (Van West and Dean 2000:21). Despite these extreme temperatures, most of the region experiences a frost-free season of well over 120 days which was crucial for the development and establishment of maize agriculture of the ancestral Puebloans (Van West and Dean 2000:21).

There are few permanent streams found on the Colorado Plateau and since much of the region is located in a rain shadow of the north-south cordilleras, annual rainfall is characterized as a biseasonal moisture pattern averaging 200mm of precipitation or less a year (Adams and Peterson 1999:23). Rain and snow melt from the higher elevations feed the few permanent streams and rivers such as the La Plata, the Animas, the Dolores, and the San Juan. Water across most of the rest of the region is often available only in seeps and springs that occur at contacts between sandstone and shale layers (Adams and Peterson 1999:22). These water pockets occur primarily at canyon head settings and their widely distributed locations probably played a key role in the location of prehistoric settlements. Despite the seemingly sporadic location
of permanent water, areas of the Colorado Plateau benefit from some of the best arable farmland for dry-farming, specifically on the wide floodplains of the La Plata, Anamis and San Juan rivers (Toll 1993). Other areas of the northern San Juan region represent a harsher environment that makes dry-land farming marginal at best (Matson et al. 1988).

Climate and the environment in the northern San Juan region are complex. There have been significant climatic changes on the Colorado Plateau from the late Pleistocene to the present. These changes would have undoubtedly affected resources and subsistence patterns available to prehistoric peoples. Ideal growing conditions would have fluctuated in the past, inevitably affecting where farming could be practiced. The development of the Little Ice Age (A.D. 1250-1450) was a key element in the prehistoric environment of the Pueblo III period that would have contributed to population movements within the region and ultimately to the complete depopulation of the northern San Juan region in the late 1200s (Van West and Dean 2000).

The southeast Utah environment

Because a large part of this thesis is focused on southeast Utah, this section discusses the region more specifically. Although the above section explores the general environmental elements of the northern San Juan region, I wanted to look more critically at the nuances of the geography and climate of southeast Utah.

The geology of southeastern Utah within the West Mesa Verde sub-region contains primarily Triassic, Jurassic and Cretaceous formations (Gregory 1938) which lays the foundation for a relatively rich soil that allowed for relatively viable
dry-land farming. Furthermore, the exposed Bluff, Summerville and Entrada sandstones were likely used as the primary building stone for Puebloan architecture (Davis and Westfall 2009:13).

The West Mesa Verde sub-region benefits from 33 to 45 cm of annual rainfall which is contrasted with the 12 to 25 cm of rainfall that falls to the west in the Lower San Juan sub-region (Gregory 1938) also contributing to productive dry-land farming to the East and more marginal farming to the West.

Temperatures in southeast Utah are similar to those across the entire northern San Juan region. Average temperatures swing from 106 degrees Fahrenheit in the summer to -29 degrees Fahrenheit in the winter (Davis and Westfall 1992:4). The frost free season in southeast Utah lasts for an average of 224 days which well meets the requirement of 120 frost free days for corn agriculture (Gregory 1938:20).

The average elevation of the West Mesa Verde sub-region hovers around 4,000 feet above sea level (Davis and Westfall 1992:4). Associated with this elevation, the range of flora and fauna classify this sub-region as an Upper Sonoran Lifezone (Davis and Westfall 2009:13). Plants in general include pinyon-juniper as well as a variety of shrubs including rabbitbrush, shadscale, Mormon tea, narrowleaf yucca, sagebrush, galleta grass, wild buckwheat, penstemon, sunflower and Indian rice grass (Davis and Westfall 1992:4, Gregory 1938). Many of these natural resources likely supplemented the agricultural lifestyle of the ancestral Puebloans living in this region. Fauna that characterize these elevations include a range of snakes, lizards, birds and rodents, jack rabbits, cottontail rabbits and bats, coyotes,
skunks, ring-tailed cats, muskrats, beavers, mountain sheep, wolves and mountain lions (Gregory 1938:26-27).

The San Juan River, which marks the southern boundary of the northern San Juan region afforded a wide floodplain that would have been viable farmland. Native flora along the Riparian corridor includes cottonwood and willow (Davis and Westfall 1992:4). The prehistoric use of the San Juan river resources included the harvesting the cottonwoods at its bank which would likely have catalyzed river bank erosion and may have altered human activity (Oviatt 1982; Gregory 1938:9).

Located in southeastern Utah within the West Mesa Verde sub-region, Comb Ridge is a striking topographic feature. Comb Ridge is a great monocline hogback of eastward-dipping rocks and extends southward and northward for more than 80 miles (Sears 1956). Its eastern slope is a hummocky surface of gently eroding Navajo sandstone down to Bulter Wash. The western face of Comb Ridge is much more abrupt; above a steep talus slopes Chinle clays and sandstones rises an almost vertical massive cliff of Wingate and Kayenta sandstones, which at places is several hundred feet high (Sears 1956). The western face of the ridge rises to a fairly consistent height above the parallel running Comb Wash. Geologically, Comb Ridge forms an imposing barrier. The Comb Ridge monocline dips below the surface to the south and is cut by the San Juan River, making this area the only naturally occurring break for many miles on either side. The two principle tributaries in this area are Butler and Comb Wash. Both streams flow south and southwest, closely flanking Comb Ridge on its West and East sides, respectively, to their junction with the San Juan River.

Soils found at the base of Comb Ridge are a combination of weathered sandstones
and shales and eolian materials transported by wind from the northern San Juan region resulting in loamy soils that can be considered relatively good for agriculture (Gregory 1938).

The social landscape of Pueblo III

The variable environment of the Pueblo III period conditioned the options available to the inhabitants of the northern San Juan region, yet they were almost as certainly not the only factor underlying social responses (Glowacki 2006; Varien et al. 2007). Social factors such as population levels, political and ritual organization were important determinants of the social landscape of the Pueblo III period. The
political powerhouse of the Aztec great house in New Mexico became more influential during the Pueblo III, likely causing new political and ideological changes to the northern San Juan region (Brown et al. 2008; Lekson 2009; Reed et al. 2005). Aztec was in many ways the new Chaco but its short-lived reign over the Colorado Plateau ended with mass migrations out of the region (Lekson 2009; Reed et al. 2005). The following paragraphs explore the social realm of the ancestral Puebloans and provides a framework for the discussion of the role towers played in the century before the final depopulation of the region. The prehistory of the ancestral Puebloans is complex and multifaceted. Towers represent one tangible element of this social world and it is therefore important to establish an understanding of the larger context from which towers developed.

Demographics and regional distribution

“From A.D. 1150-1300, the geographic area of the Northern San Juan region appears to be roughly equivalent to the Mesa Verde cultural region, at least at a very basic level, for several reasons” (Glowacki 2006:13). These reasons include a similar material culture, distribution of a regional population indicated by Mesa Verde ceramics, and a decrease in long-distance exchange, which suggests an element of social isolation from other cultural communities in the Southwest (Glowacki 2006:13; Pierce et al. 2002). Even within the northern San Juan region, Glowacki (2006) notes different spheres of interaction between the eastern and western halves of the region.

The Pueblo III period is characterized by localized abandonments and shifts in populations across the region (Hurst 1992:67; Varien 2002). Between A.D. 1200 and
1250, there appears to have been an overall increase in population size, density and aggregation in the northern San Juan region although this trend cannot be accurately stated for the entire northern San Juan region (Wilshusen 2002). Overall, population in the northern San Juan region is argued to have reached its peak by the mid-1200s and declined sharply until the complete depopulation of the region by A.D. 1300 (Varien et al. 2007; Wilshusen 2002:118). Regional population trends are complex and have their own histories of influx and decline. For example, relatively low levels of population were characteristic of southeastern Utah until A.D. 1180 and the population of the area peaked in A.D. 1200 (Varien et al. 1996). Furthermore, inhabitants of the western portion of the northern San Juan region including southeastern Utah began to leave the region roughly a decade before their counterparts in the East (Lipe 1995). This population decline in the West coincides with a significant population increase in the East suggesting that western inhabitants migrated East (Glowacki 2006; Varien et al. 2007).

Settlement patterns

One consequence of the increasingly crowded landscape was constraints on residential movement which led, in part, to increased aggregation (Glowacki 2006; Hurst 1992; Varien et al. 1996; Varien et al. 2007; Wilshusen 2002). This trend towards aggregation began around A.D 1225 (Lipe and Varien 1999:303). Although there are differences in scale, this aggregation is apparent in the archaeological record in both southeastern Utah and southwestern Colorado (Cameron 2009; Hurst 1992; Varien et al. 2007). Across the northern San Juan region, environmental degradation,
a decrease in available water sources and arable land for agriculture, and evidence of conflict are also thought to have been catalysts for community aggregation (Dean and Van West 2002; Hurst 1992; Lipe and Varien 1999; Varien et al. 2007). Canyon heads and canyon rims increasingly became the locations for these aggregated settlements, many of which enclosed springs or were located adjacent to a dependable water supply (Lipe and Varien 1999:327). In a study conducted by Kelley (1996), 11 of the 19 villages in the southwestern Colorado study area were associated with springs. Another sample of seven Pueblo III community sites published by Lipe and Ortman (2000) found that five enclosed springs (Goodman Point, Hedley Main, Cannonball, Sand Canyon, Seven Towers Pueblos) and one site had a spring at its base (Woods Canyon Pueblo). Securing a defensible location and domestic water source appears to have been central concerns in site location within all sub-regions of the northern San Juan (Lipe and Varien 1999:327-328).

Many of these sites appear to have been built in easily defensible positions. Indisputable evidence of violence in the archaeological record at sites such as Sand Canyon Pueblo, Castle Rock Pueblo, and Cowboy Wash Pueblo, indicates that conflict occurred during this time (Kuckelman et al. 2002). Pueblo III sites across the northern San Juan region are situated on canyon rims and ledges, mesitas, and escarpments (Hurst 1992:68). The aggregation of sites around permanent water sources might also suggest that settlements were concerned about access to resources from outside threats (Kuckelman 2002). Given the defensive nature of site locations, site architecture and bioarchaeological evidence (Kuckelman 2002), it is apparent that
raiding, feuding, or at the very least, anxiety over the possibility of hostilities was common during the Pueblo III period.

Smaller habitation sites in canyon bottoms and mesa top settings were common during the Pueblo III period although there is a clear trend of aggregation towards larger community centers which may have provided a means for coping with variable agricultural productivity and environmental fluctuations (Hurst 1992; Varien 2002; Varien et al. 2007). Larger sites, consisting of 50 or more total structures, likely served as community centers for these nearby smaller sites (Glowacki 2006:40; Lipe and Ortman 2000:92). Differing from the large, impressive canyon head communities of the central Mesa Verde region, community centers in southeastern Utah tended to be small, dispersed, and regularly spaced (Lipe and Ortman 2000:92). These changes in settlement patterns are a significant element in the cultural context of towers. The greater emphasis on aggregated communities provided a new system in which to establish buffers against environmental and social risks by expressing social identity and social organization while reframing and maintaining social relationships with population fluxes and possible outside threats (Adler 2002).

**Architecture**

While the room to kiva ratio remains relatively constant with earlier time periods, new architectural forms proliferated during the Pueblo III period. The shift to canyon rim and canyon head sites was accompanied by a suite of new architectural forms including public architecture such as site-enclosing walls, bi- and tri-walled structures, plazas bound by roomblocks, D-shaped structures and towers (Glowacki
2006, Lipe and Varien 1999). The quote below exemplifies the integration of these new types of architecture into site layout while recognizing localized diversity in their ultimate form.

“A recurring suite of architectural features at these villages indicates that builders were employing a common language of architecture forms in relation to site plan and setting. On the other hand, each village contains a unique inventory and arrangement of features, indicating that the ‘statements’ made by each community using this language were somewhat free to vary” (Lipe and Ortman 2000:104).

Enclosing walls have been defined as restrictive architecture used to “delimit site boundaries, provide protection, and regulate access in and out of pueblos” (Glowacki 2006: 67). They have also been argued to be a defensive measure against outside attack (Kenzle 1997). Site-enclosing walls become incorporated into site architecture more commonly during the Pueblo III period (Lipe and Varien 1999:319). These walls were commonly one to two meters in height and surrounded all or a majority of the entire site, although at sites such as Woods Canyon Pueblo, they can partition off clusters of public architecture along the canyon rim (Lipe and Ortman 2000:107). The results of a comprehensive study of enclosing walls in the McElmo-Monument sub-region by Kenzle (1997), suggests that site-enclosing walls were predominantly associated with larger sites and are found at 13 of the 20 sites in the sample. In another intensive survey of community centers in the McElmo-Monument sub-region, Glowacki and Varien (2003) demonstrated that towers are present at sites with site-enclosing walls at 37 of the 42 communities explored. This comparison has lead Glowacki (2006) to suggest that towers and site-enclosing walls functioned in a similar restrictive and regulative capacity.
Great kivas are found in the northern San Juan region from the Basketmaker III to the Pueblo III periods although they are found at the greatest density in the northern San Juan region between A.D. 1050 and 1150 (Lipe and Ortman 2000:112). Great kivas are defined by their large, circular, semi-subterranean shape with interior diameters ranging from 10 to 30 meters in width (Herr 1994). Unlike smaller household kivas, great kivas are found both roofed and unroofed (Herr 1994; Lipe and Ortman 2000). Glowacki (2006:60) demonstrated that great kivas were found in similar proportions across the northern San Juan, suggesting that the inhabitants of this region were using a common form of architecture to integrate site inhabitants.

The number of multi-walled structures began to proliferate in the late Pueblo III period (A.D. 1225-1300) (Churchill et al. 1998). The categories of multi-walled structures consist of three different forms: bi- and tri-walled structures and D-shaped structures (Lipe and Varien 1999:319). According to Glowacki (2006:63), multi-walled structures are examples of exclusionary architecture in that they create boundaries that can be crossed only by certain members of the community. Multi-walled structures were built primarily at large sites and community centers and Glowacki (2006:65) argues that the proliferation of these structures is connected with the politics of the Mesa Verde Proper and the McElmo-Monument sub-regions. Glowacki (2010) noted that there are no multi-walled structures west of Aneth, Utah which is roughly equivalent with the McElmo-Monument sub-region boundary. Other archaeologists such as Lekson (1999) suggest that multi-walled structures are connected to the Aztec regional system. The largest of all tri-walled structures in the San Juan region is at the Aztec great house with smaller outlier versions found at sites
across the northern San Juan region. Lekson (1999) argues that these tri-wall structures are Aztec’s version of Chacoan outliers with a package of attributes including standardized construction and ideology.

D-shaped structures are defined by their unique shape and there is considerable variety in their architectural form. In general, D-shaped structures have two stories and an exterior line of rooms around the outside (Lipe and Varien 1999:319). Well-known examples of D-shaped structures include Horseshoe House at Hovenweep National Monument and Sun Temple at Mesa Verde National Park. D-shaped structures have also been identified as towers (Sun Temple and Sand Canyon Pueblo) (Glowacki 2006:64; Lipe and Varien 1999:391). The McElmo-Monument sub-region boasts almost 80% of the D-shaped structures in the northern San Juan region (Glowacki 2006:65).

Plazas during the Pueblo III period vary in size and location and are often informally constructed (Lipe and Ortman 2000:111). Plazas are most commonly identified as flat areas enclosed by architectural features such as roomblocks, site-enclosing walls, or natural features such as canyon walls or boulders (Lipe and Ortman 2000:111). Plazas are most commonly found at large sites and community centers across the northern San Juan region, although the highest numbers are found in the Mesa Verde Proper and McElmo-Monument sub-regions (Glowacki 2006:61). The inclusion of plazas into site layout during the Pueblo III period suggests a trend towards more public forms of communal ritual and ceremony (Glowacki 2006).

Some of the earliest towers were first documented on Chapin and Wetherill Mesas in Mesa Verde National Park (Rohn 1977:250; Varien 1999), although the
earliest suggested tower is a jacal structure at the Sacred Ridge site outside of Durango, Colorado dating to A.D. 800 (Potter and Chuipka 2007). Towers connected to kivas linked by a subterranean tunnel (tower-kiva complexes) are more common examples of towers during the late Pueblo II period while isolated or detached towers are more common to the Pueblo III (Lipe and Ortman 2000; Lipe and Varien 1999:320, Rohn 1977:250).

**Previous research on towers**

Tower recordation and excavation has predominantly focused on Mesa Verde National Park and Hovenweep National Monument (Fetterman and Honeycutt 1987; Greubel 1991; Hayes 1964; Johnson 1999; Neily 1983; Rohn 1977; Winter 1981). Therefore this section will focus primarily on tower sites in southwest Colorado.

Morley and Kidder were the first researchers in the northern San Juan region to define towers. In their publications, Morely and Kidder discuss towers found in McElmo Canyon and characterized them as “boulder houses” (Morely and Kidder 1917). They posited that towers located on prominent boulders indicated that they were used as defensive lookouts or for line-of-sight communication between sites.

Jesse Walter Fewkes during the 1920s was the next archaeologist to turn his attention to towers. Working with the towers at Hovenweep, Fewkes defined three distinct tower types: 1) detached towers not associated with other rooms; 2) towers attached to kivas; 3) towers integrated with other site architecture (Fewkes 1923: 145-146). From his collection of data, Fewkes (1923) suggested several possible functions
for towers including use as observatories, forts, storage bins, or structures for performing religious ceremonies.

Tower research was renewed in earnest during the 1950s. Albert Schulman (1950) working with towers in southwest Colorado, appears to be the first scholar to define towers as structures that are taller than they are wide and to consider towers as an architectural feature that can be distinguished from other classes of structural features. Shulman (1950) argues that towers served as defensive features such as watchtowers. He suggests that towers at Hovenweep and along McElmo Canyon played an important and integral part in the defense of these communities. Shulman felt that the ancestral Puebloans were forced to build towers as defensive mechanisms to combat the increased violence of the Pueblo III period.

Also during the 1950s, archaeologist Carroll Riley (1950) examined the towers at Hovenweep focusing on violence during the Pueblo III period. Riley concludes that the Hovenweep towers were tangible evidence of the unsettled conditions of the northern San Juan region during the decades prior to the region’s depopulation in that they demonstrate formalization in construction, they are difficult to enter, and contain windows that could have been used for shooting arrows (Riley 1950). The isolated locations of the Hovenweep towers strongly suggested to Riley (1950) that towers were not used as habitation structures.

Towers as astronomical observatories became a prominent idea during the 1970s (Ellis 1975; Reyman 1975; Williamson et al. 1977). Williamson et al. (1977) noted a high frequency of tower alignments with equinox and solstices at Hovenweep. In particular, they found solar alignments in three rooms at Hovenweep,
including one attached to a kiva. From ethnographic data on Puebloan communities, it can be assumed that astronomical observances probably served a role in agriculture and tracking the movements of celestial bodies and was likely important in timing ceremonies and constructing ritual calendars (Williamson et al. 1977).

Also beginning in the 1970s, investigating towers as ritual structures became a pervasive theme. Rohn (1971) argued that towers’ frequent association with kivas points to their ceremonial use. Mule Canyon Ruin in southeastern Utah (discussed in Chapter Four) is one such example of a tower-kiva complex with a tower and kiva attached by an excavated subterranean tunnel. From excavations at Hovenweep, Winter (1981) cites the presence of ceremonial artifacts such as kiva jars holding a wide array of faunal bones as evidence of the towers’ ceremonial purposes. Cedar Tree tower on Mesa Verde contains a sipapu, a feature that appears frequently in kiva construction and is linked to ceremony and ritual (Fewkes 1921). Towers across the northern San Juan region from the late Pueblo II period are most commonly found in association with kivas (Fetterman and Honeycutt 1987). Sites that consist of a tower and associated kiva depression have been recorded on the Canyon of the Ancients National Monument at sites such as Lightning Tree Tower (5MT1691) and site 5MT4878 (Varien 1999). At Mesa Verde National Park, archaeologists have documented numerous examples of tower-kiva complexes (Hayes 1964; Rohn 1977; Smith 1987). Excavated examples of towers and kivas connected by a subterranean tunnel include Far View Tower and Cedar Tree Tower, both in Mesa Verde National Park.
In the late 1970s and early 1980s, there was a large-scale attempt undertaken to understand the towers at Hovenweep National Monument by San Jose State University. The Hovenweep National Monument data were compiled from test excavations at five different tower sites completed in 1976 (Winter 1977). The sample consists of seven individual towers at six different tower sites where test units and trenches were dug. None of the towers were completely excavated. The objective of the Hovenweep Project was to “reconstruct the Anasazi agricultural system at Hovenweep and the surrounding ruins on Cajon Mesa” (Winter 1976:1). The project tested a total of 30 sites to understand relations of economic change and growth for the communities of Cajon Mesa. The towers were intentionally chosen for test excavations because they were assumed to be locations of “economically related rituals, processing activities and perhaps even storage and consumption activities” (Winter 1977:5).

Winter (1981) suggests that the tower category is actually an architectural rather than functional classification. Winter found enough variety in the artifact and feature assemblages in towers that they could be classified better by their structural form than by the activities that took place within them. Winter is credited with creating a coherent set of tower type definitions: isolated towers standing atop boulders or at canyon rims; integrated towers included structures architecturally integrated into room blocks or kivas; and Unit Pueblo towers which pertains to small, crudely constructed towers that are part of Prudden Unit ruins on the mesa tops, away from canyon edges (Winter 1981:29). On the basis of the excavation results, Winter (1981) argues that towers served a number of economic and agriculturally related
activities. Winter posits that the overarching use of towers was likely oriented toward the successful maintenance of a farming economy. Winter (1981) also created a timeline for the towers at Hovenweep. In tracing the changes in architectural style and use through time, Winter saw a development from the small, crudely built mesa top tower of Pueblo II and early PIII to the imposing, multiple story towers of the late Pueblo III period. Furthermore, Winter found the small towers attached to PII-III mesa top unit pueblos were associated primarily with kivas, thus suggesting a religious function. The later Pueblo III towers, in contrast, seemed to have been used for a variety of socioeconomical purposes such as food preparation and storage (Winter 1981). Because Winter’s Hovenweep data is part of my larger tower sample, I discuss the attributes of each of the tower sites excavated and recorded by Winter (1977).

**HOV 685**

HOV 685 is a small site located along the rim of Big Ruin Canyon, which is a tributary to Cross Canyon. Ceramics from the site date from the PI to the PIII period. The site consists of four kivas, a possible plaza, rim dam, talus walls and one tower.

The tower at HOV 685 is a D-shaped structure constructed of pecked sandstone blocks and dates to the Pueblo III period (Winter 1977). Excavations of the tower uncovered walls that were several meters in height. The structure’s foundation was built on bedrock. The floor surface was the natural bedrock, and floor artifacts included three grinding bins, two metates, and three manos (Winter 1977:27).
5MT116

This mesa top site consists of seven rooms, a kiva, a tower and a midden. There were five test trenches placed at the site which bisected one room, the tower, the midden and possible farm land East of the site (Winter 1977:49). The test trench in the tower revealed a “poorly constructed” circular tower made with lightly shaped sandstone blocks (Winter 1977:50). Although a use surface was defined, there were no artifacts or features associated with the tower (Winter 1977:50).

Holly House and Boulder House: 5MT602

This site is comprised of both Holly House and Boulder House, both of which make up a tower complex located at the head of a tributary of Bridge Canyon. The site also consists of a series of dams and terraces (Winter 1977:36). Ceramics and dendrochronology samples date the site’s occupation to the Pueblo III period.

The Holly House tower is a rectangular tower comprised of multiple rooms and is thought to have been two or three stories in height (Winter 1977:212). Excavations of the Holly House tower yielded considerable food processing material. The floor of this tower yielded one McElmo black on white kiva jar, a Mesa Verde corrugated vessel, and a Hovenweep corrugated jar that contained the skeletons of a rabbit, three lizards, two birds, a mouse and a toad (Winter 1977:39). Floor contact artifacts also included grinding stones, a serrated biface, and a fire pit (Winter 1977:39). Dendrochronology samples retrieved from the one of the canyon rim towers range in dates from A.D. 1246 to 1267 (Winter 1977:39).
The second tower excavated at 5MT602 is Boulder House, a rectangular tower with multiple interior rooms and was likely two or three stories in height (Winter 1977:212). The artifact assemblage found on the plastered floor produced artifacts associated with food processing, much like the canyon rim tower. The floor of the tower yielded a fire pit, two projectile points, bone awls, a bone scraper, and sherds from a Mesa Verde corrugated jar (Winter 1977:212). Tree ring samples from this tower date the structure’s construction to no earlier than A.D. 1201 (Winter 1977:39).

5MT771

This large unit pueblo is located on Cow Mesa several kilometers north of Big Ruin Canyon. The site consists of several rubble mounds, three kivas, a tower, two large middens and several farm terraces (Winter 1977:46). One of the eight test trenches placed at the site examined the tower, revealing it to be a circular structure constructed of double coursed walls (Winter 1977:46). No floor surface or floor artifact or feature assemblages were found (Winter 1977:46).

Twin Towers: 42SA1955

More commonly referred to as the Twin Towers site, 42SA1955 is a large cluster of towers, roomblocks, kivas, several middens and check dams, and talus terraces located above a spring near the head of Little Ruin Canyon (Winter 1977). Ceramics and pecked stone architecture suggest that this site dates to the Pueblo III period. Test trenches, intended to recover economic data, were placed in the northern
room of the western tower, the kiva, the canyon rim dam, and three talus terrace walls (Winter 1977).

The test trench in the northwest room of the west tower of this site uncovered a rectangular floor plan with several meters of collapsed wall rubble which has led Winter (1977:34, 212) to suggest that the tower was originally over two stories tall. Wall construction material consisted of shaped and pecked sandstone blocks. The tower floor was constructed of thick plaster laid down upon cultural fill (Winter 1977:34). The floor artifact assemblages were made up of an intact Mesa Verde black on white mug, olla, kiva jar, corrugated jars, and a spindle whorl (Winter 1977:212). The floor itself was modeled with the imprints of human footprints in the plaster (Winter 1977:34). Dendrochronology samples date the structure to no earlier than A.D. 1232.

42SA4892

42SA4892 is located on the southern rim of Little Ruin Canyon. Ceramics and Mesa Verde style architecture point to a Pueblo II and Pueblo III period occupation (Winter 1977:22). The site consists of an L-shaped roomblock that wraps around a kiva depression, a tower to the south of the kiva and a midden located to the southeast and a tower. Nine test trenches were placed in different portions of the site including the roomblock, kiva depression, tower and midden. The test trench in the tower did not uncover any defined walls although the site map suggests that the tower was circular (Winter 1977:Figure 7). Excavation did yield a lens of sherds and lithics
under a layer of wall fall and above sterile soil. There does not appear to be a floor nor were there any floor features detected.

**Other tower research**

David Johnson (2003) completed a study which focused on thirteen tower sites around Hovenweep National Monument in southwest Colorado. He tested the hypothesis that Pueblo III towers were constructed and used to enable visual monitoring of valuable resources such as agricultural fields. Johnson’s GIS analysis indicated that the tower viewsheds were focused on the land best suited for dry farming (Johnson 1999, 2003). Johnson argued that the location of towers would have captured attention of anyone entering the area and the towers would have posed as sentinels, manned or unmanned, guarding important resources. In other words, towers would have served as markers of land tenure for the communities who constructed them.

Some of the most recent tower research, presented by Diederichs and Dr. Glowacki in a 2007 Society of American Archaeology poster, has focused on the spatial distribution of 105 Pueblo III tower sites at Mesa Verde National Park including a selection of sites in the Mancos and Johnson canyons to the south of the National Park (Diedrichs and Glowacki 2007).

The key results of this research discussed by Diedrichs and Glowacki (2007) are as follows:

- 61% of sites with towers were habitation sites; 39% of sites were either isolated towers or tower-kiva complexes.
• 70% of sites with towers had 10 associated rooms or less.

• Of the 82 sites with data on environmental settings, 18% were located on mesa tops, 20% on canyon rims, 40% on talus slopes or in alcoves, and 8% in canyon bottoms.

Diedrich and Glowacki’s research shows that towers in Mesa Verde National Park and closely associated areas are located in diverse environmental settings and are present at small and large habitation sites as well as in specialized contexts. This diversity has caused them to argue that towers served multiple roles.

Other current tower research includes Glowacki’s (2006) PhD dissertation which discussed towers as an example of public architecture within the larger social landscape of the Pueblo III period in the northern San Juan region. Glowacki is one of the first scholars to define towers as exclusionary structures and discusses how this affects the focus of tower activity. Glowacki (2006) suggests that towers and other types of exclusionary architecture such as enclosing walls and multi-walled structures emphasize differences between community members and others and possibly indicate social inequalities and differential access to power.

From the 1990s to the present there has been a great deal of research on the Pueblo III period of northern San Juan region (see Adler ed. 1996; Glowacki 2006; Lipe and Varien 1999; Varien and Wilshusen eds. 2002). Much of the archaeological work accomplished during these years was undertaken by Crow Canyon Archaeological Center focused primarily on the large, aggregated canyon head communities that dominate the southwestern Colorado landscape (Varien and Wilshusen 2002). Many of these sites have towers associated with them. Excavations
conducted by Crow Canyon Archaeological Center researchers at Yellow Jacket Pueblo (Kuckelman 2003; Ortman et al. 2000), Sand Canyon Pueblo (Bradley 1992; Kuckelman et al. 2002), Castle Rock Pueblo (Kuckelman 2002), and Woods Canyon Pueblo (Churchill 2002; Ortman 2000) provide an in depth look at the social landscape of the Pueblo III period and include specific reference to towers. Below I have outlined the relevant site and tower information from four of the sites recorded by Crow Canyon Archaeological Center that I used in this thesis.

**Sand Canyon Pueblo 5MT765**

Sand Canyon Pueblo is a large Pueblo III canyon head community that was occupied from A.D. 1240-1270. It was excavated in the 1980s (Bradley 1992l; Crow Canyon Archaeological Center 2004; Kuckelman 2007; Ortman and Bradley 2002). The following description of Sand Canyon relies heavily on Kuckelman’s (2007) architectural chapter from the online Sand Canyon site report that is supplemented by information from the Crow Canyon database (Crow Canyon Archaeological Center 2004).

Sand Canyon consists of 420 rooms, 90 kivas, 14 towers, an enclosed plaza, a D-shaped multi-walled structure, and a great kiva (Ortman and Bradley 2002). The site is located around a spring at the head of a tributary drainage for Sand Canyon. The community is bounded by a site-enclosing wall and is situated on both the canyon rim and the slopes below. Although there are 14 towers at Sand Canyon, only five towers were recorded in detail, and four others were partially excavated. Towers at this site were inferred by high rubble mounds that were either circular or D-shaped
(Bradley 1992). During the excavations at Sand Canyon, the amount of rubble associated with individual structures was not quantified and therefore was not used to estimate the number of original stories. Instead, multiple stories were inferred on the basis of the continuation of intact masonry above at least one roof-beam socket or roof-support ledge (Kuckelman 2007).

*Figure 2.2: Site map of Sand Canyon Pueblo. (Crow Canyon Archaeological Center 2004).*

**Tower Architecture**

The towers at Sand Canyon are an interesting mix of construction methods and the data collected during their excavation are extremely useful for comparison to towers elsewhere in the northern San Juan region. Tower 101 is a D-shaped structure
located within an architectural block directly to the west of the canyon head and north of the spring. Tower 101 abuts the north face of the site-enclosing wall which suggests that the tower was built at the same time as the enclosing wall or shortly afterwards (Kuckelman 2007). The structure has been labeled a "tower" because it is D-shaped and is in a special location (outside the site-enclosing wall). Although Crow Canyon scholars argue that the label does not imply any specific function, it is suggested that since there is no preserved access linking the interior of the tower to the outside, it is possible that the design was defensive (Crow Canyon Archaeological Center 2004). Tower 101 was dated using a single tree ring which provided an A.D. 1250 date suggesting that the tower was either constructed or repaired sometime after A.D. 1250 (Kuckelman 2007).

Tower 101 yielded “appreciable quantities of de facto refuse” (Kuckelman 2007) suggesting that the site occupants did not take many of their possessions with them as they left or the tower was used as a midden prior to departure. This is a common theme that reappears at many other structures at Sand Canyon Pueblo. Although the abandonment patterns of Sand Canyon are interesting, what is pertinent to this study is the type of refuse that was collected from Tower 101. The interior of Tower 101 contained a fire pit suggesting either the need for light, heat or food processing activities (Crow Canyon Archaeological Center 2004). The latter interpretation is strengthened by the recovery of a complete slab metate. Two niches in the tower wall and the head of a sandstone animal found in the structure fill suggest that tower might have had ritual significance. The variety of data compiled from this
structure suggests that it could have been used for multiple different functions including defense, storage, domestic or ritual activities.

Tower 212 is part of Architectural block 200 which is located along the western edge of the site and backed up against the inside of the site-enclosing wall (see Figure 2.3). Tower 212 had an extremely interesting and unique use life. Excavation data from Tower 212 shows that the tower is a circular structure that was remodeled into an above ground kiva (Kuckelman 2007). No other excavated kivas at Sand Canyon were built inside of pre-existing aboveground, circular structural features. “Characteristics of the walls of the southern recess of Kiva 208 suggest that Tower 212 was modified into a kiva...These characteristics include the asymmetrical shape of the southern recess, the irregular width of the interior wall that forms the southwest corner of the recess; and the probable abutting of the narrow, exterior south wall of the southern recess to the southeast corner of Room 211” (Kuckelman 2007).

![Figure 2.3: Close up plan map of Tower 212 that was remodeled into a kiva. (Crow Canyon Archaeological Center 2004).](image)
The fact that Tower 212 was remodeled into a kiva strongly suggests that towers were considered a functionally different architectural category from kivas. Some scholars argue that many features that have been identified as unexcavated towers are actually above ground kivas (Kuckelman, personal communication 2009). However, the evidence of a tower being later converted into a kiva suggests instead that the two structures may have functioned very differently.

The third tower excavated at Sand Canyon was Tower 1019/1008, located in Architectural block 1000 and is abutted against the inside of the site-enclosing wall, across from block 100 directly to the east of the canyon head and north of the spring. Tower 1019/1008 is a D-shaped structure and constructed outside of the site-enclosing wall, abutting the wall’s northeast face. Adjacent to Tower 1019/1008 to the south, is another possible D-shaped tower that was unexcavated. Evidence from Tower 1019/1008 suggests that the structure was two stories tall, although interestingly, the lower structure (Structure 1008) was quite short with first story beam sockets reaching only 1.2 to 1.5 meters in height (Kuckelman 2007). The ceiling height of this lower story of the tower suggests that it was not likely used for habitation. However, in the case of this tower, two fire pits and a variety of artifacts including a metate fragment, two complete manos, two complete and one fragmentary axe, a polishing stone, a projectile point, a complete jet pendant, eggshell, a peckingstone, some shaped slabs, animal bones, and many sherds and flakes, suggests that that Tower 1019/1008 was not used only for storage (Crow Canyon Archaeological Center 2004). Before Tower 1019/1008 was constructed, three loopholes built into the site-enclosing wall would have afforded views of the
landscape outside of the site perimeter (Kuckelman 2007). From atop the tower, one would have benefited from a much more expansive view of the landscape. The construction of Tower 1019/1008 was simultaneous with the construction of Room 1002 which covered up two of the loopholes rendering them useless for viewing. This apparently intentional construction that obscured the view from the loopholes suggests that either the loopholes were no longer needed or the tower replaced them as a lookout. Furthermore, Tower 1019/1008 appears to have been the only multiple story structure associated with Block 1000. Doorways in Tower 1019/1008 connected the spaces between the site-enclosing wall and the courtyard associated with block 1000. A possible second story doorway in Tower 1019/1008 would have linked the second story of the tower with the roof of Room 1002. De facto refuse was found in the lower room (1008) of the tower along with the presence of an informal hearth (Kuckelman 2007). Although a violent event is associated with the abandonment of Block 1000 that resulted in the deaths of multiple individuals who remained unburied, there were no human remains found within Tower 1019/1008 (Kuckelman 2007).

The last tower excavated at Sand Canyon was located in Architectural Block 1200 which, similar to Block 1000, is situated against the eastern edge of the site between the site enclosing wall and the edge of the canyon rim. Tower 1203 is a circular structure that is argued to have been built before the rest of the architectural block (Kuckelman 2007). The tower was constructed on bedrock and at the very edge of the canyon rim. There is no remaining evidence of a doorway for Tower 1203 and it is suggested that the tower was entered through a crevice in the bedrock floor of the structure (Kuckelman 2007). A single tree ring associated with Tower 1203 yielded a
date of A.D. 1169 which is believed to represent either a damaged or reused beam and
does not accurately reflect when the tower was constructed (Kuckelman 2007).
However, in the interest of this study, the construction date is less important than the
fact that the tower exhibits evidence of roofing; evidence for which is relatively
uncommon.

*Woods Canyon Pueblo: 5MT11842*

Woods Canyon Pueblo is a large aggregated community center that was
occupied from A.D. 1140 to the late 1200s. It is located along the northern canyon rim
of Woods Canyon in southwest Colorado with architecture spilling down off the rim
on the talus slope and canyon bottom below. A spring is located at the base of the site
in the canyon bottom. The site was recorded and tested by Crow Canyon
Archaeological Center from 1994 to 1996 (Churchill 2002).
Figure 2.4: Site map of Woods Canyon Pueblo (Crow Canyon Archaeological Center 2001)
Tower architecture

Of the 16 towers documented at Woods Canyon Pueblo, the published discussions of the structures are vague and only consistently refer to their general geographic location at the site. My description of the towers at Woods Canyon Pueblo is limited to discussing the superficial location of towers at the site and supplemented by the irregular mention tower attributes noted in the published text.

Six of the towers at Woods Canyon Pueblo are located on the canyon bottom below the canyon rim and at the base of the talus slope. These towers are prominently constructed atop detached boulders (Churchill 2002). The lack of mention of structure shape suggests that the towers were most likely circular since this is the most frequently documented tower shape across the northern San Juan region. Other architectural features associated with the towers at the canyon bottom are agricultural features such as low masonry walls that likely represent terraces for gardening and water control (Churchill 2002).

Along the eastern talus slope, five more towers were constructed adjacent to and east of the drainage. One of the towers was reported to be square in shape suggesting that the rest were circular, although this was not specifically stated (Churchill 2002). There is no mention of the towers physical association with other architecture suggesting that the towers were isolated features. Other features found at this part of the site are 11 to 18 residential units, kiva suites, and two middens (Churchill 2002).

Four of the 16 towers at Woods Canyon are clustered on the canyon rim. This portion of the site is situated along the northeastern perimeter and is bounded to the
north by a site-enclosing wall (Churchill 2002). Features associated with this rim complex include several towers, a D-shaped structure, a kiva, a plaza, and other poorly preserved and defined surface structures (Churchill 2002). Interestingly, the rim complex at Woods Canyon looks strikingly similar to the tower complex sites in the southeast Utah study area (discussed in the following chapter), although D-shaped structures are not known in southeast Utah. Similar to Tower 1203 at Sand Canyon, one of the towers at canyon rim towers at Woods Canyon spans a crevice in the bedrock rim and it is suggested that this opening was the established entrance for the tower interior (Churchill 2002). Furthermore, a masonry structure was constructed directly below the crevice and the tower above suggesting that this lower structure may have functioned as a lower story of the tower (Churchill 2002). Three more towers are located along the canyon rim but are outside of the clustered rim complex. Chronology at Woods Canyon Pueblo suggests that the rim complex architecture was built later than the rest of the site architecture (Churchill and Ortman 2002).

Although the towers at Woods Canyon Pueblo are poorly reported, they can be a useful addition to the compilation of tower data that spans the northern San Juan region. Many of the site’s kivas and roomblocks are closely associated with the towers, although according to Churchill (2002), surface recordation has not illuminated whether the Woods Canyon towers were associated with residences or functioned as public architecture. The fact that many of the towers at Woods Canyon were built on detached boulders is congruent with the location of other Pueblo III towers at Hovenweep National Monument (Johnson 2003) and in other parts of the northern San Juan region. Furthermore, the rim complex that includes several towers
is especially important for comparison to the tower complex sites found in southeast Utah. The other towers at the site are also useful when assessing the variable landscape settings of towers which are essential for defining towers as a distinct architectural feature class.

Yellow Jacket Pueblo: 5MT2, 5MT3, 5MT5

Yellow Jacket Pueblo is perhaps the largest Pueblo II and Pueblo III community in southwestern Colorado. Located on the top of a small mesa between two drainages, Yellow Jacket was occupied for over two hundred years and has a complex occupation history (Wilshusen and Mobley-Tanaka 2003). Some researchers suggest that the site was established beginning in 900 A.D. and occupied through 1300 (Lekson 1999:9) while other researchers stretch the site’s beginnings back to A.D. 500 (Lang et al. 1986).

Yellow Jacket Pueblo consists of an estimated 600 to 1,200 rooms, a minimum of 195 kivas, and at least 19 towers (Kuckelman 2003; Wilshusen and Mobley-Tanaka 2005). Other features such as monoliths, petroglyphs, and isolated extramural walls and dams are also associated with the site architecture. Chacoan roads evident at the site are thought to be associated with the great kiva.
Of the 19 possible towers identified at Yellow Jacket Pueblo, 18 were positively identified as tower structures on the completed site map. At Yellow Jacket, towers were inferred from the presence of circular rubble mounds (Figure 2.5) (Kuckelman 2003). Although in the published site report, the towers are not
discussed individually as they are in the Sand Canyon publications, the tower data that are discussed are extremely useful. All 18 of the towers are circular structures with an interior diameter that varied from 2.5 to 6 meters (Kuckelman 2003). The towers are located in 11 different architectural blocks, and are distributed across the expansive site. The towers identified at Yellow Jacket represent examples of many of the different tower types found in the northern San Juan region. Ten of the towers are flanked by kivas to the south, suggesting possible tower-kiva complexes (Kuckelman 2003). In fact, all but two of the towers at Yellow Jacket are close enough to have been connected to kivas. Integrated towers are illustrated by one tower which is physically bonded to the north end of a roomblock in Block 300 and another is incorporated into the architecture of Block 2500. The tower associated with Block 2500 is thought to have had multiple stories. The great tower complex includes four towers, three of which are located in the southwest, northeast and southeast corners of the block. One of these towers is also thought to have been multiple stories. The fourth tower a detached structure adjacent to the spring associated with the site. Kuckelman (2003) argues that the location of the towers at Yellow Jacket Pueblo would have been key defensive features, their positions reflecting beneficial locations for guarding the roomblocks and spring.

**Castle Rock Pueblo: 5MT1285**

Castle Rock Pueblo is a large Pueblo III habitation site located in McElmo canyon that was occupied between A.D. 1260 through the 1280s. The site was
excavated by Crow Canyon Archaeological Center from 1990 to 1994 (Crow Canyon Archaeological Center 2003; Kuckelman 2000).

The pueblo consists of 16 kivas, 40 surface rooms, nine possible towers, a D-shaped enclosure, two plazas, middens, numerous retaining walls, and a site-enclosing wall (Kuckelman 2000). It is situated both around the bottom and top of a prominent sandstone butte. Six of the nine towers at Castle Rock Pueblo have been recorded on the site map and are discussed below. The remaining three towers were designated based on historic photographs and may not have actually been towers (Kuckelman 2000). Three towers at Castle Rock were excavated and are discussed below with the surface data recorded from the other three towers. Towers were identified by high rubble mounds.

Figure 2.6: Site map of Castle Rock Pueblo (Crow Canyon Archaeological Center 2001)
Tower architecture

Structure 207/208 was a multiple story tower wedged between the south face of the sandstone butte and a detached boulder (Kuckelman 2000). This tower was not excavated. The shape of this tower was not definitive and instead seems to have been built to accommodate the irregular space between the butte and boulder. The location of this tower could have been either defensive as suggested by the natural barriers enclosing the structure on two sides or used to access buildings on top of the boulder.

Little architecture from Structure 301 remains preserved and the identification of this structure as a tower is tentative, although the straight south wall suggests that the tower was originally square or rectangular in shape (Kuckelman 2000). Kuckelman (2000) makes only brief mention of the structure in relation to other site features. This tower was identified but not recorded.

Structure 305 is a D-shaped tower situated against the north face of the sandstone butte. Estimated from the quantity of associated rubble laying down slope, it is thought that this tower was originally two stories tall (Kuckelman 2000). The tower itself was protected by the butte and its location is suggested to have been defensive (Kuckelman 2000). Structure 305 was one of the few towers at Castle Rock that was excavated. The floor of the structure contained a hearth with associated burned plant remains and ash, one complete corrugated jar and two complete kiva jars sitting against the wall (Kuckelman 2000). Although the tower’s location is thought to be defensive, the assemblage recovered from inside the tower suggest that food processing many have been the primary activity associated with this tower.
Structure 307/310 was a rectangular tower with multiple stories located on a ledge, midway up the north face of the sandstone butte. This tower is thought to have reached 3.5 meters in height (Kuckelman 2000).

Structure 401 is a circular tower located at the northwest edge of the site and was also excavated by Crow Canyon. It contained a hearth and grinding tools (Kuckelman 2000). Although the location of this tower is thought to have suggested a defensive function, the feature and artifact assemblage suggests that food processing was also a predominate activity.

Structure 404/409/410 is a rectangular tower situated at the northeastern edge of the site. This excavated tower represents the only solid evidence of multiple stories, where beam stubs projected from the inside faces of the preserved north and east walls and a historic photo illustrates evidence that this tower was at least three stories tall (Kuckelman 2000). There is no information on the height of the ceiling.

Kuckelman (2000) suggests that the towers at Castle Rock were predominantly used for defense, providing protection and as a place to store food provisions in case of an attack. The interior features and artifact assemblages recovered from some of the excavated towers also suggests a domestic component. It is likely that the towers at Castle Rock provided a space for multiple different functions depending on the varying needs of the community members. It is possible that domestic activities taking place within the towers could have been replaced by defense in times of need (Kuckelman 2000).
Summary

This chapter has delved into the natural environment and social landscape of the Pueblo III period considering the northern San Juan region as a coherent geographical and social community. The diverse environmental settings across the region and the individual settlement patterns of the distinct sub-regions would have created whole suites of unique social interactions and relationships between participants of the Mesa Verde culture creating the context from which towers developed. This chapter also traces the development of tower research within the discipline of archaeology, focusing on the research and explanations pertaining to tower function. This research has lead to a considerable wealth of knowledge about the prehistoric trajectory of towers in the northern San Juan region.

The social landscape of the late Pueblo II and the Pueblo III periods was a time of significant change, both politically and environmentally. Aztec replaced Chaco as the new regional power and the communities of the northern San Juan underwent an organizational transformation with people aggregating together to protect against growing violence and waning natural resources. Among other new architectural forms, towers became popular forms of construction and could be found across the entire northern San Juan region. It is likely that tower function was a response to the suite of changes that characterized the Pueblo III period. Many of the functions discussed in this chapter (defense, territory/boundary marking, resource monitoring, and social identity) can be seen as cultural responses to the political and environmental landscapes during this time.
The previous research on towers in southwest Colorado and Hovenweep National Monument strongly support the theory that towers were built in response to the turbulent late Pueblo II and Pueblo III periods. The excavations of the towers at Hovenweep have indicated that they were used as activity areas for the processing and storage of food while the work of Crow Canyon at sites such as Sand Canyon Pueblo and Castle Rock Pueblo suggest that towers were used as means of defense, to store food in case of an attack or simply for food processing or domestic activities. Towers at Yellow Jacket indicate a closer relationship with kivas and resources such as water. Woods Canyon towers are also thought to be closely related to the roomblocks and kivas at the site although their location on detached boulders and along the canyon rim inside the site-enclosing wall may also suggest that they were defensive structures or used to create a boundary between the site and the outside world.
Chapter 3

Methods: Investigating towers in the northern San Juan region

The following chapter describes how my southeast Utah tower sample was selected and the geographic landmarks of my project boundaries. It outlines the different criteria that I chose to record to allow for the independent evaluation and assessment of my results. My fieldwork involved recording overall site information from each site, including architectural documentation of the towers and artifact counts. Many sites were completely re-mapped and all were photographed. The main considerations during data collection were: 1) construction attributes; 2) site attributes; 3) landscape and ecological features (see Appendix A for the tower recordation from created for this research). The latter portion of this chapter discusses the larger database of towers including the tower sites in southwest Colorado as well as methodological and sample issues and concerns. Finally, I examine the ways that tower attributes relate to function.

Study Area

The boundaries of my southeast Utah study area are defined by the western slope of Cedar Mesa to the West, White Mesa to the East, the San Juan River to the South and Whiskers Draw to the North (Figure 3.1). This area covers a considerable portion of San Juan County, Utah. I chose this particular area because it represents part of the western periphery of the northern San Juan region and is less well researched and understood than southwest Colorado and its surrounding communities.
to the east. Although tower sites are found across much of southeastern Utah and southwestern Colorado, I chose to define my study area based on arbitrary geographic landmarks such as White Mesa and Whiskers Draw in order to keep my sample at a reasonable size for the scope of this thesis project. To the east, Cedar Mesa represents what has traditionally been established as part of the western periphery of ancestral Puebloan culture (Adler 1996; Glowacki 2006; Lipe and Varien 1999; Varien et al. 1996). My study area was limited to sites on Bureau of Land Management property.

The data from the Comb Ridge Heritage Initiative, more commonly referred to as the Comb Ridge Survey Project (CRSP) headed by Winston Hurst and Dr. Catherine Cameron provided a useful base which I used to center my study area.
boundaries, although the western and eastern boundaries of my study area are slightly expanded to include a larger tower sample. The CRSP has completed one of the most intensive recent efforts to do detailed documentation of the sites along Comb Ridge, North of the San Juan River. The study area for the CRSP includes the length of Comb Ridge between the San Juan River and north to the old highway 95. Both sides of Comb Ridge, Butler and Comb washes were also included within the project boundary.

Tower Sample

In order to identify all known towers in my study area I reviewed the Comb Ridge Survey Project database as well as the Utah State Historic Society digital database of site forms. Conversations with Winston Hurst also resulted in the addition of sites into my data set by identifying known tower sites not yet in either the CRSP or Historic Society databases.

I developed a set of attributes that would allow a more complete understanding of the form and construction of towers, as well as their social and natural settings. I focused primarily on Pueblo III period towers, although some tower sites straddled the Pueblo II and Pueblo III transition, relying on the painted ceramics present on the site surfaces and McElmo-style masonry that had been recorded in site forms. I field-checked every site that included supposed towers.

During my field work, towers that were badly eroded or not well preserved, I identified based on large piles of masonry rubble that were commonly circular although I did not rule out square, rectangular, or sub-rectangular shapes. Upon
visitation, if a tower did not meet my established definition it was eliminated from my sample. This process at times only eliminated individual towers from an overall site while at other times required the removal of an entire site from my database. The previous inventories of tower sites from the Comb Ridge Survey Project and the Utah State Historical Society database combined to produce 15 known tower sites within my proposed study area, with a total of 40 towers.

**Attributes used in the analysis**

The suite of attributes that I used to record towers include descriptions of each tower (type, shape, masonry shaping, wall coursing, technique of masonry construction, wall width, interior space, orientation of entrance, height of standing masonry, estimated original height, evidence for multiple stories, evidence of roofing, bonding or abutment to other structures, and other features), variables concerning the relation of towers to the sites in which they occur (site size/type, site location) and variables that record the relationship of these towers to their landscape as well as their viewshed. A systematic look at these attributes is an important step towards understanding how they relate to function. For example, how towers are related to other site architecture such as site-enclosing walls may relate to a defensive or boundary marking function. Similarly, tower wall construction including width, stone shaping and the use of mortar may indicate how important the stability and contents within the tower were to the builder. Perhaps the tower was built to store food or was a place to seek refuge from an attack.
Attribute 1: Tower type

1. Detached
2. Integrated
3. Tower-kiva complex

Three tower types were defined based on the association of towers with other structures and features. The spatial association of towers with other structures was another element of my in-field recordation and is important when attempting to assess the relationship between a tower and its surrounding built landscape. What makes this attribute so important is the inherent physical distinction between these three contexts. The construction of each of these tower types would have required a premeditated agenda prior to constructing the tower. A tower’s physical relationship to other structures and to the site itself was probably a significant factor for interpreting a tower’s function in the society.

Tower association within the site was addressed in terms of proximity to other structural features such as rooms, room blocks, retaining walls, enclosing walls and kivas. *Detached towers* are free-standing structures that are not physically bonded to other architectural features or structures. These towers are detached from other architecture but are still be associated with a site. Detached towers are different from isolated towers in that they are still associated with a site with other domestic architecture. Truly isolated towers are found in southwest Colorado, but there are no isolated towers in the southwest Colorado/Hovenweep sample I have collected. Furthermore, I have not included detached towers in the integrated tower category because I think there is a significant human decision involved when deciding whether to build a tower in the middle of a roomblock as opposed to 15 meters away from
other architecture. For a schematic example of a detached tower see Feature 1 in Figure 4.2.

Integrated towers are tower structures that are physically bonded to other architectural features such as retaining walls or above ground masonry rooms. For a schematic example of an integrated tower see Figure 4.9. Tower-kiva complexes are a type of integrated tower which is defined separately because of its unique association with a specific structural form: a kiva. A tower-kiva complex demonstrates a direct connection between a tower and a kiva. This is commonly evidenced by a subterranean tunnel linking a tower to a kiva structure. Tower-kiva complexes are different from a tower kiva which is a multiple story kiva rather than being two separate, but associated structures (a tower and a kiva). For a schematic example of a tower-kiva complex see Figure 4.8.

Attribute 2: Tower shape

1. Circular
2. Rectangular
3. Square
4. Sub-rectangular
5. D-shaped
6. Irregular

Although towers are commonly assumed to be round, not all are. I defined six tower shapes (see Figure 3.2). A variety of tower functions could be accommodated by almost any number of shapes, thus it is possible that tower shape reflects an aesthetic or symbolic quality. Recording tower shape also allows comparisons between towers and shapes of other types of architecture. For example, pithouses are commonly circular structures and kivas continue this traditional domestic shape
whereas rooms and roomblock suites are usually square or rectangular. Examples of public architecture have been recorded as D-shaped. Tower shape can add to this growing catalog of the trends of structure shape. As a distinct architectural class, towers should be confined to a pre-defined set of shapes which allows for the exploration between the similarities and differences in tower shape in relation to other architectural features of the Pueblo III period.

Tower floor plan was used to define tower shape. While some towers have been well preserved and their shape is easy to ascertain, it was sometimes difficult to define tower shape from badly eroded towers with little or no standing architecture. Tower shape was only documented if foundation stones were in place making it possible to infer an overall shape.

Circular towers were defined by the lack of squared corners. Square towers had 90-degree angled corners and all four walls were the same length. Rectangular towers also had 90-degree angle corners but two parallel walls were longer than the two
perpendicular walls. Sub-rectangular towers were mostly rectangular in shape but with obviously rounded corners. D-shaped towers had an arcing/semi-circular wall and a straight wall with two 90-degree corners. Irregular shaped towers often seem to have been built to fit the location in which they were constructed (e.g. conforming to the top of a boulder or set between a boulder and cliff face).

**Attribute 3: Masonry shaping**

1. Unshaped
2. Shaped

The effort and labor to prepare shaped, regular building blocks implies time investment and perhaps importance whereas unshaped stones could be used to build a stable structure but was less labor intensive (Rohn 1971:45). Builders during the Pueblo III period were adept at building beautifully constructed buildings and the realm of knowledge and ability it took to shape stone had been well engrained in the culture since the Pueblo II period if not before. Therefore, building towers using shaped stone was a conscious and voluntary decision to formalize how towers were presented and created extra effort in construction.

Masonry shaping was identified by the shaping of natural stone blocks or slabs. Shaped stones were commonly of similar shape and size. Unshaped stones have rough edges and corners and there was additional effort to shape the stone. Digital photographs were taken of all towers with standing masonry in order to document the differences between shaped and unshaped stone.
Attribute 4: Horizontal wall coursing

1. Single course
2. Double course
3. Compound

The number of horizontal courses used in wall construction created narrower or wider walls, which may relate to the original height. Single cours ed walls by definition creates a narrower wall which might have been less stable than a double coursed or compound wall that could support a taller structure.

There are three types of horizontal coursing: single, double and compound masonry. Single cours ed walls are one stone wide whereas double coursing consisted of two parallel courses of stone stacked next to each other.

Compound masonry is a variant of double coursed masonry with some stones overlapping between the two coursings.

Wall coursing was identified by counting horizontally across the top of intact masonry and confirmed by looking at a wall cross-section, if possible.

Attribute 5: Presence/absence of mortar

1. Dry-laid
2. Wet-laid

The presence or absence of mortar was recorded as either dry-laid or wet-laid.

Wet-laid masonry has a mortar bed between stacks the building stones whereas dry-laid masonry lacks mortar. The mortar used by the prehistoric builders is a mud mortar made from clay, or a mixture of clay, sand and water. Mortar creates a
stabilized bed for stacking irregular shaped stones and makes walls stronger by eliminating gaps between stones and decreasing the shifting of the masonry. Mortar would more likely have been used in structures that were roofed or needed extra stability as well as creating a barrier between animals, humans, the environment, weather and the tower interior. If the time and additional resources were available, the presence of mortar suggests an emphasis on sturdy construction which may indicate differences in tower function.

![Figure 3.4: Examples of wet-laid masonry (left) and dry-laid masonry (right).](image)

In the field I differentiated between dry-laid (no mortar) and wet-laid (mortar used) construction methods by assessing whether or not mortar was present in the intact masonry. At times this designation was inconclusive given the varying condition and preservation of the towers. I could not always systematically decide whether mortar was not present or had just eroded away so all judgments were made to the best of my ability, based on the presence or absence of mortar. Digital photographs were taken of all towers with standing masonry in order to document the differences in dry-laid and wet-laid construction techniques.
Attribute 6: Average wall width

The width of a wall was an important structural element in creating wall stability. It can also help assess the estimated original height of a structure as thicker walls commonly support taller buildings than thinner walls. Because most towers today do not stand at their original height, measuring the width of the remaining walls is one of the primary means of estimating the original tower height.

Wall width (cm) was measured horizontally across at least two different places along the standing wall and then averaged for the most representative measurement. The average wall width was then rounded to the nearest tenth of centimeter.

Attribute 7: Interior space

Calculation of the interior area within a tower allows the assessment of how many people could have fit within a tower or the amount of room that would have been available for food processing or food storage. Towers with large interior space could have afforded a different suite of activities involving more people or more food for a larger group than towers with smaller interior space.

For circular structures, the interior structure diameter (meters) was measured from the interior of one wall to the interior of the opposite wall. For square, rectangular and sub-rectangular towers two perpendicular measurements were taken to record the interior distances between each set of parallel walls. The interior of D-shaped towers were recorded similarly to the rectangular towers where the length of
the interior of the straight wall was recorded as well as the distance from the center of the straight wall to the apex of the arced/semi-circular wall.

Attribute 8: Tower entrance

1. Door absent
2. North
3. South
4. East
5. West
6. North-east
7. North-west
8. South-east
9. South-west
10. Floor entrance
11. Roof entrance
12. Foundation level entrance

The entrance of a tower indicates how space was organized within the tower and also how the tower relates to its surrounding landscape. The presence of a foundation level entrance might indicate the importance of easy access or a lack of concern with security, while if the tower was accessed through the top or through the floor as was the case in tower-kiva complexes, this might suggest more concern with security or a symbolic reason.

I also recorded the cardinal or intermediate direction of foundation level entrances. Cardinal directions were recorded not only to understand the orientation of the tower to the landscape, but to attempt to discern if there was a common pattern to this orientation. The presence or absence of a foundation level tower entrance was the
first detail recorded. Of the towers that did have evidence of a foundation level entrance, the direction was recorded using a compass while standing in the middle of the tower structure facing the tower entrance (i.e. from interior perspective).

Attribute 9: Height of currently standing masonry

The height of the standing masonry was used in association with quantified wall fall to estimate the original tower wall height. The current wall height can also be used as a benchmark for monitoring the preservation of the tower in future years and as an indication of the degree of deterioration that has occurred since abandonment of the structure. The height of currently standing masonry (in centimeters) was measured vertically from the modern ground surface to the top of the tallest intact tower wall coursing.

Attribute 10: Estimated original height

Tall towers would have allowed for a more expansive viewshed and would have been more visible from greater distances away. Conversely, shorter towers would have been less visible from far away and likely would not have commanded the same view of the landscape. These differences may relate to a fundamental difference in how towers functioned. An emphasis on verticality suggests adequate resources and or an importance of visibility, while shorter structures suggest a conscious decision away from visibility. This dichotomy of appearance likely affected the role that towers preformed. Tall towers might have been more often associated with functions that required visibility including line-of-sight
communication, defensive lookouts or places of refuge. Short towers may be more likely related to storage or food processing activities where heightened verticality is not an important element of function.

The estimated original height of a tower was calculated using the height of the standing masonry as a base measurement. If patterned wall fall was evident, I counted the courses and added them to the standing masonry height. If there was no pattern to the wall rubble, I estimated wall height using a rule of thumb suggested by Richard Wilshusen (personal communication, 2009): if collapsed masonry rubble comes up to slightly lower than chest level then it represents a structure between two and three meters tall. The assumptions inherent in this rule of thumb are that the person doing the measuring is standing at about the level of the inferred prehistoric ground surface and that the measurer is between about five and half and six feet tall. Tower height was estimated to the nearest half meter.

*Attribute 11: Multiple stories*

1. Viga sockets
2. Possible ceiling beams

Whether or not towers were one or more stories has implications referring to how interior space was conceptualized and may have implications for inferring function. Multiple stories might indicate that it was used for storage of food (although not a necessity) with the second story keeping the food dry and away from rodents, a ritual reference to multiple worlds or levels, or if found in association with slot windows could have been used for multiple levels for looking out that would have been useful for defense.
I recorded the presence or absence of viga sockets and beams with intact wall masonry continuing above in order to assess the possibility of multiple floors. The lack of evidence pointing to multiple stories is not in itself evidence, because it is possible that evidence for this attribute has not preserved.

**Attribute 12: Evidence of roofing**

1. Viga sockets
2. Presence of roof beams
3. Burned jacal

A roof on a tower suggests that the structure interior needed protection from the outside environment. If towers were used for storage or food processing then it would have been important to keep the harvests dry and clean. If towers were used for defense, a roof would have been one more element of protection from intruders. If towers were used for line-of-sight communication or lookouts, roofs would have allowed an elevated platform for communication. If towers were not originally roofed than it conversely suggests that the activities within the tower were not dependent on protection from outside. For example, if towers were used as astronomic observatories the lack of roof might have created a purposively confined view of celestial and solar movements.

Evidence that towers were roofed was difficult to ascertain. The presence of viga sockets, possible roof beams or burned jacal were three lines of evidence that I used to consider the possibility that towers had been originally roofed. The lack of evidence pointing to original roofing is not in itself evidence, because it is possible that evidence for roofing has not preserved.
Attribute 13: Bonding/Abutment

1. Bonded
2. Abutted

This attribute category only pertains to integrated towers as they were connected to other structures. Whether towers were abutted or bonded with other structures can be used to assess the history of construction at a site. Towers abutted to other structures indicates that the two features were constructed at different times. Towers bonded to other structures suggests that the tower and other structure were built during a single construction episode and that the planning for the two structures were conceived simultaneously.

Bonding and abutment was identified by examining the joints connecting towers and other architectural features such as rooms, kivas or retaining walls. Towers bonded to other architecture through overlapping stones shows a seamless junction between one structure and the next. Abutted walls show an abrupt end of one feature and the wall of a tower. Digital photographs were taken of any structural joints and overall association of tower and other structures.

Figure 3.6: Illustration of a tower (on left) abutted to a site-enclosing wall (on right). (Dry Wash Overlook).
Attribute 14: Wing walls

I had not anticipated finding these low stone walls, but wing walls were found only in association with detached towers on canyon rim. They are arcing dry-laid coursed wall alignments that abut one of the tower walls and extend from the tower wall to the canyon edge. It does not appear that they are footer alignments from rooms or other structures.

I documented the presence or absence of these wall alignments in the field by recording their material type, masonry shaping, masonry type, laying technique, length, width, and height using the same methods as I have discussed above for the towers themselves. I also recorded which wall the wing wall alignment was abutted to and which direction it ran.

*Figure 3.7: Example of a wing wall alignment (feature 8) abutted to tower (feature 1) (from T. Robinson 2008).*
Attribute 15: Viewshed

The viewshed from each tower location is important because it can help us understand the relationship between the tower and the surrounding landscape. An expansive viewshed would have been beneficial for a defensive lookout or line-of-sight communication between settlements. It also means that the tower would have been visible from farther away, either attracting or deterring outsiders. Towers with a less expansive viewshed means that a tower’s presence would only have been noticeable from up close.

![Figure 3.8: Panorama viewshed from tower at Wetherill’s Chimney Rock. (Photo courtesy of Tucker Robinson).](image)

I took UTM coordinates (NAD 83) and elevations from a handheld GPS unit at the center of each individual tower. Digital photographs were taken from each tower location in the four cardinal directions as field verification for the subsequent GIS analysis. In narrative form, any visible prominent natural landscape feature was recorded. The natural attributes in the close vicinity of the towers varied from freestanding boulders, mesa tops, canyon rims, mouths and heads of drainages, edges of drainages, low knolls and the base of talus slopes. Distant, but prominent landscape attributes included mountains (Abajos, Sleeping Ute, Chuska, or the Carizzos), dominant landforms such as Cedar Mesa or Comb Ridge. Line-of-site with other
archaeological sites, major Comb Ridge crossover trails, viewshed up and down
either Butler or Comb Wash, mouths of larger drainages, and the San Juan River were
also referenced.

*Attribute 16: Association of towers with permanent water sources*

1. Presence of seep/spring
2. Absence of seep/spring

Many researchers have looked at the association of towers with access to
natural resources, such as good agricultural land (Johnson 1999) and permanent water
sources (Van Dyke and King 2010). I focused solely on the association of permanent
water sources. Water is a vital resource and it was no coincidence that sites during the
Pueblo III period were often near permanent water sources (Lipe and Varien
1999:327).

To identify site/spring relationships, I noted the
proximity of towers to a
permanent water sources (distance
in meters) based on site forms and
my own observations during in-
field site analysis. A permanent
water source such as seeps, springs,
and productive drainages had to be
within 50 meters of site architecture to be associated with the site itself.

*Figure 3.9: Spring associated with the Picket Towers site.*
Attribute 17: Site type/size with which towers are located

1. Small site
2. Medium site
3. Large site
4. Community center
5. Tower complex

This attribute records the size of site where towers are located. The number of individuals living in a settlement affects relationships with natural resources and agricultural production. Larger sites require a social organization that is capable of handling greater degrees of integration as well as a greater need for defense and more room for storage or areas for food processing.

Using a typology of site size modified how sites are identified by archaeologists in Utah as well as Diedrichs and Glowacki (2007), I defined a scale of site size by the number of rooms evident at the site from IMACS forms or by counting the number of surface rooms at a site during my own fieldwork. Site types included different scales of habitation sites: small sites had 1 to 10 rooms, medium sites consisted of 11 to 30 rooms, large sites had 31 to 50 rooms, community centers had 51 or more rooms and tower complexes were designated by their heavy focus on towers rather than domestic architecture. For example, tower complex sites such as Cave Towers and Dry Wash Overlook are associated with other architecture below the canyon rim, but the sites are considered ‘tower-centric’ because the towers at these site are unquestionably the dominant architectural focus. In other cases, such as Picket Towers (see figure 4.16), sites with domestic architecture are located in close proximity. However, due to how Utah designates its archaeological sites (a concentration of artifacts and features within a +/- 30 meter radius) tower complex sites and domestic sites are separated, despite their possible cultural connection.
Attribute 18: Geographic location of tower sites

1. Canyon rim
2. Canyon head
3. Base of talus slope
4. Canyon bottom/flatlands

Tower sites were characterized by their location on the landscape which I categorized by a number of different geographic locations. Where a site is located on the landscape is a product of several different decisions. As discussed in Chapter Two, Pueblo III settlements are commonly found in defensive locations such as canyon rims or mesa tops (Lipe and Varien 1999:303). Although it can be argued that canyon rims and canyon heads are similar geographic locations because of their high positions, I will continue to separate these two locations because they demonstrate different degrees of visibility of the landscape and that canyon heads are exclusively associated with permanent water sources while canyon rims may or may not demonstrate this association (Lipe and Ortman 2000:107). The base of a talus slopes has a lower elevation but they can also be considered to be a defensive location because the site can only be approached from certain directions. Canyon bottoms or
flatland locations are also geographically “low” points on the landscape and are commonly associated with sites with late Pueblo II period components.

Location was identified for each tower site. For most sites, its location on the landscape was distinct but for sites that overlapped more than one landscape category, I chose the most prominent landscape feature to characterize the site. For example, sites with the majority of architecture found on a canyon rim, but also have structural components below at the base of the talus slope were identified as a canyon rim settlement.

*Attribute 19: Association with site-enclosing walls*

Scholars have suggested a strong correlation between towers and sites with site-enclosing walls (Glowacki and Varien 2003). For example, much of the research that has been completed at village sites in southwest Colorado have noted the presence of towers as part of the site-enclosing wall architecture (Churchill 2003, Kenzle 1993, 1997; Lipe and Ortman 2000). This relationship has caused scholars to argue that towers functioned as defensive structures. I included this attribute as a category in my southeast Utah sample in order to investigate whether or not this pattern persisted in the West Mesa Verde sub-region.

In the field, I recorded the presence or absence of a site-enclosing wall. At sites had a site-enclosing wall, I looked at the individual towers at the site and their relationship to the site-enclosing wall. I differentiated between towers that were constructed as part of the site-enclosing wall architecture and those that were not.
As discussed in earlier chapters, in order to compare the smaller southeast Utah sample with southwest Colorado, I have included six tower sites excavated at Hovenweep National Monument (Winter 1977) and four sites recorded by Crow Canyon Archaeological Center (Churchill 2003, Kuckelman 2000, 2003 and 2007). The larger sample of towers used in this project includes Sand Canyon, Woods Canyon, Castle Rock and Yellow Jacket Pueblos (all recorded and excavated by Crow Canyon Archaeological Center). The comparison of the southwest Colorado and Hovenweep dataset with the southeast Utah sample will allow me to identify patterns and variability between two distinct sub-regions of the northern San Juan region.

These sites were selected because the published site literature was easily accessible and contained the most detailed information about specific towers. A discussion of each of these sites and their site reports can be found in Chapter Two. I have chosen to rely heavily on the site report data as opposed to the numerous articles and chapters written about these sites because I think they represent the best resources of primary data with the most attention to detail. Not all of the site reports were consistent in presenting individual tower measurements or construction attributes and I was unable to include attributes 3-16 that are listed and discussed above. However, the data I compiled were found in both samples. These attributes include tower type (attribute 1), tower shape (attribute 2), association with natural resources (attribute 16), site location (attribute 18), and association with site-enclosing walls (attribute 19).
How tower attributes relate to function

A majority of published tower research has focused on understanding how towers function (Fewkes 1923; Johnson 1999, 2003; Kuckelman 2000, 2003; Lipe and Varien 1999; Morely and Kidder 1917; Riley 1950; Rohn 1971; Shulman 1950; Williamson et al. 1977; Winter 1980). Although there have been significant contributions towards understanding function, part of the reason we have not been able to determine specific functions for all towers is because we do not understand the range of variability present in the tower data that we have already acquired. This section discusses how the attributes discussed in this chapter can be grouped to best address how towers might have functioned. I introduce the range of attributes that may characterize certain functions and evaluate their effectiveness at describing these functions. Tower function is revisited in Chapters Five and Six to evaluate how well the towers in the southeast Utah and southwest Colorado and Hovenweep data sets fit the attributes provided for the below tower functions.

Defense, boundary marking, resource monitoring, storage, food processing, and social identity are possible functions addressed using the data presented in this thesis. The use of towers for line-of-sight communication or as astronomical observatories is not evaluated because it requires accurate and consistent measurements and knowledge of astronomy to evaluate this function. Furthermore, I recognize that the attributes discussed below may also characterize other functions. While the goal of this discussion is not to define exact tower functions, the systematic
analysis of the patterns found in towers may help in making it easier to promote one interpretation over another.

*Defense/resource monitoring/boundary making*

The idea that towers functioned as defensive structures or as structures that overlooked and guarded access to natural resources are inherently bound up with boundary making. While I recognize that these three functions have different connotations, their archaeological signature from the surface is very similar. One would expect that a tower used to create boundaries, whether it is to act as a defendable area from attack or to guard or limit access to certain areas or particular resources would be formally constructed with thick fortified walls and situated in a prominent and defensive geographic location such as a canyon rim or canyon head. Furthermore, it is likely that they would be associated with a site-enclosing wall since this architectural feature is strongly related to ideas of defense and boundary making. If towers functioned to limit or guard access to a natural resource there should also be a strong relationship between these towers and resources such as permanent water sources.

*Food processing/storage*

If towers were used as activity areas for food processing or places for food storage, it is likely that these structures would show attributes that protected the interior from the outside environment and provided efficient space within to have been used for food processing or storage. Mortared walls would have protected the
stored food from the outside environment and one would expect that the structure had been originally roofed. Multiple stories might also have been useful but not necessary for these functions. People processing food on the ground floor could have used the upper story to store food. If the structure was used solely for food storage multiple stories might have been useful to sort the harvest. One would expect that all sites would have needed storage despite size or location and therefore there should be no positive correlation between a particular site size or tower location. Furthermore, the viewshed of a tower used for storage or food processing would likely not have been important.

Social identity

To use a modern analogy, the symbol of Coca-Cola is a pervasive American icon that is globally recognizable. There is obvious variability in soda recipes, can designs and bottle types but it is still identified as a distinctively American item. Although on a much smaller scale, the ancestral Puebloans of the northern San Juan region of the American Southwest created a suite of material culture that was likely recognized by contemporary culture groups much as it is distinguishable by archaeologists today. To suspect that the towers in the northern San Juan region functioned as markers of social identity, it is likely that towers would have shared consistent patterns in their construction and perhaps even location. They should be found at all site sizes with no particular correlation with a certain size. If towers were meant to be seen by others, marking the identity of the site inhabitants, these towers should be found in prominent locations with large portions of the landscape visible. It
could also be argued that towers used to mark social identity would be found at sites associated with an important natural resource such as a permanent water source. This association would be a way of combining the ideas of limiting access and promoting a particular identity of the site inhabitants, a physical way of demonstrating to others, their political, ideological or economic power.

**Methodological and sample issues**

As with any attempt at archaeological research, the sample, attribute categories, and methodologies used have challenges. First is the problem of preservation. Tower preservation varied from intact courses of standing masonry several meters in height to mere rubble mounds, barely affording enough information to define the structure. Research implications from this inconsistency in preservation meant that not all categories of data could be collected. In some cases the tower entrances were obscured by rubble and wall fall. If no standing masonry was present, construction techniques and masonry detail categories were left blank. At times it was difficult to define structures and there were a few cases where I was required to define a tower based on the combination of empirical evidence and common sense.

The re-use or scavenging of wall fall has implications for the estimated original height of the towers. Although I did the best I could to quantify the original wall height using intact masonry and the amount of wall fall it is possible that the wall rubble stones were scavenged and re-used for other construction. This limitation has considerable consequences for the estimation of original height. Although I
continue to reference estimated original wall height, I understand this attribute can be disputed.

Another attribute that invites dialogue is the matter of single or multiple story towers. While some researchers contend that towers are only towers if they are multiple stories, I believe that the number of stories does not define a tower. A single story tower can still reach the same original height as a multiple story tower. For example, the well-preserved tower at the Cave Towers site has standing masonry four meters tall and shows no evidence of multiple stories. In other cases, because of preservation issues, the number of stories is a difficult attribute to assess and is not necessarily an important factor in determining tower height. In this research, I recognize single story structures as towers as long as their other contextual attributes distinguish them from above ground rooms.

It is important to emphasize some of the disparities between the two databases used in this thesis research (southeast Utah and southwest Colorado/Hovenweep). Because I was able to conduct my own fieldwork in southeast Utah I could gather data on all different site sizes (small, medium, large, community centers, and tower complexes). However, the published literature on the sites in southwest Colorado focuses primarily on community centers. This raises issues when attempting to compare how towers functioned within these different site sizes so I have addressed this bias by not using comparisons that relate to site size. Rather I have focused on how towers were built and used.
Chapter 4

Towers of southeast Utah

This chapter discusses the 15 sites and 40 towers I recorded during my thesis fieldwork. It includes a description of each site, its location and context (see Appendix C for raw data collected). Site and tower discussions in this chapter are arranged by the different site sizes (small, medium, large, community center, tower complex) introduced in Chapter Three. Separating towers into categories based on site size and type may relate to differences in tower use. I have grouped small and medium sites into one category because they are relatively similar in size and there were not enough medium sites to make its own category. There are six sites in the small and medium category, three large sites, two community centers, and three tower complex sites.

I describe site location by paying particular attention to how towers are situated within sites and how they are distributed across the landscape in relationship to natural features. For each tower site, I first describe the site location and other features, I then describe the individual tower architecture and construction. I discuss characteristics of each tower that are summarized and used in Chapter Five to address tower function. These factors include the location of the site and its position near well-traveled routes, tower location within the site, association with permanent water sources, and visibility of geographic landmarks.
Towers at small-sized and medium-sized sites

Butler Wash Mesita: 42SA5536

Site location and description

The Butler Wash Mesita site is located on the top of a north/south running mesita, south of the northern forks of Butler Wash. The site is situated among a sparse assortment of small pinyon and junipers and the closest water source is Butler Wash 100 meters below. The site is almost within line-of-sight with Butler Wash Ruins, a large habitation site in an alcove on the west side of Butler Wash. The two sites were likely occupied at the same time. The Butler Wash Mesita site, in contrast
to the larger Butler Wash Ruins site, is a small site that consists of a single masonry
tower, two roomblocks, with four rooms each. One of the roomblocks contained a
blocked-in kiva. Although limited, the artifacts on the surface and the masonry
features date the site to the Pueblo III period. The lack of midden associated with this
site and the possibly unfinished roomblock masonry indicates that the site was not
inhabited for any considerable length of time and that site construction was not
completed upon abandonment. This site was recorded during my 2008 summer
fieldwork with the cooperation of the Comb Ridge Survey Project crew (Hurst 2008).
Figure 4.2: Site map of Butler Wash Mesita site (from Hurst 2008).
Tower architecture

The tower sits directly on the western mesita rim, overlooking the slick rock below roughly 10 meters west of the primary roomblock. The tower at this site is detached, sitting approximately 10 meters from other architectural feature. The tower is circular with evidence of a southern entryway. Shaped, faced, and pecked sandstone blocks and slabs were used as construction material with mortared walls compound masonry with an average wall width of 60 centimeters. The interior diameter of the structure is 2.5 meters. A single possible roof beam is the only remaining evidence that the tower was originally roofed or is at least one story tall. There is a low arcing wing-wall extending off the western side of the tower that does not seem to have any apparent function. Intact masonry stands only a meter in height and the lack of abundant associated rubble suggests that the tower was either not finished or the stone was re-used somewhere else. At its original height it is possible that the tower would have been within line-of-sight with Butler Wash Ruin to the West. Other prominent landforms visible from the tower include the western face of Comb Ridge, the Abajo mountains and the general location of the San Juan River. There are no artifacts found in association with this structure.

Tower discussion

Based on surface ceramics and architecture, the Butler Wash Mesita site is thought to be contemporary with the larger alcove site of Butler Wash Ruins. The close proximity of the Butler Wash Mesita site with Butler Wash Ruin suggests some type of interaction between the two sites. The Butler Wash Mesita site is located
almost exclusively on the west side of the mesita and the tower is visible from below to the West but the entire site is hidden from the south and east. This westward viewshed suggests it was built with particular reference to Butler Wash Ruin. The tower is not directly associated with a water source and a preliminary assessment suggests that it does not overlook possible prehistoric farmland. It is possible that the tower represents a communication point or outpost of the larger alcove site below.

*Mouth of Cold Spring: 42SA28207*

*Site location and description*

This site is located on the eastern flank of Comb Ridge, on a low bedrock outcrop overhang along the south rim and mouth of Cold Spring drainage, which runs eastward, intersecting with Butler Wash. The Cold Spring site is a small cluster of features including of a tower, possible kiva depression, and a thin surface midden. The site is roughly 20 meters from Cold Spring drainage, which is not perennial, but there is an accessible spring up the wash. The site was mapped and recorded by the Comb Ridge Survey Project Crew during the summer 2007 field season (H. Robinson 2007).
Figure 4.3: Site map for Mouth of Cold Spring site (after H. Robinson 2008).
**Tower architecture**

The tower at Cold Spring appears to be the only aboveground architecture at the site. The tower is built on a bedrock shelf that is the highest point on the site and the kiva depression is located several meters to the South. If there was indeed an entrance at the floor level to begin with, the poor preservation of the tower makes it impossible to define an entryway. The tower rubble suggests that the structure was circular and constructed from unshaped sandstone blocks and slabs. From the lack of preservation it is impossible to determine whether the tower was wet or dry-laid. The tower was a single course wide averaging 40 centimeters in wall width. Because the tower was only a single course wide it is possible that the structure did not need mortar for its construction. The interior structure diameter measures 2.5 meters. There is no evidence that the tower was roofed. The tower viewshed extends up and down Butler Wash and West up Cold Spring drainage and the highest peaks of the Abajo Mountains to the North.

**Tower discussion**

The lack of construction effort invested in this tower is indicated by the rough, unshaped stones used in building the tower. Unfortunately because of the poor preservation it is difficult to use the construction attributes to suggest tower function. However, conspicuous geographic location chosen for the tower suggests that its visibility was important. The tower’s location at the mouth of a drainage with a permanent spring to the East and a location that likely overlooked farmland to the
East by Butler Wash, it is possible that the tower served as a marker or guard for the spring up the canyon or monitored the farmland below to the East.

*Fishmouth Canyon tower site: 42SA23793*

**Site location and description**

This site is located on the southern rim of a sandstone hogback at the mouth of Fishmouth Canyon, which drains off of Comb Ridge to the East and into Butler Wash. The site consists of a roomblock with eight rooms, a single square surface room, a kiva, tower, and midden. There are also six petroglyph rock art panels at the base of the drainage rim below the roomblock, surface room and tower. The site was recorded and mapped by Douglas Bowman and the Four Corners School as part of the Fishmouth Canyon Survey Project in 1998 (Bowman 1998). A collection of three shrines (or herraduras) are located on the northern end of the hogback more than 100 meters away from the site.
Figure 4.4: Site map of Fishmouth Canyon tower site (after Bowman 1998).
**Tower architecture**

The tower at this site is similar in location and form with other towers on Comb Ridge, in particular those towers at the Lower Butler Wash site and the O’Grosky site. The tower is a detached, circular structure on the southern rim of the hogback above Fishmouth canyon. The tower is 12 meters away from other architecture at the site. Constructed of unshaped sandstone blocks and slabs, the tower has a single course of wet-laid masonry that is 50 centimeters wide. Built on bedrock, there are six courses of standing masonry on the northeast tower wall, 75 centimeters tall. There is a considerable amount of wall fall associated with this tower, suggesting that its original height once stood close to three meters. An intact tower entrance faces east and is 73 centimeters wide. The interior diameter of the tower is 2.5 meters. There is no evidence that the tower was multiple stories or that it had been roofed. There is a short, low arcing wing-wall that abuts the tower to the southeast and terminates at the canyon rim. This wall was constructed of dry-laid, unshaped sandstone blocks and slabs and is 1.3 meters long.

**Tower discussion**

The Fishmouth Canyon tower site is very similar to other tower sites near Comb Ridge. The tower at this site is in full sight of Fishmouth Ruin to the West and is located between two Comb Ridge cross-over trails. Although there is no modern permanent water source associated with this tower site, the Fishmouth Canyon drainage may have been a reliable water source judging from the predominance of cottonwoods in the drainage bottom. A 360 degree view from the tower includes
landmarks such as the crest of Comb Ridge can be seen to the West and the Abajo mountains to the North, Little Black Mesa to the East and the Chuska and Carrizo mountains to the South. The tower also commands a considerably expansive viewshed both North and South along Butler Wash.

The relatively prominent location of the tower at the Fishmouth site combined with the estimated original height of three meters suggest that this tower was built to be seen. There is a heavy concentration of Pueblo III period sites on Comb Ridge, and the location of this tower at the mouth of a heavily populated canyon, the water source in Fishmouth Canyon and the two cross-over trails would have made this area well traveled. Whatever their purpose, individuals traveling in this area would have had no trouble noticing the Fishmouth tower or the site inhabitants.

**Comb Wash Spring: 42SA28208**

*Site location and description*

The Comb Wash Spring tower site dates to the Pueblo III period and consists of two detached towers on separated clay knolls at the base of the talus slope on the west side of Comb Ridge. The site is located slightly South of the Jackson Crossing cross-over trail, one of the few recorded cross-over trails that can be followed from one side of Comb Ridge to the other. The site is flanked to the North and South by two sizable finger ridges with a drainage basin between them. The towers at this site are associated with an active seep at the center of the site. Other than a rock concentration, there is no architecture at this site. A thin artifact scatter associated with the site includes lithic debitage, ceramic sherds and ground stone. A possible
herradura is located at the western edge of the site. Despite the lack of architecture at
the site, there are several Pueblo II and III habitation sites within reasonable
proximity (less than 100 meters) to have been associated with the Comb Wash Spring
tower site. However, none of these sites have of yet been systematically recorded. I
recorded the Comb Wash Spring site in cooperation with the Comb Ridge Survey
Project crew during the summer of 2008 (T. Robinson 2008).
Figure 4.5: Comb Wash Spring site map (after T. Robinson 2008).
**Tower architecture**

Tower 1 is a detached circular structure that is located atop a clay mound deposit approximately 80 meters south of Tower 2 and 100 meters from the seep. The tower is badly eroded but appears to have been wet-laid and built with two courses of shaped and unshaped sandstone blocks and slabs. There is no standing masonry, but the rubble mound stands a meter tall and it is likely the tower originally stood between two and three meters tall. The average wall width is approximately 60 centimeters. The interior structure diameter reaches 2.5 meters. The rubble obscures any evidence of a doorway. Eroding out of the fill from Tower 1 is a considerable amount of charcoal and burned jacal with stick impressions, strongly suggesting the tower was roofed and possibly burned at abandonment. I believe that this evidence is for roofing rather than multiple stories because the stick impressions were too small to have supported an upper floor.

Tower 2 is also a detached circular structure situated atop a clay mound. The tower is located above and south of a rill with water spilling down from the seep. Similar to Tower 1, Tower 2 is badly eroded and there are no intact masonry courses from which to infer wall thickness, construction style or technique. The stones used in building Tower 2 are shaped sandstone blocks and slabs. The lack of preservation obscures any evidence of a tower entrance. There are two looter holes dug into Tower 2. Eroding out of the fill from these looter holes is charcoal and burned jacal with stick impressions, which like Tower 1, suggests that the tower was originally roofed and burned at abandonment.
Both towers at this site were oriented to the West and from these towers, Comb Wash and the mouths of tributary canyons draining off of Cedar Mesa were visible. The talus slope and Comb Ridge, behind the towers, obscures the eastern view, although it is possible to see where Jackson Crossing drops down. Views to the North and South are obstructed by natural colluvial clay fins.

_Tower discussion_

These two towers are the only ones in the sample with direct evidence that towers were roofed. They occupy distinctive and prominent landforms and are associated with a perennial water source. It would not have been possible to access the spring without crossing by or between these two towers. Furthermore, the close proximity of this site to the Jackson Crossing cross-over trail may also be important as distinctive sites are often associated with one end or the other of a cross over trail (Winston Hurst, personal communication 2008). The towers would have been easily noticed by traffic crossing the uplift and may have functioned as a locational and/or identification marker for travelers, guarding access to the water source.

*Lower Butler Wash tower site: 42SA28205*

_Site location and description_

The Lower Butler Wash tower site is on the southern end of a cuesta on the east side of Comb Ridge. The site features are situated both on the escarpment that forms the southern edge and on the sediment slope and terrace below to the South. The site is an early Pueblo III period complex consisting of a single tower, hand print
pictographs, a small rock shelter with masonry, a stone circle, the possible remains of a room block and an extensive midden (T. Robinson 2008). I recorded the site in cooperation with the Comb Ridge Survey project crew during the summer of 2008 (T. Robinson 2008).

Figure 4.6: Lower Butler Wash tower site map (from T. Robinson 2008).

**Tower architecture**

The tower at this site is a circular masonry structure detached from other site architecture. Standing masonry at the site reaches almost two meters high and the amount of associated wall fall suggests that its original height stood between two and three meters. There is no evidence of multiple stories. The tower is located on the
very edge of the drainage and the southern half of the tower has collapsed down slope. There is evidence of an entryway facing to the west. The tower masonry is prepared and shaped blocks and slabs built with a wet-laid laying technique. The wall width averages 60 centimeters of compound masonry. The interior diameter of the tower is two meters. There is no evidence that this structure was roofed. Like several of the towers within my study area, the tower at the Butler Wash site has a low westward arcing wing-wall (feature 8) abutted to the tower and opening to the South.

**Tower discussion**

The tower viewshed extends both to the North and South of Butler Wash. The tops of the Abajo Mountains to the North and Chuska Mountains to the South are also visible. The location of the tower at the mouth of the drainage suggests that it might have served as a marker for individuals traveling up and down Butler Wash and across Comb Ridge. It is likely that the drainage held water at least during parts of the year and the tower may also have been associated with this water source. Given the heavy traffic generated by a substantial population and site density in southeastern Utah, the Lower Butler Wash tower would have been a prominent architectural feature.

*White Triangle Complex: 42SA24646*

**Site location and description**

The White Triangle complex is located at the base of the talus slope along the western face of Comb Ridge and near the western end of the White Triangle crossover trail. Although more than a mile away, the site is also located almost directly
East of the Comb Wash great house. The site consists of four masonry towers, one masonry roomblock with intact coursed walls, a kiva depression and a herradura South of the site. The towers are located on separate knolls and one of these towers is atop a detached boulder with a set of five pecked steps climbing its east side. There is also a large kiva depression surrounded by an unusually high berm of dirt (14 meter diameter from berm to berm), with no accompanying roomblock present. The artifact assemblage at this site is sparse, but what is available indicated it was a late Pueblo III occupation. A spring is also associated with this site. The White Triangle complex site was documented and mapped by the Comb Ridge Survey Project crew in the fall of 2005 (Hurst 2005).
Figure 4.7: Site map of White Triangle Complex site (from Hurst 2005).
Tower architecture

The towers at this site all command an expansive view along the length of the Comb, especially to the North. Looking westward, the towers face the mouth of Mule Canyon. The entire site stretches out along a north/south axis.

Tower 1 is a square tower on a detached boulder. The structure was built using shaped sandstone blocks and slabs with wet-laid masonry. There is an intact entrance to the tower facing northeast and is reached by a series of five shallowly pecked hand and foot holds. The tower walls are a single course wide with an average width of 50 centimeters. Due to the inaccessibility of the tower, I was unable to take precise interior measurements but I estimate that the structure measures 2.5 x 3 meters (north/south x east/west). There are 12 courses of standing masonry that reach 1.5 meters in height. In combination with associated rubble, I estimate the original tower height to have stood approximately 2 meters tall. There is no evidence that the tower was originally roofed.

Tower 2 is a detached circular tower constructed on ground surface and is located to the southwest of Tower 1. The tower was constructed of shaped sandstone blocks and slabs. The dry-laid sandstone walls are a single course wide, measuring on average 40 centimeters. The interior diameter of the tower is three meters. There is no evidence that the tower was roofed.

Tower 3 is another detached circular structure constructed on the ground surface and is located approximately 10 meters south of Tower 2. Tower 3 is constructed of unshaped sandstone blocks and slabs and is only a single course wide, which on average measures 40 centimeters. The poor preservation of this tower
makes it impossible to discern whether the masonry was laid using a wet or dry laid technique. The tower diameter measures four meters. There is no discernable entrance. There is 70 centimeters of standing masonry and the lack of associated rubble suggests that the entire structure never exceeded two meters in height. There is no evidence that the tower was originally roofed.

Tower 4 is another detached circular tower approximately 40 meters South of Tower 3. Tower 4 was constructed of unshaped sandstone blocks and slabs. However, standing wall sections demonstrate wet-laid compound masonry that is 50 centimeters thick. Intact masonry stands 80 centimeters tall and in combination with associated rubble, the estimated original height can be projected to no taller than two meters. The interior diameter of this structure measures six meters. Like all the other towers at the White Triangle Complex, Tower 4 shows no evidence that it was roofed.

Tower discussion

As the entire site is situated against the western face of Comb Ridge, it is apparent that its attention was focused to the West. It’s location near the base of the White Triangle cross-over trail and the presence of the herradura south of the site suggests that the site denoted a significant cultural landmark to the prehistoric peoples inhabiting southeastern Utah. The considerable viewshed of the towers and the fact Tower 1 was constructed on top of a boulder, increasing its visibility, also suggests that this site played a visible role in marking or monitoring access across the cross-over trail. Furthermore, individuals traveling West across the cross-over trail would have reached the White Triangle site before they reached the Comb Wash great
house. It is possible that the towers at the White Triangle site were used as sentinels to monitor or limit access to the great house.

_Mule Canyon Ruin: 42SA2164_

*Site location and description*

Mule Canyon Ruin can be visited using a paved pull off along the North side of Highway 95 along the eastern edge of Cedar Mesa. The site was originally excavated by a University of Utah archaeological team in 1973 and was stabilized and reconstructed the following year (Wilson 1973).

The site is located on a low knoll in the pinyon-juniper wooded Baullies flatlands, west of Comb Ridge and south of the head of Mule Canyon. Currently, the site does not seem to be directly associated with any permanent water source. The site was initially occupied around A.D. 750 and occupied most heavily between A.D. 1000 and 1150. The site was probably occupied by two or three families as the architecture consists of a room block of 12 rooms, an earthen kiva and a masonry kiva connected to a single tower by a subterranean tunnel. Another subterranean tunnel connects the kiva to the roomblock suite. This construction allowed people to move from the tower to the kiva to the roomblock without walking on the ground surface.
Tower architecture

The tower at Mule Canyon is a circular structure located to the South of the masonry kiva. The original excavators and stabilization crew indicated that the
circular tower was probably two stories high when in use (Hull 1973). “Stones were strewn rather evenly for 20 ft. out from the base of the tower indicating it had been the tallest structure at the site” (Hull 1973:84). There is no evidence of a doorway suggesting that it was either accessed from the top or through the subterranean tunnel linking it to the kiva. The material type used for the construction of the tower was the typical combination of sandstone blocks and slabs. The stones are shaped and faced. The tower walls were two courses wide, averaging 40 centimeters. At the time of excavation there were five courses of standing masonry (Hull 1973). The interior tower diameter is three meters. Hull (1973) notes that the interior of the tower was originally plastered. The site form does not mention any evidence of the structure having been roofed. Cultural material recovered from the tower’s excavation included only a few ceramic sherds and chert flakes (Hull 1973). The tower’s use surface was hard packed dirt and there is no mention of artifacts found on the floor (Hull 1973).

The subterranean tunnel between the kiva and the tower is reported to have been dug through southern corner of the southern recess of the kiva and ended with a vertical shaft that opened up into the floor of the tower (Hull 1973). The tunnel was 63 centimeters wide, 5.6 meters in length, and 90 centimeters deep. The tunnel entrance at the kiva end was framed by stones, but the tunnel itself was earthen (Hull 1973). The tunnel fill was similar to that of the kiva and contained very little cultural material (Hull 1973).

By comparison, the other tunnel connecting the kiva to the roomblock shows evidence of more formality. Beginning in the northwestern wall of the kiva bench, the entrance of the tunnel was constructed using wet-laid masonry, and the tunnel interior
has earthen walls (Hull 1973). Fill removed from the tunnel also contained sherds, ground stone, and chipped stone. Burned timbers were also found suggesting that at least part of the tunnel had been formally roofed (Hull 1973). Comparison of the soil stratification noted by Hull (1973) between the kiva and the tunnel suggests that the tunnel was constructed after the kiva had been completed.

The viewshed of the Mule Canyon tower includes prominent views of the Abajos, Sleeping Ute and Chuska mountains. The tower is also in view of the Mule Canyon and the west face of Comb Ridge. Mule Canyon Ruin is in direct line-of-sight with the Cave Towers site, one mile to the southwest, suggesting possible line-of-site communication or at least social connections between the two communities.

*Tower discussion*

Tower-kiva complexes are common in southwestern Colorado and the presence of a similar complex in the western fringes of the cultural region suggests social and ideological ties to Mesa Verde Proper and the McElmo-Monument sub-regions to the East. Because tower-kiva complexes are a relatively rare association between two distinct structural features, it can be suggested that perhaps the combination played an integral role within the community.
Towers at large-sized sites

O’Grosky: 42SA28206

Site location and description

The O’Grosky site is on the first low hogback uplift of the eastern flank of Comb Ridge, along the north rim of the mouth of a southeastern canyon draining into Butler Wash. The site complex dates to the Pueblo III period based on artifacts and architecture. The site consists of three towers, one of which is detached and the other two which are incorporated into roomblock architecture, three small roomblocks, the biggest consisting of thirteen rooms, between two to six kivas, and a low retaining wall along the northern site boundary. A possible informal plaza area and a series of pecked steps off the canyon rim leading down to two smaller roomblocks found off the canyon rim on a lower ledge. There do not appear to be any permanent water sources associated with this site, although the drainage below likely had water for part of the year. This site has not been excavated, but was mapped and documented in both 2002 and 2006 by the Comb Ridge Survey Project crew (H. Robinson 2006). Other features that could be associated with the O’Grosky site include a herradura 450 meters to the North of the site and the White Triangle cross-over trail.
Tower architecture

All three towers at the O’Grosky site are circular. Tower 1 is a circular detached structure situated approximately 25 meters northwest of the rest of the site.

Figure 4.9: Site map of the O’Grosky site (from H. Robinson 2006).
architecture and is the most prominently located feature within the site complex. Four courses of intact masonry on portions of the northeast and southwest walls indicate the tower was constructed with unshaped sandstone blocks and slabs and the masonry appears to have been built using a dry-laid laying technique and is only a single course wide, averaging only 40 centimeters in width. The intact masonry stands approximately 60 centimeters in height and the lack of abundant associated rubble suggests that the original tower height was somewhere around a 1.5 meters. The tower is three meters in diameter. There is no evidence that the tower was roofed.

Towers 2 and 3 are examples of integrated towers. Tower 2 was constructed as part of an 11 room surface roomblock. The tower is sub-rectangular and similar to Tower 1, was built using unshaped sandstone blocks and slabs and the masonry appears to have been dry-laid. There is no evidence of an entrance for this tower. The wall width of Tower 2 is 40 centimeters and is only a single course wide. The interior dimensions of the tower are 3.5 x 2.8 meters (East/West x North/South). Given the relatively narrow wall width, the average height of intact masonry standing less than a meter high and the absence of abundant rubble, it is likely that the tower stood two meters tall. There is no evidence that this structure was roofed.

Tower 3 is another integrated tower that was constructed at the west end of a surface roomblock containing four rooms. The tower is constructed of sandstone blocks and slabs which are shaped, well faced and some stones which are pecked. Tower 3 is sub-rectangular and its interior dimensions measure 2.5 x 4 meters (North/South x East/West). There is no evidence of an entrance at this tower. The tower wall is a single course wide and the average wall width is 40 centimeters. The
intact masonry and associated rubble suggests that the tower was around two meters tall. There is no evidence that this structure was roofed.

All three towers at O’Grosky appear to have been close to two meters in height. The prominent location of the detached towers gives them a significant viewshed to the North and South along Butler Wash and East to Tank Mesa. Visible landmarks farther away include the Chuska and Abajo mountains. The canyon-orientation of the site implies that it was meant to be seen, especially from the South.

Tower discussion

The prominent location of the structures suggests that the visible presence of the towers was an important consideration in their construction. All three of the O’Grosky towers have an extensive view of the landscape. These towers also show some of the least amount of attention to construction effort as evidenced by the unprepared stone material and the dry-laid masonry technique. Although the towers are found in prominent locations, the disjuncture between the location of the towers and the lack of construction effort suggests that the towers were not meant to be defensive or used as refuge against invaders. The towers could have been used as look-outs for community members or as physical markers on the landscape for travelers.
Ruin Spring: 42SA3028

Site location and description

The site of Ruin Spring is on the western portion of White Mesa. Ruin Spring is strikingly similar in its site layout and architectural features to the canyon head communities that characterize the Pueblo III period to the East in southwestern Colorado. The site consists of a series of roomblocks and kiva depressions on both sides of a small canyon that contains a still functioning spring surrounded by a site-enclosing wall. The spring seeps out of the North side of the drainage. Site occupation dates to the Pueblo III period as inferred from the Mesa Verde and McElmo ceramics found at the site. To the East of the site, a Basketmaker III slab lined cist, plus numerous pueblo components suggest a long occupation history. The site was recorded briefly with sketch maps in 1973 by two BLM archaeologists (Fike and Civish 1973). I have not included a map of this site because the existing documentation is only a partial map of the site and it was beyond my funds and resources to re-map the site.

Tower architecture

There are five towers at Ruin Spring. All of them have been architecturally bonded either to other site features such as roomblocks and kivas or to site-enclosing wall. Two of the towers are tower-kiva complexes, one is connected to a roomblock and the other two were constructed as additions to the site-enclosing wall. There is line-of-sight between all of the towers at Ruin Spring and each command a view of the spring.
Tower 1 is a circular structure that appears to be directly associated with a kiva depression to the South. The tower and kiva are less than 5 meters from the other. The tower is a two course wide, wet-laid structure made from unshaped sandstone blocks and slabs. The average wall thickness is 50 centimeters and the interior structure diameter is two meters. The amount of rubble suggests that that tower originally stood at a height of between two and three meters. There is no evidence that the tower was roofed. Also because of the poor preservation of the tower it is also impossible to ascertain if there was an entryway. Tower 1 has a good view of drainage and the site to the North and East and the viewshed includes the Abajos to the North and Black Mesa to the West.

Tower 2 is a circular structure built into the architecture of a roomblock and there is an associated kiva to the East. Tower 2 was constructed of shaped and sandstone blocks and slabs. There is no exposed masonry so it is difficult to determine the wall thickness or whether the tower was built using mortar. The amount of rubble associated with this structure suggests that the tower was originally between two and three meters tall. The lack of intact masonry means it is not possible to determine if and where there was a tower entryway. There is no evidence that it was roofed. Tower 2 was built along the South side of the drainage that runs through the site and overlooks the spring. From the tower it is also possible to see the Abajo Mountains to the North.

Tower 3 is a circular structure that abuts the site-enclosing wall along the southern periphery of the site. The tower was built on a sandstone shelf that falls away to the North and East. This location is one of the highest points in the southern
portion of the site. The tower was constructed of a single course of unshaped sandstone blocks and slabs. There is no intact masonry so it was not possible to determine the average wall thickness. The interior diameter of the structure is three meters. The extent and amount of the rubble suggests the tower originally stood between two and three meters in height. There is no evidence of a doorway or roofing for the structure.

Tower 4 also abuts the site-enclosing wall that wraps around the southern portion of the site. The tower is located south of where the drainage that bisects the site drops down to the spring. Tower 4 is a circular structure that is a single course wide and constructed of unshaped sandstone blocks and slabs. The interior structure diameter is three meters. Despite the lack of intact masonry, the amount and extent of rubble suggests the original tower stood between two and three meters in height. There is no evidence of a doorway or indication that the tower was originally roofed. The tower is located on a low spot at the site so it does not command an expansive view.

Tower 5 at Ruin Spring is a sub-rectangular structure directly associated with a kiva. The two structures are located within five meters of each other. The tower is situated on the highest point of the site, directly above the spring, and several meters North of the drainage rim. The tower walls are two-courses wide with McElmo style masonry. The shaped sandstone blocks and slabs were stacked using mortar. The average wall thickness is 40 centimeters and the interior structure area is 4 x 2 meters (North/South x East/West). There is an intact entrance to the southwest facing the canyon. There are 13 courses of standing masonry along the east wall that reach
approximately a meter in height. In combination with the associated rubble, the tower likely reached taller than two meters. Tower 5 commands an expansive view and the Abajos are visible to the North, Cedar Mesa to the West and the rest of the Ruin Spring site to the South.

_Tower discussion_

The Ruin Spring site illustrates the far-flung influence of Mesa Verde in the prehistoric world. As one would expect, moving away from the Mesa Verde Proper and the McElmo-Monument sub-regions and towards the cultural periphery, there becomes more variation in architectural form. The towers at Ruin Spring represent a continuum between the large canyon head communities of southwest Colorado and its western periphery. Some of the towers at Ruin Spring, like those at the Pueblo III canyon head communities in southwest Colorado such as Sand Canyon Pueblo, are abutted to the site-enclosing wall. Some of the other towers are directly associated kivas. These tower-kiva complexes are also common in southwestern Colorado and mirror the relationship between towers and kivas at Yellow Jacket Pueblo.

The Ruin Spring towers were likely patterned after those found at existing canyon head communities in southwest Colorado. The prominent location of most of the towers at Ruin Spring suggests that their landscape location was the most important aspect of their function. Whether abutted to the site-enclosing wall or identified in conjunction with a kiva, the towers at Ruin Spring were visible elements of architecture for the community members. The context and location of the Ruin Spring towers seems to suggest that their social role lay in their visibility. The two
towers integrated with the site-enclosing wall suggests that these towers played a
defensive role, perhaps monitoring and limiting access to the site and to the
permanent water source.

Wetherill’s Chimney Rock: 42SA20393

Site location and description

The Wetherill Chimney Rock site is located on a high rock point on the East
side of Cottonwood Canyon overlooking a meander of Cottonwood Wash. The site is
situated on top of the rocky point as well as at the base of the bench and is comprised
of seven separate structural units containing one or more rooms with associated kivas
and towers. Between 30 and 50 rooms are estimated for this site, but wall lines are
obscured by rubble and colluvial soil accumulation, so more buried rooms may exist.
The visible standing walls are constructed of McElmo style masonry suggesting a
Pueblo III period occupation history. Ceramics found below the structural units also
indicate a late Pueblo II through Pueblo III occupation. Instead slope-washed artifacts
cover the southern slope below the structural units. There is a spring located to the
North of the site situated under an overhang.

The site was recorded by the La Plata Archaeological Consultants, Inc. in the
summer of 1988 and is described as “a ‘Hovenweep-Style’ McElmo-Mesa Verde
phase village complex with a seemingly defensive location” (La Plata Archaeological
Consultants 1988). The crew that initially recorded this site identified four towers in
total, however, on personal inspection, one of the towers defined by the field
archeologists did not meet my criteria for identifying towers. The structure that was
eliminated was located on the farthest point of the mesa finger overlooking Cottonwood Wash, but there was no structural evidence to suggest a tower was constructed on the point. Although the site form indentified four towers, I only include the three towers in my analysis.

Figure 4.10: Site map of Wetherill Chimney Rock (after La Plata Archaeological Consultants 1988).
Tower architecture

Tower 1 is a sub-rectangular detached tower located on the southern boundary of the site but is visible to the other site features on top of and below the mesa finger. The tower is composed of wet-laid shaped sandstone blocks and slabs with compound masonry with an average wall width of 50 centimeters and an interior diameter of 4 x 5 meters (North/South x East/West). The tower has been decently preserved with 70 centimeters of standing masonry. The intact masonry in combination with associated rubble suggests that Tower 1 likely stood 2.5 meters in height. There is no evidence that this tower was roofed. Tower 1 commands a view primarily to the West, overlooking Cottonwood Wash. A curve in the canyon wall blocks any view of the canyon to the North and South.

Tower 2 is a circular detached structure located upslope on a rocky knoll at the highest natural point of the site and overlooks all of Cottonwood Wash to the South, West and North. The tower is constructed of unshaped sandstone blocks and slabs, and is two courses wide with walls 50 centimeters wide. There is no evidence of an entrance for the tower. The deteriorated condition of the tower makes it difficult to discern whether mortar was used in construction. There is no standing masonry left although the amount of associated rubble suggests that it might have stood between two meters tall. There is no evidence that the tower was originally roofed. The tower is also associated with a semi-circular retaining wall located off the east side of the tower structure. There are three courses of dry-laid single coursed masonry of the retaining wall standing which is 60 centimeters high. The associated rubble suggests that the retaining wall likely stood one meter high.
Tower 3 is a circular structure located on top of a detached boulder that is 10 by 6 meters at the base of the talus slope and below the architectural features above on the mesa finger. Tower 3 consists of a single course of dry-laid unshaped sandstone blocks and slabs with an average wall width of 40 centimeters. There is no evidence of an entryway. The interior diameter of the structure is estimated at three meters. There is no evidence that the tower was originally roofed. The tower has a good view of the wash to the West and has line-of-sight with the other two towers at the site. Directly below the tower is a kiva depression and a small roomblock of seven to ten rooms built into and underneath the boulder.

Tower discussion

The towers at Wetherwill’s Chimney Rock vary in context, location and construction. Towers 1 and 2 are located on prominent and visible locations within the site and would also have been some of the first structures seen when approaching the site from the South and East. To access the spring from either of these locations, an individual would also have to pass by one of these two towers first. Tower 3 located on the talus slope below does not command an expansive view of the landscape but it is situated on the detached boulder above the other site architecture on the talus slope and terrace above Cottonwood Wash. Tower 3 would have been visible from any point within the site. It is possible that Tower 3 functioned to monitor access to the site from below, while towers 1 and 2 monitored access from above.
Towers at community centers

Comb Wash great house: 42SA4755 and 42SA4756

Site location and description

The Comb Wash great house site is located West of Comb Wash and on the West side of Comb Ridge. The entire site surrounds a drainage that drains into Comb Wash. There are arguments for and against the Comb Wash great house being a traditional great house but either way, its impressive size likely had an impact on the communities surrounding it. While the Comb Wash great house is not the only great house in southeastern Utah, it is the only great house with towers. The site consists of a large pueblo ruin mound containing evidence of perhaps 50 one- and two-story rooms, six kivas, four towers, several middens, circular enclosing wall, and two prehistoric “belt loop” road swales (Hurst n.d.). The site is located primarily on top of a knoll and yields a commanding view of a several mile long section of Comb Wash. The site is divided by shallow ravine that trends to the southeast. University of Colorado test excavations in 2003-2004 revealed classic Mesa Verde ground-faced masonry in double coursed and compound walls, typical Mesa Verdean plastered kivas with the full battery of architectural features including banquettas, pilasters, keyhole recesses and above-ground ventilators (Hurst n.d.).
Figure 4.11: Site map of northern half of the Comb Wash great house (after Hurst 2005).
Figure 4.12: Site map of southern half of the Comb Wash great house site. (after Hurst 2005).
Tower architecture

Tower 1 is a circular detached structure located in the southeast section of the site. The tower was constructed using shaped limestone and sandstone blocks and slabs. This is the only tower I know of that was constructed using limestone as building material. The poor condition of Tower 1 has made it impossible to determine wall width, number of coursing and laying technique. The average diameter of Tower 1 is 3.8 meters. The amount of associated rubble suggests that the tower was more than two meters tall. There is no evidence of multiple stories or roofing.

Tower 2 is a circular detached structure located East of the drainage and North of Tower 1. The tower has an intact foundation entrance facing West. Constructed of sandstone blocks and slabs, the walls are double coursed using wet-laid masonry. Intact masonry is 60 centimeters tall and 50 centimeters wide. The interior diameter of the tower is 3.8 meters. The original height is estimated to have been between two and three meters tall. Possible viga sockets 50 centimeters up the northern wall with masonry continuing above suggests that this tower may have had two stories. There is no evidence that this tower was roofed.

Tower 3 is a circular detached structure located West of the drainage across from Tower 2. There is a visible foundation level entrance facing northwest. The tower is constructed of sandstone blocks and slabs with wet-laid double coursed walls 60 centimeters tall and 50 centimeters wide. The interior diameter of the tower is 3.5 meters. The estimated original height of the tower is two meters. There is no evidence that this tower had multiple stories or roofing.
Tower 4 is a circular detached structure located West of the drainage and South of Tower 3. The tower was constructed of shaped sandstone blocks and slabs but its poor preservation made it impossible to determine wall width, coursing, original height, or laying technique. The interior diameter of the structure is 3 meters. There is no evidence that this tower had multiple stories or had been roofed.

**Tower discussion**

Although relatively tall (likely between two and three meters) these structures are found on an eastern slope, below the major habitation area of the site. The lack of any major, long-distance viewshed for these towers suggests that the towers did not serve as defensive, look-out structures or as line-of-site communication points. However, by symmetrically flanking the banks of the drainage running though the site, it is possible that these towers functioned in relation to the water that was perhaps a more productive source of water in prehistory. They might have served to protect or claim the water source from outsiders who might want to use it.

**Radon Point: 42SA14274/14275**

*Site location and description*

The Radon Point site is a large Pueblo III canyon head community on a major western spur drainage of White Mesa. Comparable to the Ruin Springs site, Radon Point is one of the eastern most sites within my study area and looks remarkably similar to the canyon head communities in southwestern Colorado such as Sand Canyon Pueblo. The site spans both sides of the drainage and includes architecture
both on the mesa top, benches and on the canyon slopes. The site contains over 50 rooms, although only 4 kivas have been located. Like many of the sites within my study area, Radon Point was constructed around a permanent water source. Radon Point was mapped and recorded by Allen Reed for the Geosource Line BF1-7-83 project in 1983 (Reed 1983).

Figure 4.13: Site map of Radon Point (after Reed 1983).
Tower architecture

The two towers at Radon Point are radically different in location and context. Tower 1 is a detached circular structure on a low bedrock shelf in the western portion of the site and approximately 35 meters away from the closest structure. The tower is a single course with walls averaging 40 centimeters wide. The masonry consists of dry-laid, unshaped sandstone blocks and slabs. The western arc of the tower wall stands five courses tall which measures 1.6 meters high. In combination with the associated amount and extent of rubble, the original tower height is estimated between two and three meters. The interior structure diameter is three meters. There is no evidence of an entrance for Tower 1, nor is there any evidence of roofing. The tower commands a good view of the site complex along the northern rim of the canyon, but the majority of the southern rim complex is obscured due to a rise in the bedrock.

Tower 1 has a considerable view of Westwater Canyon to the northwest and the Bear’s Ears geologic landmark on Cedar Mesa to the west. The tower viewshed includes features along the north rim of the canyon, but a rise in bedrock obscures the architectural complexes along the south rim. The tower overlooks two small side canyon drainages; one to the West and one to the North.

Tower 2 is a circular structure that is part of a larger architectural complex on the mesa top finger on the south side of the side canyon drainage. Tower 2 seems to be associated with four kivas, a room block and a midden. Although no surface evidence suggests any structural connection (i.e. tunnel) between the tower and the kivas, its close proximity is reminiscent of other excavated examples of tower-kiva
complexes such as Mule Canyon Ruins. Despite the lack of abundant intact masonry, the tower appears to have only been a single course wide with dry-laid masonry and shaped sandstone blocks and slabs. The three courses of intact masonry stand 60 centimeters high. The original height is estimated to have stood between two and three meters tall. The interior diameter of the structure is two meters. There is no evidence of an entryway for this tower, nor is there evidence of roofing. This tower is located on a prominent bump and has good views of the entire site as well as the Abajos to the North, Cedar Mesa and Westwater Canyon to the West.

Tower discussion

The context of these two towers is strikingly reminiscent of the towers in southwestern Colorado, such as the ones found at Sand Canyon Pueblo and Yellow Jacket Pueblo. Integrated towers and tower-kiva complexes are much more common to sites in southwestern Colorado and their numbers drop off significantly at tower sites as one moves West. The context of the towers at Radon Point suggest that towers served an integrative role in the lives of the site inhabitants given their focal location within the site as a whole, perhaps with links to accessing the permanent water source or their location in proximity to other architecture may suggest storage.


Tower complex sites

Cave Towers: 42SA1725

Site location and description

The Cave Towers site is perhaps the most substantial tower complex within my study area. It has also been heavily visited by tourist traffic although the tower preservation is better than one would expect with so many visitors over the years. Cave Towers is located around the canyon rim of the head of Mule Canyon. The tower features at this site are clustered around a permanent spring just below the canyon rim. The site consists of five towers, two possible kivas along the canyon rim, and two rectangular rock alignments that suggest rooms. A series of alcove room blocks, isolated rooms, two kivas and a midden are located below the canyon rim. Despite the scatter of other architecture at this site, I have administratively defined it as a tower complex site because of the dominant architectural emphasis of the tower cluster.

The Cave Towers site has a colorful history of archaeological investigation. Originally recorded in 1964 by archaeologist Earl Smith (Smith 1964), the site was rerecorded in 1968 and 1969 by Weber State College (Green 1969) and designated a different site number. In 1968, Weber State College cleared around the base of Tower 1 at this site and they piled up the rubble and wall fall into a berm to the south, west and east of the tower (Green 1969). In 2003, Larry Nordby wrote an unpublished draft of a report on the Cave Towers site which outlined the towers and other architectural features (Nordby 2003). The previous documentation of this site was
poor, inconsistent and no systematic site map has been drawn. With the help of a small crew, I rerecorded the site and created an updated IMACS form that included all of the site architecture now designated under site number 42SA1725 and drafted a new site map (Bredthauer 2010). Because the interest of this study emphasizes tower location and relationships, the site map below, includes only the architecture along the canyon rim and does not include the scattering of architecture below the rim.
Figure 4.14: Site map of the Cave Towers site (Bredthauer 2010.).
Tower architecture

The four towers at Cave Towers are in different stages of preservation. Some of the towers have been relatively well preserved with multiple courses of standing, intact masonry, while other towers consist of rubble mounds with no intact courses.

Tower 1 is a circular detached tower located along the east rim of the western finger of Mule Canyon. The tower is constructed directly on bedrock. The masonry stones used in construction are shaped and unshaped sandstone blocks and slabs. Wall construction was wet-laid core and veneer masonry with an average wall width of 60 centimeters. The tower’s doorway is still intact and faces southeast along the rim. The base of the doorway is 50 centimeters above the foundation. Seven wooden lintel beams are still in place. The doorway is 65 centimeters wide and 1.3 meters tall. The southeast wall arc stands four meters high. It is likely that this is close to the original height of the tower. There is no evidence of multiple stories in the form of viga sockets in the wall masonry. The northern arc has collapsed with rubble extending down slope into the canyon. The interior diameter of the tower is 2.5 meters and is filled with over a meter of wall fall. A possible original roof beam sticks out of the rubble inside the structure. Historic and recent disturbance include the clearing of rubble around the tower base in 1968 (Green 1969), heavy traffic to the site and etching on the masonry.

Tower 1 also has a low, arced wing wall abutment off the southern side of the tower and opening to the east, towards the canyon rim. The basal foundation of the wall alignment is built on bedrock and is still intact but considerable historic and recent disturbance has dislodged and collapsed any standing cours ed masonry. There
appears to be no preparation of the stones used in construction. As there is no intact masonry, it is unclear how wide the original wall was or the masonry technique utilized. The wall extends off the western arc of Tower 1 and extends 2.5 meters before turning north. The North wall arcs around and abuts the north wall of Tower 1. The interior diameter of the feature is 2.5 x 3.5 meters (north/south x east/west).

Tower 2 is a detached circular structure that is located approximately 30 meters down slope and North of Tower 1. Tower 2 is constructed on the bedrock rim overlooking the finger of Mule Canyon. The masonry stones consist of shaped and unshaped sandstone blocks and slabs. Three courses of intact wall coursing along the north arc of the structure measures 47 centimeters high and is constructed using a compound masonry technique, dry-laid with sandstone spall and chunk chinking stones. The average wall thickness is 70 centimeters. The interior structure diameter is 3.5 meters wide. There is no remaining evidence of an entryway for this tower. Scant rubble suggests that the structure was comprised of low walls that likely reached a height of two meters, however the given high accessibility of the site, heavy visitation and possible vandalism and exposure to the elements may obscure accurate estimations of the tower’s original height. There is no evidence that this tower had been originally roofed. A heavily trafficked modern trail runs along the northeast side of the structure that has caused considerable erosion and dislodged intact masonry.

Tower 3 is a circular structure that overlooks the head of the side canyon where the spring is located. Construction technique for Tower 3 consists of wet-laid compound masonry with some spall and chunk chinking stones comprised of minimally shaped and unshaped sandstone blocks and slabs. Average wall thickness
is 60 centimeters. The interior diameter of the structure is 4.5 meters. A possible entryway is located on the east side of the structure, but is obscured by rubble with remains of lower left and right jambs. Although the lower portion of the entryway is missing, it is estimated that the extant opening width is 60 centimeters. Although this tower is predominantly a rubble mound, intact coursing is present and exposed along portions of the northern arc of the structure. Rubble has been cleared from the northeast exterior of the structure exposing 13 to 15 intact courses along that portion of the structure standing two meters in height. It is likely that the tower’s original height would have been over two meters. There is no evidence that this tower was roofed.

Tower 3 is abutted to the west by a low wing wall. No intact masonry remains, but the wall alignment extends approximately two meters to the West. The stone used for construction are unshaped sandstone blocks and slabs. Construction technique was dry-laid but it is possible that the mortar has eroded. Given the limited amount of rubble, it is possible that this wall was never very tall, likely never exceeding more than two meters.

Tower 4 is a square structure constructed along the eastern bedrock rim overlooking the spring. Towers 1 and 2 are visible across the canyon to the southwest. Alignments observed were suggest a square shaped structure. A rubble mound averaging two meters in height obscures most of the structure making most of the data categories for tower recordation null. The lack of considerable intact masonry made it impossible to discern masonry construction style. The north wall is estimated to be 3.4 meters long. The construction stone consists of blocks, slabs and irregular
shaped sandstone blocks that were minimally shaped or unshaped. Wall fall and ephemeral stone alignments and two visible 50 centimeter portions of coursed stone alignments were observed. It is likely that the tower originally stood between two and three meters high. There is no evidence of a tower entryway. There was also no evidence that this tower was roofed.

Tower 5 is a circular structure located on an uplifted bedrock outcrop set back 12 meters from the eastern rim of the canyon and is situated east of an above ground kiva structure. Tower 1 is visible across the canyon. The tower was constructed using wet-laid, core and veneer masonry. The material consisted of shaped sandstone blocks and slabs. Spall and chunk chinking stones were also placed in the mortar. Average wall width is 70 centimeters. There is no evidence that the tower was roofed. Standing masonry along the west arc stands three meters high. The original tower height is estimated to have been more than three meters. Similar to Tower 1, there is no evidence of multiple stories. The interior diameter of the structure is three meters. There is no evidence that this tower had been originally roofed.

Associated with this tower is a L-shaped retaining wall connecting Tower 5 with the above ground kiva which is four meters down slope to the west and which abuts another above ground kiva structure, 1.3 meters to the south. The retaining wall is constructed primarily of unshaped sandstone slabs and stands at its tallest point a meter in height.
**Tower discussion**

All five towers have a similar viewshed stretching primarily to the south, looking directly down the canyon. The Chuska Mountains can be seen from many of the towers and it is likely that at their original height and without modern vegetation, the Sleeping Ute Mountain might have also been visible. All five towers at this site are within sight of one another and almost all of them have a direct line of sight with the spring. Like other towers described in this study, the location of these towers is tied to the presence of the permanent water source. It is possible that towers at times served as a marker or monitor for the water source, perhaps reinforcing water claims and limiting access to the spring. To access the spring, it would have been impossible to not pass through the cluster of towers at the canyon rim or be watched from above while at the spring location.

**Dry Wash Overlook Ruins: 42SA5024**

**Site location and description**

The Dry Wash Ruins site is located along the rim of the head of a tributary to Comb Wash on the eastern edge of Cedar Mesa with an expansive view East looking at Comb Wash and a wide span of Comb Ridge. Cross-over trails along Comb Ridge visible from this site include Jackson’s Crossing and Night Rider. The Sleeping Ute Mountain is visible to the East, the Carrizo Range to the southeast, Black Mesa, the Chuskas and the San Juan River canyon to the South, and Monument Valley is visible to the southwest. The site is made up of four towers and an arced enclosing wall. The towers are located directly above a permanent spring with easy access down to the
spring using a series of pecked steps. A five-room alcove site and several granaries are located below the canyon rim as well. Despite this architecture below the rim, I have decided to include Dry Wash Ruins as a tower complex site rather than a habitation site because of its tower-centric emphasis on the canyon rim. This would have been the most visible component of the site. The site was briefly recorded by Earl Smith (1968) and includes a sketch map of the tower architecture. There is only a single sentence that mentions the stabilization and fencing of the site.
All four towers and the enclosing wall at Dry Wash Ruins were heavily stabilized in 1964 so interpretations of tower construction was made more difficult.
since they have lost their original form. Although there is a site form describing the
towers after stabilization, there is no previous documentation that record the towers in
their original condition. However, despite this lack of documentation, the towers at
Dry Wash Ruin represent an interesting architectural relationship that can be
meaningfully discussed.

Tower 1 is a circular structure abutted to a site-enclosing wall to the
Southwest and to the East. The tower walls are wet-laid and two courses wide,
constructed of unshaped sandstone blocks and slabs with chinking stones set into the
mortar. The average wall width is 60 centimeters. The interior structure diameter
reaches seven meters in width. It is possible that this above average diameter is the
result of the stabilization and may not accurately reflect the true width of the original
structure. The average wall height is 1.2 meters high and it is likely that originally,
the tower stood between two and three meters tall. There is no evidence of an
entryway for this tower, nor is there evidence of multiple stories or roofing. However,
the 1964 stabilization may have removed any remaining evidence.

Tower 2 is a circular structure located approximately eight meters east of
Tower 1 and is similarly abutted by the site-enclosing wall along the tower’s east and
west wall arcs. The tower walls are constructed using unshaped sandstone blocks and
slabs with chinking stones laid into the mortar. The average wall thickness is 50
centimeters wide. There is no evidence of a tower entryway. The interior structure
diameter measures five meters. Again, this above average measurement may be a
result of the stabilization rather than reflect the original tower diameter. Seventeen
intact masonry coursings stand three meters tall and it is likely that the original tower
height stood taller than this current measurement. There is no evidence that the tower had multiple floors or that it had been roofed.

Tower 3 is a circular structure located roughly five meters east of Tower 2. Tower 3 is abutted by the site-enclosing wall along the tower’s western and southern wall arcs. The tower was constructed of two courses of wet-laid unshaped sandstone blocks and slabs with chinking stones laid into the mortar. The average wall width is 60 centimeters. The interior diameter of the structure is seven meters wide. This measurement may be a result of the stabilization efforts. There are 12 courses of standing masonry which measure 1.2 meters tall. In combination with associated rubble, the tower likely originally stood between two and three meters tall. There is no evidence of an entrance for Tower 3. There is also no remaining evidence that the tower had multiple stories or a roof.

Abutted to the northern arc of Tower 3 is a 1.6 meter tall semi-circular wall alignment. The wall, which was also stabilized in 1964, is constructed of shaped sandstone blocks and slabs and is two course wide, wet-laid wall with an average width of 50 centimeters. Its current height is 1.6 meters although it may have originally reached a similar height as Tower 3 which likely stood between two and three meters. There is no remaining entryway for this room addition.

Tower 4 is located closest to the rim of Dry Wash and is situated within the site-enclosing wall, nine meters south of Tower 3. The site-enclosing wall arcs to the east of Tower 4 and ends at the canyon rim. The tower is constructed of two courses of wet-laid unshaped sandstone blocks and slabs. The average wall width is 90 centimeters. The interior diameter of the structure is 3.5 meters wide. There is no
evidence of a tower entryway but the southern arc of the tower has fallen and may obscure the remains of a floor level entrance. Along the western arc of the tower, 21 courses of standing masonry remain which measures three meters in height. In combination with the associated amount of rubble, it is estimated that the tower originally stood 3.5 meters high. There is no evidence of multiple stories or an original roof.

The site-enclosing wall at Dry Wash is constructed of dry-laid and unshaped sandstone blocks and slabs. The average wall thickness measures a meter wide and 1.5 meters tall. The wall encloses the Dry Wash site in a rough U-shape with its western and eastern ends abutting the canyon rim and abuts towers 1-3 and encloses Tower 4.

Tower discussion

All four towers at Dry Wash have an expansive view down Comb Wash and Comb Ridge to the South and East. The Carrizo Mountains are visible along the eastern horizon as is Black Mesa, the Chuska Mountains and River Canyon. Monument Valley is also visible to the Southwest. Visible cross-over trails on Comb Ridge include Night Rider and Jackson’s Crossing. It is likely that many contemporary Pueblo III sites would have been visible from the towers at Dry Wash.

The Dry Wash Ruins site is similar to the other tower complex sites as its multiple towers are located along a canyon rim and encircle a permanent water source. In fact, all four towers benefit from easy access down to the permanent spring by the use of pecked hand and foot holds. However, the enclosing wall associated
with these towers is unique among the tower complex sites within my study area. It is likely that the towers in relation to the site-enclosing wall and the spring functioned in some defensive capacity, perhaps limiting or guarding access to the spring. The prominent location of the towers on the landscape was likewise an intentional way of increasing their visibility. Enclosing walls and towers have both been described as examples of exclusionary architecture (Glowacki 2006) so it could be inferred that the towers at Dry Wash Ruins functioned to limit access to the spring. Given the scarcity of permanent water sources during the Pueblo III period and other tower-spring correlates, it is reasonable to suggest that towers served as a marker for the location of the spring and the identification and identity of its human guards.

Picket Towers: 42SA1721

Site location and description

Picket Towers is a Pueblo II/III tower complex site with no directly associated habitation architecture. Three pecked steps on the eastern canyon rim drops down to a lower bench at the same level of the spring where a small petroglyph panel with several images is located. An archaeological survey of Cedar Mesa published in 1969 by Weber State College (Green 1969) defined Picket Towers as part of a community cluster of sites called the Picket Fork Sites along the rim of Picket Fork canyon. However, since there was no domestic architecture directly associated (within 50 meters) with the three towers at Picket Fork, I continue to define the site as a tower complex.
Weber State College (Green 1969) is also responsible for the excavation of one of the towers at this site and the publication includes a discussion of the site architecture. Founded on this fieldwork, Dee Hardy (1975) completed a masters thesis on the materials recovered from these excavations. The results of Hardy’s study will be discussed below.

Figure 4.16: Site map for Picket Towers (Bredthauer 2010).


*Tower architecture*

Picket Towers is made up of three detached towers at the head of Dry Fork and surround a permanent spring. Tower 1 at Picket Towers is a circular structure that is located approximately five meters west of the western rim of Dry Wash canyon. The tower exhibits the best preservation of the three towers at this site. Tower 1 has core and veneer wall masonry with chinking stones constructed of shaped sandstone blocks and slabs and using a wet-laid technique. The average wall thickness is 60 centimeters. The interior diameter of the structure is three meters wide. The east and west arcs of the tower still have standing masonry which stands two meters in height. The original tower height can be estimated to have stood as much as three meters. There is no evidence of multiple stories or roofing. Tower 1 is visible from across the canyon to the East by at least 700 meters. Tower 1 viewshed also includes a view down Dry Wash Canyon to the South and on the southern horizon, the Chuska and Carrizo Mountains are visible. The tower is within sight of the permanent spring approximately 30 meters below.

Tower 1 was excavated by Weber State College in 1968 (Green 1969). The tower was tested both inside and outside and dug down to bedrock. Interestingly, the floor of the tower had a prepared clay floor with a central fireplace (Green 1969). A few artifacts including ceramics, bone, shell and chipped stone were also recovered from Green’s 1968 testing.

Tower 2 at Picket Towers is a circular structure set back from the western rim and at the head of Dry Wash. Tower 2 is two courses wide with wet-laid masonry with unshaped sandstone blocks and slabs and chinking stones. The average wall


thickness is 60 centimeters. Although the wall fall rubble obscures clear evidence of an entryway there does appear to have been a tower entrance facing south. The northern arc still consists of standing masonry which reaches a height of 1.2 meters. It is likely that the tower originally stood two meters tall. The interior diameter of the structure measures four meters. There is no evidence that the tower was roofed. The tower is intervisible with the other two towers at the site. Tower 2 is situated directly west and above the permanent spring. It is possible, that at its original height, the spring would have been visible from the top of the tower. From the East, the tower is visible from 700 meters away along the canyon rim.

Tower 3 is a circular structure that is set back a meter from the eastern rim of the canyon. The tower is a single course wide of dry-laid unshaped sandstone blocks and slabs with an average wall width of 40 centimeters. The interior diameter of the structure measures four meters in width. There is also evidence of a possible entryway facing north. There are six courses of standing masonry along the eastern arc that is 70 centimeters tall. This height in combination with the associated wall fall rubble, the tower originally could have stood approximately 1.5 meters tall. There is no evidence that this tower was roofed. The tower is situated so it overlooks the spring to the west and the other two Picket towers at the site. The location of the tower also benefits from an expansive view down the canyon to the South including the Chuska Mountains, and Cedar Mesa to the Northwest.
*Tower discussion*

The towers at Picket Towers show a certain level of diversity in their original construction and size. The construction techniques vary from a single course wide dry-laid masonry to core and veneer masonry with wet-laid construction. The tallest likely stood close to three meters and none of the towers, even the excavated Tower 1, demonstrate evidence of roofing. All three towers are within easy access to the permanent spring at the canyon head and each tower commands a significant viewshed down the canyon and includes the Chuskas, Carizos and Cedar Mesa.

Picket Towers represents one of the very few tower sites excavated west of Hovenweep National Monument. Although Tower 1 was excavated, the other two towers were left unexcavated. In a thesis written by Dee Hardy in 1975, Hardy discusses the Picket Tower site and concludes that the tower that was excavated might have been used for lithic manufacturing and meat processing based on the evidence of chipped stone and faunal remains of deer. It is unclear whether these artifacts were recovered from within the tower itself or from the surrounding area. Only a light lithic scatter remains on the site surface today.

There is no evidence that the Picket Towers served a defensive purpose although their prominent location along the canyon rim and its close proximity to the permanent spring may suggest that the towers were used to protect or take advantage of the water from the spring. In order to access the spring from the canyon rim, an individual would have to pass through the three towers. The tower complex is also the first site approached from the North and it is possible that the tower complex also functioned to limit access to the communities beyond. Evidence from the excavations
at Tower 1 including the prepared floor and hearth, suggests that the towers were used at some point as activity centers. It is possible that the towers served as short-term residences for individuals who guarded the spring and the sites beyond.

Summary

This chapter has examined the 15 tower sites and the 40 towers within the southeast Utah study area. The data has concentrated on each site and the towers within each site with emphasis on their location, architecture and context. In general, the towers recorded were predominantly detached towers and circular in shape although their construction and location on the landscape was variable. The sites that towers were associated with varied in size as well. A relationship between towers and the presence of permanent water sources was the strongest general trend that I noticed through fieldwork. The location of these towers often blocked access to water sources, therefore monitoring or guarding access to the water. Some tower sites that may not be associated with permanent water sources seem to instead be within site of Comb Ridge cross-over trails. Some of these sites such as the Comb Wash Spring site and the Lower Butler Wash site are also associated with herraduras. In both cases, towers seem to be related to ideas of visibility and maintained a restrictive relationship with permanent water sources, possible farmland, other sites or cross-over trails. These patterns and more, formulated from the data presented this chapter will be used in the following chapter (Chapter Five) to systematically analyze and
discuss these tower attributes and begin to look at comparisons and cross tabulations between the tower data.
Chapter 5

Exploring towers across the northern San Juan region

This chapter begins by looking at the frequencies of tower construction attributes in order to ascertain the variability inherent in towers. First, I systematically discuss the frequencies and proportions of each variable recoded for the southeast Utah sample, establishing patterns between tower attributes and addressing differences and similarities in towers. (See Appendix C for the southeast Utah raw data and Appendix D for the southwest Colorado and Hovenweep raw data collected). Second, this chapter looks at how well tower construction and locational attributes relate to the proposed functions defined in Chapter Three.

The first section of this chapter discusses in detail the attributes recorded from the southeast Utah sample with specific references to how these towers relate both within the sample and to other architectural features of the Pueblo III period such as kivas and rooms. The second section brings together comparisons of attributes to address patterns and variability in tower construction and context. The third section introduces the attributes from the southwest Colorado and Hovenweep sample which overlap with the variables from southeast Utah. The patterns presented in these data are compared with the patterns from southeast Utah to examine continuity and differences of towers across the northern San Juan region (see Appendix D). The goal of this tower attribute assessment is to create a broader understanding of the variability encompassed within the architectural feature class defined as towers.
These comparisons will contribute towards better defining towers and create a foundation for assessing possible tower functions.

**Describing southeast Utah towers**

The following section discusses each of the 19 variables recorded on southeast Utah towers (defined in Chapter Three) and then examines the distribution of these attributes in the tower sample. I have separated the variables into distinct categories that relate to the form and construction of towers and their relationship to the community and the environment in which they are found. These categories include: key tower attributes (site size, site location, association with permanent water), tower construction (tower shape, masonry shaping, horizontal wall coursing, presence/absence of mortar, average wall width, interior space, entrance, evidence of roofing), tower height (height of currently standing masonry, estimated original height, estimated number of stories), attributes relating to the site (tower type, bonding/abutment of integrated towers, wing walls, association with site-enclosing walls), and attributes relating to the natural landscape (viewshed).

**Key tower attributes**

The first three attributes: site size, site location, and association with permanent water are discussed upfront because they describe the context of tower location on the landscape and the types of sites they are most commonly associated.
The patterns demonstrated by these three attributes should orient the reader for later discussions of how other tower attributes relate to one another.

**Attribute 16: Association with permanent water sources**

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<th>Frequency</th>
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<td>No</td>
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<td>Total</td>
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*Table 5.1: Tower sites associated with permanent water sources in southeast Utah.*

Of the 15 sites in the southeast Utah sample, 60% of the sites are in close proximity to a permanent water source while 40% of the tower sites are not near a water source. The pattern in Table 5.1 suggests that sites associated with permanent water sources are significantly more likely to have more towers than sites that are not associated with a water source. Tower sites associated with water include: Comb Wash Spring, White Triangle Complex, Ruin Spring, Wetherill’s Chimney Rock, Cold Spring, Radon Point, Cave Towers, Dry Wash Overlook, and Picket Towers.

This is an interesting relationship considering that most sites in the Pueblo III period are found in association with water (Lipe and Ortman 2000:107; Lipe and Varien 1999:327). Although outside the scope of this thesis, it would be intriguing to see if sites with towers are commonly found in association with water while sites without towers are found far from water sources.
Attribute 17: Site sizes at which towers are found

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</table>

Table 5.2: Distribution of tower sites in relation to site size in southeast Utah.

This variable describes the types of sites at which towers are found. As discussed in Chapter Four, the 40 towers that I recorded were present at 15 sites. Towers are found sites of all sizes and in fact almost 50% of tower sites are considered smaller sites. This suggests that towers were a type of architecture that was recognized and used by everyone. They were not limited to community centers or specialized sites such as tower complexes.
This attribute looks at the number of towers found at sites of different types. Only a little over 25% of towers are found at small and medium sites while 40% of the towers at large sites and community centers. This suggests that while smaller sites have towers more often, there are more towers constructed at larger sites and community centers. This can superficially be explained by more people, more towers. That tower complex sites include the largest number of towers is explained by the fact that tower complexes are defined by the clustering of a group of towers making the unique context of tower complex sites an intriguing area of exploration. It is interesting that 30% of all towers in the study area are found at this site type. The decision to build a tower complex site is predicated on the fact that towers will be the architectural and perhaps cultural focus at the site. Interestingly, the concentration of towers within this site type is also related to the fact that tower complex sites are always associated with a water source.
Attribute 18: Site location

<table>
<thead>
<tr>
<th>Tower sites at different locations</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canyon rim</td>
<td>8</td>
<td>53.4</td>
</tr>
<tr>
<td>Canyon head</td>
<td>3</td>
<td>20.0</td>
</tr>
<tr>
<td>Canyon bottom/flats</td>
<td>2</td>
<td>13.3</td>
</tr>
<tr>
<td>Base of talus slope</td>
<td>2</td>
<td>13.3</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 5.4: Distribution of towers sites across site location categories in southeast Utah.

Over 70% of the tower sites are located on canyon heads and rims. The smallest number of tower sites are found on canyon bottoms/flatland and talus slopes. The patterns illustrated by Table 5.4 conform to the larger pattern of site locations across the northern San Juan region (Lipe and Varien 1999:107). While canyon rims and canyon heads are different, both of these site locations are both prominently positioned while the base of talus slopes, canyon bottoms and flatland are all “lower” points on the landscape. This pattern suggests that tower sites are more commonly found on high points on the landscape versus low places.

Attributes pertaining to tower construction

The following group of attributes relate to tower construction and include traits such as tower shape, masonry shaping, horizontal wall coursing, masonry laying technique, average wall width, interior diameter, orientation of entrance and evidence
of roofing. Individual assessments of these attributes are important for breaking down the variables that effect how a tower was originally constructed as well as what the final product looked like.

Attribute 2: Tower shape

<table>
<thead>
<tr>
<th>Tower shape</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circular</td>
<td>34</td>
<td>85.0</td>
</tr>
<tr>
<td>Square</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td>Sub-rectangular</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*Table 5.5: Frequencies of tower shapes.*

Of the six possible categories of tower shape (circular, rectangular, square, sub-rectangular, D-shaped, and irregular), the tower sample in southeast Utah consisted only three of the categories. An overwhelming majority of the towers were circular followed by small numbers of square and sub-rectangular towers (Table 5.5). That more than 80% of towers are circular may also be a consequence of the fact that archaeologists only recognize towers that are circular because of a preconceived notion of what a tower looks like.

What is interesting is that not all towers are circular. The variability in tower shape suggests that tower shape was not entirely formalized the way that other architectural forms are. For example, the norm for kiva shape in the northern San Juan region is circular just as rooms are almost always rectangular or square. The six
examples of towers that were not circular do not demonstrate any construction or contextual variability to suggest a reason for their different shape.

**Attribute 3: Masonry shaping**

<table>
<thead>
<tr>
<th>Masonry shaping</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>24</td>
<td>60.0</td>
</tr>
<tr>
<td>No</td>
<td>16</td>
<td>40.0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Table 5.6: Frequencies of material shaping.*

Towers in southeast Utah were built with shaped stone 60% of the time, but there were a significant number of towers that were built with unshaped stone (Table 5.6). Given that the soft sandstone common to this region makes it relatively easy to shape and that all of the towers in the southeast Utah study area were constructed of sandstone blocks and slabs (with the exception of Tower 1 at the Comb Wash great house that combined limestone and sandstone), the 40% of towers that did not have shaped stones is not likely a result of the type of raw material or the difficulty of manipulation. Since material shaping requires extra effort during construction, it is not surprising that almost half of the towers were constructed using naturally shaped stone without further modification. However, it is significant that a little more than half of tower construction did demonstrate the extra effort taken to shape the stone. Naturally occurring sandstone slabs and blocks easily accessible at the base of talus slopes are usually relatively regular in shape that can be readily used in construction.
without requiring extra modification. However, the use of shaped stones creates a much more stable wall than unshaped irregular stones (Rohn 1971:45). Rohn (1971:45) also points out that a wall constructed of shaped stones creates a smoother wall that was both more comfortable to lean against and more aesthetically pleasing. It might also create a better surface to hold plaster if towers were originally plastered, such as the Mule Canyon Ruin tower. While it is apparent that material shaping influences structural stability, an interesting relationship to explore is how the use of material shaping is related to other aspects of tower construction and how these relationships relate to site size or location. These relationships may help inform on how cultural elements affect the decision to use shaped or unshaped stone.

Attribute 4: Horizontal wall coursing

<table>
<thead>
<tr>
<th>Horizontal wall coursing</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single course</td>
<td>14</td>
<td>35.0</td>
</tr>
<tr>
<td>Double course</td>
<td>14</td>
<td>35.0</td>
</tr>
<tr>
<td>Compound</td>
<td>10</td>
<td>25.0</td>
</tr>
<tr>
<td>Missing (not measured)</td>
<td>2</td>
<td>5.0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 5.7: Proportions of horizontal wall coursing.

There seems be some consistency in the proportion of towers that were constructed using single coursed, double coursed or compound masonry. Single
coursed walls should support a relatively shorter wall (under three meters). If this suggestion is true, 35% of the towers in the southeast Utah study sample should be shorter than three meters, while 60% of the towers should be three meters or taller. Furthermore, other documentation (Rohn 1971, 1977) has demonstrated that habitation rooms more commonly use double coursed walls over single coursed walls where storage facility walls are more commonly single coursed. Of the excavated towers in the southeast Utah study area, Tower 1 Picket Towers corresponds with Rohn’s assumption. This tower had core and veneer masonry and exhibited a prepared clay floor with a central fire pit (Green 1969). Artifacts recovered from the floor included ceramics, bone, shell and chipped stone all of which can all be used to argue for a domestic function (Green 1969). To a lesser degree, the tower excavated at Mule Canyon also corresponds with this theory. The Mule Canyon tower had double coursed walls and a hard packed dirt floor (Hull 1974). Ceramics and lithics were found in the fill but no artifacts were found on the floor (Hull 1974). Both of these towers augment the theory that double coursed rooms tended to be domestic. Unfortunately since no towers with single wall coursings have been excavated it is not possible to see if these towers showed evidence for being used for storage.
**Attribute 5: Presence/absence of mortar**

<table>
<thead>
<tr>
<th>Presence/absence of mortar</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wet-laid</td>
<td>20</td>
<td>50.0</td>
</tr>
<tr>
<td>Dry-laid</td>
<td>6</td>
<td>15.0</td>
</tr>
<tr>
<td>Missing (not measured)</td>
<td>14</td>
<td>35.0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Table 5.8: Frequency of the presence or absence of mortar.*

In the southeast Utah sample, half of the sample of towers where the presence or absence of mortar could be recorded had wet-laid masonry while only 15% were constructed with dry-laid masonry. The 14 towers that could not be included in this sample were in poor condition and evidence for masonry laying technique had not preserved. Tower construction tends towards the use of mortar, as do most other Pueblo III architectural structures such as roomblocks where the use of mortar in construction is almost universal (Rohn 1971, 1977). Given their knowledge, the fact that 15% of the time the ancestral Puebloans chose not to use mortar in tower construction suggests that towers sometimes functioned in some capacity that did not require the sturdy construction that the use of mortar would offer or perhaps there simply was not enough water to make mortar. The possibilities include towers that were not particularly tall, were constructed in limited time, not intended for long-term use, or the activities taking place within the tower did not necessitate protection or insulation from the outside environment.
**Attribute 6: Average wall width**

<table>
<thead>
<tr>
<th>Average wall width</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg. wall width (meters)</td>
<td>38</td>
<td>0.40</td>
<td>0.90</td>
<td>0.53</td>
<td>0.13</td>
</tr>
</tbody>
</table>

*Table 5.9: Average wall width of towers in southeast Utah*

*Figure 5.1: Histogram and normal curve illustrating the distribution of average wall widths. Wall widths marked at 10-centimeter intervals.*

The average wall width of towers in the southeast Utah sample measured between 40 and 90 centimeters. The average wall width measured a little more than 50 centimeters in width, but with a fairly large standard deviation. The average wall width of a tower in southeast Utah is similar to towers excavated at Mug House in Mesa Verde National Park whose average wall widths averaged between 50 and 60 centimeters (Rohn 1971:86). In comparison, the wall widths from double coursed
walls of habitation rooms at Badger House at Mesa Verde National Park measure 30 centimeters (Hayes and Lancaster 1975:80). In fact, the average wall width of a tower is on par with the average width of a core and veneer wall from the Bluff great house, a Pueblo II and III period Chacoan great house (Cameron 2009). Wall width could not be measured at two poorly preserved towers in the sample of 40. Core and veneer walls were built very thick in order to hold structure two to five stories tall (Cameron personal communication 2009). It thus seems that tower walls with an average width of 50 centimeters were built to be tall.

One would expect that the wall width would correlate with horizontal wall coursing: narrower walls using single coursing and wider walls using double coursing and compound masonry. However, looking at the raw data (see Appendix C), double coursed walls and single coursed walls commonly fell within the 40 to 60 centimeter range. The two outlier cases, illustrated in Figure 5.1, are from the Dry Wash Overlook site. The modern stabilization effort at this site may have skewed the original wall width of these towers. When the data in Table 5.9 is run without these towers included in the sample, the average width and standard deviation is not substantially different. Therefore, the inclusion of these towers do not significantly change the results.
Table 5.10: Results of interior space data from southeast Utah sample.

<table>
<thead>
<tr>
<th>Attribute 7: Interior space</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interior space</strong></td>
</tr>
<tr>
<td>N</td>
</tr>
<tr>
<td>40</td>
</tr>
</tbody>
</table>

Tower space quantifies the amount of interior space available. The interior width of a tower also directly relates to the established tower definition as structures that are taller than they are wide. The interior space for towers that were not circular were calculated by averaging room length and width. The towers in southeast Utah display a wide range of diameters from a mere two meters to eight meters. However,
the average diameter of towers in the sample is 3.5 meters, with a range of 2.5 and 4.5 meters in width. The average interior floor space area of these towers equals 9.6 square meters.

The three obvious outliers with very large interior diameters illustrated most clearly in Figure 5.2 come from two separate sites. The six meter diameter tower is located at the White Triangle Complex site and its wide diameter suggests that it could have functioned as an above ground kiva given the range of the standard deviation for standard Pueblo III period kiva sizes discussed above. The other two towers with interior diameters of seven and eight meters wide are from the Dry Wash Overlook site. The enlarged diameter of these towers may be a result of the 1970s stabilization and many not accurately reflect the original width of the towers. However, the towers were built on bedrock and show no evidence of kiva features (reconstructed or original) and therefore I have assumed that despite their wide diameter they are still examples of towers. Furthermore, even when these outliers are removed from the sample, it does not create a substantial difference in the overall mean or standard deviation of tower diameters.

Kuckleman (2003) suggests that the average diameter of other towers in southwestern Colorado average four meters or less. In comparison, the average diameter of the towers in southeast Utah fit into this range. With the initial identification of towers from the surface it is sometimes difficult to discern whether you are looking at an above ground kiva or a tower. Interestingly, the average diameter for a kiva in the northern San Juan region is roughly four meters with an average floor area of between 11 and 12 square meters (Lipe1989:56; Smith
One standard deviation of the floor area is between 3.4 and 5.9 square meters (Lipe 1989:56; Smith 1998: 66). This suggests that structures have a greater likelihood of being towers when they are four meters in diameter or smaller.

When compared with the mean floor area of an average Pueblo III period habitation room, the pattern is reversed. The average northern San Juan region room has 8.7 meters of interior space (Lipe 1989:56) which is actually smaller than the interior floor space of the average Pueblo III tower in southeast Utah (9.6 square meters). This is something to keep in mind when looking at square or rectangular towers on the surface. Rooms and square towers are very similar in size and based on interior space alone, it would be difficult to tell the two features apart.

*Attribute 8: Orientation of entrance*

<table>
<thead>
<tr>
<th>Orientation of entrance</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor entrance</td>
<td>1</td>
<td>2.5</td>
</tr>
<tr>
<td>North/Northwest/Northeast</td>
<td>5</td>
<td>12.5</td>
</tr>
<tr>
<td>South/Southwest</td>
<td>7</td>
<td>17.5</td>
</tr>
<tr>
<td>East</td>
<td>2</td>
<td>5.0</td>
</tr>
<tr>
<td>West</td>
<td>3</td>
<td>7.5</td>
</tr>
<tr>
<td>Door absent/obscured</td>
<td>22</td>
<td>55.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*Table 5.11: Southeast Utah tower orientation of entrance.*
Doorways could be identified in almost half of the towers in the sample. There does not seem to be a particularly strong pattern that suggests that tower entrance location was based on direction. The poor preservation of many of the towers obscured the ability to discern the presence or absence of an entrance may account for why over 50% of the towers could not be recorded for this category. However, another possibility is that perhaps close to 50% of the towers in the southeast Utah study area did not have floor level entrances. They may have been accessed through the roof. Both of these options are difficult to identify since most of the towers have never been excavated and the original roof or ceiling of the towers are no longer preserved.

**Attribute 12: Evidence of roofing**

<table>
<thead>
<tr>
<th>Evidence of roofing</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>4</td>
<td>10.0</td>
</tr>
<tr>
<td>No</td>
<td>36</td>
<td>90.0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Table 5.12: Evidence of roofing.*

The southeast Utah sample suggests that most towers were not roofed, although a significant limitation to this assessment is the poor preservation of most of the towers in the sample. Tower roof beams could also have been salvaged and recycled for other structures when tower sites and the towers themselves were abandoned. The four examples of roofing material are from two towers with original
roof beams (Bulter Wash Mesita and Tower 1 from Cave Towers) and two towers with burned and imprinted jacal (Towers 1 and 2 at Comb Wash Spring).

Attributes pertaining to tower height

The following group of attributes can all be used to assess the original height of a tower. They include the height of currently standing masonry, the estimated original height and the estimated number of stories. All of these attributes are informative for understanding the visibility of towers on the landscape. Since tower visibility has always been a strong descriptor of towers themselves, these attributes are important for understanding the variability in tower height and how it relates to tower function. The most important attribute discussed below is the estimated original height of each tower. Although this attribute is only an estimate, it is more applicable to assessing original height because it combines both the height of currently standing masonry with the amount of associated wall fall rubble.

Attribute 9: Height of currently standing masonry

<table>
<thead>
<tr>
<th>Height of currently standing masonry (meters)</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height of currently standing masonry</td>
<td>33</td>
<td>0.40</td>
<td>4.00</td>
<td>1.25</td>
<td>.85</td>
</tr>
</tbody>
</table>

Table 5.13: Distribution of height of currently standing masonry.
The height of currently standing masonry indicates the degree of tower preservation and can also be used to help estimate the original height of the tower. On average, towers in southeast Utah retain about a meter and a half of standing wall with a large standard deviation (Table 5.14). The two tallest towers with masonry currently standing at three and four meters in height are two exceptionally well-preserved towers at the Cave Towers site (Tower 1 and Tower 5).

**Attribute 10: Estimated original height**

<table>
<thead>
<tr>
<th>Estimated original height</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Est. original height</td>
<td>40</td>
<td>1.00</td>
<td>5.00</td>
<td>2.59</td>
</tr>
</tbody>
</table>

*Table 5.14: Estimated original height for towers in southeast Utah sample.*

*Figure 5.3: Histogram and normal curve illustrating distribution of the height of currently standing masonry. Currently standing masonry marked at 50-centimeter increments.*
The estimated original height of towers an important variable as it compares part of the tower definition of structures that are taller than they are wide. As I addressed in Chapter Three, there are significant limitations for this variable. The removal and re-use of stone may alter the amount of rubble or even intact masonry at a tower and distort the true original height of the structure. I reemphasize here again that this attribute is an estimation, using the imperfect archaeological record, my naked eye, and my own confidence, rather than a definable measurement. With these limitations acknowledged, the overall results suggest that towers in the southeast Utah sample are most commonly 2.5 meters in height. The tallest tower is from Mule Canyon Ruin (see Chapter Four). This site was stabilized and reconstructed in modern times, however I recorded the estimated height from the original site report.
(Hull 1974). This measurement was an estimate of the original height and not the height of the walls at the time of excavation.

Attribute 11: Estimated number of stories

Towers with multiple stories were indicated by viga sockets with intact masonry extending above them. There is only one example of a tower with this type of evidence. This tower, Tower 2 at Comb Wash great house, has a series of viga sockets located along the west wall and are approximately 70 centimeters above the modern ground surface. The presence and height of these viga sockets is very similar to tower 1019/1008 from Sand Canyon Pueblo in southwest Colorado (discussed in Chapter two) where the presence of viga sockets located approximately 1.5 meters the ground surface suggested multiple stories (Kuckelman 2007). Poor preservation and reduced wall height may have erased evidence for multiple stories at the other towers within the southeast Utah sample. Because the pattern for multiple stories is heavily dependent upon preservation and the fact that the southeast Utah data does not show strong evidence of multiple stories, this attribute will not be considered further.

Evidence for multiple stories must not be confused as an alternate estimation for a tower’s original height. As demonstrated at Tower 1 and 5 at Cave Towers, these towers show some of the best preservation and have the most standing masonry (between three and four meters) and neither have evidence of multiple stories. There is no reason to suspect that a single story tower could not have reached the same height as a tower with multiple stories.
**Tower attributes pertaining to tower association with the site**

The relationship of towers to the sites of which they are a part is extremely important because it may indicate the physical and social context of towers and possibly how they functioned within the site. Attributes considered include tower type (whether they were detached or attached to other architecture), bonding and abutment of towers with other architecture (an indication of contemporaneous or sequential construction), wing-walls (low wall alignments associated with detached towers), and the association of towers with site-enclosing walls (a relationship established for towers in southwest Colorado).

**Attribute 1: Tower type**

<table>
<thead>
<tr>
<th>Tower type</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detached</td>
<td>25</td>
<td>62.5</td>
</tr>
<tr>
<td>Integrated</td>
<td>11</td>
<td>27.5</td>
</tr>
<tr>
<td>Tower-kiva complex</td>
<td>4</td>
<td>10.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

*Table 5.15: Distribution of tower types in southeast Utah sample.*

Sixty three percent the towers in the southeast Utah sample are detached towers – in other words, towers that are not connected to other site architecture. Only slightly more than 25% are integrated towers and there are even fewer tower-kiva complexes (see Table 5.15). The comparatively low number of tower-kiva complexes
can perhaps be attributed to the fact that tower-kiva complexes were not commonly built after the late Pueblo II period. (Lipe and Varien 1999:320). Since the majority of the sites in the southeast Utah study area date to the Pueblo III period, the lower number of tower-kiva complexes may be expected. Of four tower-kiva complexes identified in this sample, the Mule Canyon Ruin site dates to the Pueblo II and the two tower-kiva complexes at Radon Point and single tower-kiva complex at the Ruin Spring site are likely to correspond to the late Pueblo II period components found at both these sites.

**Attribute 13: Bonding/abutment of integrated towers**

<table>
<thead>
<tr>
<th>Bonding and abutment</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not measured</td>
<td>9</td>
<td>60.0</td>
</tr>
<tr>
<td>Abutted</td>
<td>6</td>
<td>40.0</td>
</tr>
<tr>
<td>Total</td>
<td>15</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Table 5.16: Distribution of bonding and abutment in southeast Utah sample.*

Archaeologists use patterns of bonding or abutting of walls to determine the sequence in which buildings were built and this attribute can suggest whether towers were built as part of a single construction episode or were built before or after other architecture. Because only integrated towers were attached to other site architecture, this attribute applies only to the 15 integrated towers and assessed the nature of their connection to other structures. Of the 15 integrated towers, there were no examples of bonded architecture and 40% of the sample were abutted to other architecture. The
nine integrated towers which could not be measured were clearly connected to other structures, but the poor preservation and lack of any intact masonry made identifying wall bonding or abutment ambiguous.

Attribute 14: Association of wing walls with detached towers

<table>
<thead>
<tr>
<th>Wing Walls</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>4</td>
<td>16.0</td>
</tr>
<tr>
<td>No</td>
<td>21</td>
<td>84.0</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Table 5.17: Distribution of wing wall alignments associated with detached towers in the southeast Utah sample.*

Detached towers are sometimes associated with low, arcing dry-laid coursed wall alignments that abut one of the tower walls and extend from the tower wall to the canyon edge. Although only four of the 25 detached towers in the southeast Utah sample were connected with wing walls I think that they deserve special note because of their unique but not entirely rare presence. Their function is unknown and it does not appear that they are footer alignments from rooms or other structures. There also does not appear to be anything unusual about these towers with wing walls. There are examples at smaller sites (Lower Butler Wash) and at tower complex sites (Cave Towers).
Attribute 19: Association with site-enclosing wall

During the Pueblo III period, some sites in southeast Utah were enclosed by masonry walls and in some cases towers were associated with those walls. Only three of the 15 tower sites in the southeast Utah study area had site enclosing walls (Dry Wash Overlook, Ruin Spring, and Comb Wash great house). The lack of sites with enclosing walls in the southeast Utah sample is likely because enclosing walls are most often associated with community centers and this site type makes up only a small percentage of the entire sample. Both Ruin Spring and the Comb Wash great house are considered community centers. Interestingly, Dry Wash Overlook is a tower complex and is associated with only a small amount of domestic architecture.

Of these three sites, five of the 13 towers found at these sites were architecturally abutted to the site enclosing wall (Towers 1, 2 and 3 at Dry Wash and Towers 2 and 3 at Ruin Spring). Although there are only a few towers integrated with site enclosing walls, the relationship between the two reflect a defensive nature. Since enclosing walls are thought to create boundaries and limit access across both sides of the wall, the addition of towers to the wall suggests that they too functioned to guard or monitor access (Glowacki 2006; Glowacki and Varien 2003; Kenzle 1993, 1997).

The excavated towers at Sand Canyon Pueblo which abutted the site enclosing wall were thought to be defensive given their location at the site (Kuckelman 2007).
**Attributes pertaining to tower relationship with the landscape**

*Attribute 15: Viewshed*

<table>
<thead>
<tr>
<th>Viewshed</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>360 degree view</td>
<td>11</td>
<td>27.5</td>
</tr>
<tr>
<td>180 degree view</td>
<td>19</td>
<td>47.5</td>
</tr>
<tr>
<td>View in only one direction</td>
<td>10</td>
<td>25.0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Table 5.18: Frequencies of tower viewshed categories in southeast Utah.*

Since viewshed was recorded in narrative form, it does not lend itself well to spreadsheet analysis. However, in order to help quantify tower viewshed I have created three categories that relate to how much of the landscape was visible from each tower location. The first category includes towers that have a 360 degree view of the landscape and one can see from all directions when standing at the tower location. The second category of towers have a 180 degree view of the landscape. This includes circumstances where viewshed is directional but includes a wider sweep of visibility. The last category consists of towers whose viewshed is only focused in one direction.

The towers in the southeast Utah study region tend to have a viewshed that encompasses 180 degrees or more of the landscape. Towers with a viewshed that only focused in one direction made up the smallest percentage. The pattern demonstrated from this attribute suggests that the towers in southeast Utah had a propensity towards
a wider rather than narrow viewshed which also infers heightened visibility. This suggests that towers were meant to be seen. This would have been useful for towers that functioned as line-of-sight communication or monitored access to natural resources.

**Pattern recognition**

Towers in southeast Utah tend to be circular, constructed of shaped sandstone made into single and double coursed or compound masonry walls. Most towers were constructed using a mortar bed to stack masonry with an average wall width between 40 and 60 centimeters and an interior space of approximately 3.5 meters. There is great variability in how tower entrances are oriented, though most had evidence of a foundation level entryway (i.e. roof entries were less common). Not much evidence of roofing has preserved. The average tower height measured, 2.5 to 3.0 meters tall. There is very little evidence that points to towers as having multiple stories, although evidence of upper stories are not likely to have been preserved. This does not mean that single story towers could not have reached or exceeded the height of towers with multiple stories. The patterns presented by tower construction suggests that southeast Utah towers were well-built structures with a similar pattern of height and width. The consistency in these patterns indicates that however towers functioned, tower construction was somewhat standardized.

Detached towers make up the bulk of the southeast Utah sample although there are also a significant number of integrated towers and a few tower-kiva complex examples. Of the few integrated towers where information was available, all abutted
other architectural structures. There were several instances of wing wall alignments associated with detached towers. Towers are found at sites of all sizes but most commonly at small and medium sized sites although there were more towers per site as the site size increased. This pattern is important but it may also be biased due to the concentration of small and medium sized sites in the southeast Utah sample. Towers are occasionally found at sites with enclosing walls and sometimes are incorporated into those walls. The frequencies of the different tower types suggests that detached towers were the most popular and it is possible that how these towers functioned was also the most prevalent across the region. The association with integrated towers and site-enclosing walls suggests that these towers functioned in a similar defensive or boundary marking capacity.

Most towers had a wide viewshed encompassing between 180 to 360 degree view of the landscape. There was a strong association between tower sites and the presence of a water source. Tower sites are found in all geographic landscape categories although most commonly at sites on canyon rims, although a few sites are located on canyon bottoms/flats and talus slopes. This pattern suggests that towers were often located on prominent locations on the landscape which would have increased their visibility. The relationship of towers and permanent water sources is a strong and interesting pattern that combined with the fact that most towers are situated on elevated locations on the landscape (canyon rims) indicates that towers were meant to be visible structures possibly perhaps related to marking or restricting access to the water source.
**Tower attribute comparisons**

One of my primary objectives has been to assess the variability of towers in southeast Utah and understand how patterned attributes can better inform researchers about their function. Although I am not attempting to solve the mystery of tower function once and for all, I am making an effort to organize tower variability by how they relate to tower function. The following sections of this chapter builds on the previous discussion of the individual attributes by establishing and analyzing cross tabulations between the prominent attributes discussed above that I believe show the strongest and most interesting patterns. These comparisons are based on three separate categories of questions pertaining to: 1) attributes relate to tower construction and height; 2) tower relationship with site size; 3) tower relationship with the surrounding landscape.

Attributes relating to tower construction include: tower height, presence or absence of mortar, and tower type. Tower attributes relating to the site include: site type, and association with site-enclosing walls. Tower attributes relating to the landscape include geographic location and association with a permanent water source. The patterned attributes that characterize each tower type and how they relate to sites and to the surrounding landscape can be used to address tower function which is discussed in Chapter Six.

The initial comparisons in this first section are used to establish relationships between variables pertaining to how towers were constructed. The structural relationships between different tower dimensions is useful in creating categories of towers based on construction attributes in order to recognize variability and patterns
in towers. Specifically, the comparisons below consider material shaping, the presence or absence of mortar, estimated original height, interior diameter, and tower type. The result of these comparisons are a series of created tower categories that can be used to further address how towers relate to the site and to the surrounding landscape.

**Comparison 1: Were towers built with shaped stones usually constructed using mortar?**

Tower construction lies at the foundation for assessing tower variability. Attributes that could be useful for address tower construction include masonry shaping, the presence or absence of mortar, wall width, and estimated original height.

I have chosen to assess tower construction looking at the relationship between material shaping and masonry-lying technique. As discussed before, material shaping or the use of shaped stones suggests an element of construction formalization and helps create a stronger wall (Rohn 1971). Wet-laid versus dry-laid masonry also suggests a degree of difference in construction effort, with wet-laid masonry requiring an extra step and likely supporting a stronger and more stable tower structure.
There is a strong pattern linking towers with shaped masonry and those built with mortar and two categories of tower construction seem evident (Table 5.19).

Towers with shaped stone set in mortar can be assumed to be well-built, while towers with dry-laid, unshaped stone are likely to represent more poorly built towers. These poorly built towers may have been expediently built, the builders lacked the resources for construction, or the stability of the tower was not an important component of its function. Approximately 50% of the 40 towers in the southeast Utah sample are well-built. Only four towers fall into the poorly built category, but there are many others for which masonry shaping and mortar use could not be discerned because they were

---

**Table 5.19: Cross tabulation between material shaping and masonry laying technique. Row percents are in bold, column percents are in italics.**
so poorly preserved. These may also represent poorly built towers that disintegrated faster than well-built towers.

*Comparison 2: What is the relationship between tower construction types and estimated original height?*

Because of their more sturdy foundation and construction, well-built towers may have been taller than more poorly-built towers, I have examined the relationship between the construction types established above (well-built and poorly-built) and estimated original height. For this comparison, I combined estimated original heights into two categories: short and tall towers. Short towers are 2.5 meters and shorter, while tall towers are above 2.5 meters. These categories resulted from examining the distribution of estimated original height and observing a natural break in this distribution at 2.5 meters (see Figure 5.4).
<table>
<thead>
<tr>
<th>Construction type and estimated original height</th>
<th>Estimated original height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction type</td>
<td>Estimated original height</td>
</tr>
<tr>
<td>Well-built</td>
<td>1-2.5 meters</td>
</tr>
<tr>
<td></td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>36.8%</td>
</tr>
<tr>
<td></td>
<td>35.0%</td>
</tr>
<tr>
<td>Poorly built</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>75.0%</td>
</tr>
<tr>
<td></td>
<td>15.0%</td>
</tr>
<tr>
<td>Material shaping and dry-laid masonry</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>50.0%</td>
</tr>
<tr>
<td>No material shaping and wet-laid masonry</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>.0%</td>
</tr>
<tr>
<td>Unknown</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>64.3%</td>
</tr>
<tr>
<td></td>
<td>45.0%</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>50.0%</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
</tr>
</tbody>
</table>

*Table 5.20: Cross tabulation between construction type and estimated original height. Row percentages are in bold, column percents are in italics.*
As Table 5.20 indicates, well-built towers tend to be taller than poorly built towers, however there are towers that do not follow this pattern. There are three towers that have a mixture of construction type and tower height. These categories include towers that have shaped masonry that is dry-laid and are either short or tall, tall towers that have no shaped masonry but do have wet-laid masonry, and poorly built tall towers. Because these towers make up only a small percentage, these categories will be combined into an ‘other’ category for future cross tabulations.

The patterns established by the above cross tabulations in Tables 5.19 and 5.20 suggest three types of towers in southeast Utah: Well-built tall towers, poorly built short towers and well-built short towers. In other words, well-built towers tend to also be tall in height. This assumption is also supported by the fact that poorly built towers are shorter which suggests that poorly built towers did not need to be built high, could not have been built too tall or they would have fallen down, or they were built tall and did fall down.

Although estimated original height is an interesting variable, because of the limitations with its accuracy, tower construction categories will only include masonry shaping and the presence or absence of mortar. Estimated original height will no longer be considered as an attribute. Tower categories will include well-built towers and poorly-built towers.

**Tower relationships to site size**

The following comparisons group and consider different combinations of attributes including tower construction, tower height, tower type, and site size in
order to fully investigate the relationships between these variables. Construction types
and site size is compared first and then compared with a cross tabulation looking at
tower type and site size.

Comparison 3: What is the relationship between tower construction and different site
sizes?

The categories of site sizes suggest distinctly different levels of social
organization. For example, a small site may have had only a handful of related
occupants where decisions could be easily made whereas community centers had
large numbers of unrelated individuals and decisions over daily life and the overall
wellbeing of a community was a more complicated affair. The differences created by
site size may only be evident today by the amount of architecture, but it had very real
implications in the past. In order to streamline this comparison I have combined small
and medium sites because there was only a single medium sized tower site and this
site was closer in size to small sites. I combined large sites and community centers
because both of these are on the larger end of the size scale. The last site type, tower
complex sites, are a cluster of towers which by definition have no substantial
associated habitation component. Thus, tower complex sites represent an entirely
different kind of site type that would have required yet a third way of maintaining its
establishment and presence on the landscape.
## Construction type cross tabulated with site size

<table>
<thead>
<tr>
<th>Construction type</th>
<th>Site type</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small and medium sites</td>
<td></td>
</tr>
<tr>
<td>Well-built tower</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Poorly-built tower</td>
<td>.0%</td>
<td>75.0%</td>
</tr>
<tr>
<td>Other</td>
<td>.0%</td>
<td>17.6%</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Unknown</td>
<td>4</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>36.4%</td>
<td>52.9%</td>
</tr>
<tr>
<td>Total</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 5.21: Cross tabulation between construction type, original height and site type. Row percents are in bold, column percents in italics.

Well-built towers are found predominantly at tower complex sites. Each of the tower complex sites with well-built towers are also associated with a permanent water
source (Cave Towers, Dry Wash Overlook, and Picket Towers). It is possible that well-built towers were constructed as evidence of ownership or controlled access to a water resource. This theory is emphasized by the three well-built towers at Dry Wash Overlook which are abutted to a site-enclosing wall which is also thought to be related to restricted access or ownership.

Poorly-built towers are most common at large sites and community centers. This association perhaps tells us that construction effort was not as important and that these towers functioned in a way that did not require formalized construction (mortar and shaping of stone). Examples of poorly-built towers at large sites or community centers include Towers 2 and 3 at the O’Grosky site and Tower 1 at Radon Point. The two poorly-built towers at O’Grosky are integrated towers which abut two separate roomblocks. Their poor construction may indicate hasty construction whose function supplemented that of the roomblock (possibly extra storage or quick defense). The poorly-built tower at Radon Point is a detached tower located on the ledge below the main site component. However, this tower has a considerable view of the drainage to the north and the valley to the west. The function of this tower might have had more to do with its visibility rather than additional construction effort. As both of these sites have evidence of structures constructed of mortar and shaped stone it is not likely that the towers at these sites were poorly constructed due to lack of resources.

Comparison 4: Are certain tower types found at particular site sizes?

Another way to look at the relationship between towers and sites is by addressing the physical context of towers within sites of different sizes. Detached,
integrated and tower-kiva complexes are three distinct physical contexts in which towers are found and assessing in what proportions they are found at different site sizes may suggest how towers were conceptualized.

As in the previous cross tabulation, I have grouped site sizes into three categories: small and medium sized sites, large sites and community centers and tower complex sites. As noted above, there are cultural differences inherent in these different sizes, a small habitation site differs considerably in size and scope from a community center and tower complexes represent an altogether different context. If patterns can be detected through this comparison, then it suggests that people at sites of a particular size and organization built towers of particular types.
<table>
<thead>
<tr>
<th>Tower type</th>
<th>Site type</th>
<th>Small and Medium sites</th>
<th>Large sites and community centers</th>
<th>Tower complex</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tower type</td>
<td>Detached</td>
<td>10</td>
<td>8</td>
<td>7</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>40.0%</strong></td>
<td><strong>32.0%</strong></td>
<td><strong>28.0%</strong></td>
<td><strong>100.0%</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>90.9%</td>
<td>47.1%</td>
<td>58.3%</td>
<td>62.5%</td>
</tr>
<tr>
<td></td>
<td>Integrated</td>
<td>0</td>
<td>6</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>.0%</strong></td>
<td><strong>54.5%</strong></td>
<td><strong>45.5%</strong></td>
<td><strong>100.0%</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>.0%</strong></td>
<td><strong>35.3%</strong></td>
<td><strong>41.7%</strong></td>
<td><strong>27.5%</strong></td>
</tr>
<tr>
<td>Tower-kiva complex</td>
<td></td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>25.0%</strong></td>
<td><strong>75.0%</strong></td>
<td><strong>.0%</strong></td>
<td><strong>100.0%</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9.1%</td>
<td>17.6%</td>
<td><strong>.0%</strong></td>
<td><strong>10.0%</strong></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>11</td>
<td>17</td>
<td>12</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>27.5%</strong></td>
<td><strong>42.5%</strong></td>
<td><strong>30.0%</strong></td>
<td><strong>100.0%</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

*Table 5.22: Cross tabulation between tower type and site size. Row percents are in bold, column percents in italics.*

It is apparent from this comparison between tower type and site size, that the broad category of towers that encompasses all tower types are located at any site size along the scale from small to community center and even in specialized contexts like tower complex sites. The results of this comparison strongly support the argument that towers were an established and universal component of site architecture and that site size was an irrelevant element in their construction. This argument is consistent
with the results from the smaller Mesa Verde National Park dataset (Diederichs and Glowacki 2007).

Consistent with the other presentations of detached tower attributes, examples of detached towers are found at each site size, suggesting that this type represents the most elastic and universal tower type in the northern San Juan region. To emphasize again, although these towers are defined as detached because they are not physically bonded to other site architecture this does not mean that they are not associated with a site. The towers are detached from other architecture, not isolated from the site itself. Detached towers are found slightly more often at small sites but this could be because there was less architecture to begin with that could have been used to integrate a tower.

Integrated towers are confined to sites on the larger end of the size spectrum and at tower complex sites. At the one tower complex site with an enclosing wall (Dry Wash Overlook), three of the four towers are abutted to the site-enclosing wall. Integrated towers at large sites and community centers are either bonded to roomblocks (O’Grosky, Radon Point, and Ruin Spring) or to site enclosing walls (Ruin Spring). The special context of tower complex sites aside, the fact that integrated towers are only found at larger sites is a significant trend. I believe that integrated towers suggests that the decision to build integrated towers meant something in terms of ownership or use.

Tower-kiva complexes may also represent a kind of integrative architecture for larger sites. It is commonly thought that kivas functioned as a domestic and a ritual space (Lekson 1988) and the association of towers with kivas has also been
thought to reference the upper and lower worlds, or male and female counterparts (Van Dyke and King in press, Swentzell 1990:27; Swentzell personal communication 2009). Each of these theories suggest an element of synchronism between two distinct concepts, integrating two distinct entities together (the sacred with the profane, the past with the future, the male and the female). Since so very few of the 40 towers recorded in this southeast Utah sample have been excavated, the likelihood of more tower-kivas in the archaeological record is a distinct possibility.

**Tower relationship to the landscape**

The following group of comparisons looks at patterns pertaining to how towers relate to the surrounding landscape. These comparisons use pertinent attributes to explore how towers relate to the landscape. The main attributes considered include tower construction (an indicator of construction formalization) and the presence or absence of a permanent water source. Although this is the only cross tabulation in this section, the discussion also brings in attributes such as site type, site location and references the relationship between towers and site-enclosing walls.

*Comparison 5: What is the relationship between towers and associated permanent water sources?*

Lipe and Varien (1999:327) have suggested that during the Pueblo III period, sites are increasingly likely to be associated with permanent water sources. Although in the scope of this project I cannot look at the relationship of all sites with water sources, I am able to demonstrate that in the southeast Utah sample, a large proportion of sites with towers were associated with water. What I attempt to do
below is assess the relationship between construction type, original height and association with permanent water sources.

**Construction type and original height cross tabulated with association to a permanent water source**

<table>
<thead>
<tr>
<th>Construction type and original height</th>
<th>Water source</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td>Total</td>
</tr>
<tr>
<td>Well-built tower</td>
<td>15</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>79.0%</td>
<td>21.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Poorly-built tower</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>50.0%</td>
<td>50.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>6.9%</td>
<td>18.2%</td>
<td>10.0%</td>
</tr>
<tr>
<td>Unknown</td>
<td>11</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>37.9%</td>
<td>27.3%</td>
<td>35.0%</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>11</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>72.5%</td>
<td>27.5%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 5.23: Cross tabulation between tower construction, original height and association with permanent water sources. Row percents are in bold, column percents in italics.
The strongest pattern demonstrated by this cross tabulation is the relationship between well-built towers and the presence of permanent water sources. Almost 80% of well-built towers are associated with a permanent water source. Eleven of the 15 well-built towers are found at tower complex sites (Cave Towers, Dry Wash, and Picket Towers). At each of these tower complex sites the towers always bracket the water source, similar to canyon head community layout, so that the only unguarded access to the water is from below. This layout may have acted in a similar fashion as a site-enclosing wall at sites without this feature. Although only Dry Wash Overlook has a site-enclosing wall, the presence of these impressive tower structures may have been enough to denote power over the water source. The excavated well-built tower at Picket Towers suggested domestic activity as its primary function, with its prepared floor, central fire pit and utilitarian artifact assemblage. Since a larger habitation site was located just down the canyon, it is possible that this tower (and possibly the two others at this site) were lived in by individuals who guarded access to the water source at the head of the canyon.

The well-built towers at habitation sites with a permanent water source include towers from the Comb Wash Spring (Tower 1), White Triangle Complex (Towers 1 and 2), and Whetherill’s Chimney Rock (Tower 1). The Comb Wash Spring tower is located at the base of Comb Ridge on the western side with a prominent viewshed up and down Comb Wash and sits on a clay knoll elevating it off the ground surface. As well as being associated with a permanent water source the White Triangle towers may be explained by their already visible location on the landscape at the base of Comb Ridge along Comb Wash which is in sight of several
cross-over trails. The Whetherill’s Chimney Rock tower is the first structure one reaches when heading to the spring from the South.

The outliers in this comparison are the tower-kiva complex at Mule Canyon (medium-sized site) the tower at Fishmouth Canyon (small site), The Lower Butler Wash site (small site) and the Butler Wash Mesita site (small site). The Mule Canyon tower-kiva complex outlier can be explained by the specialized association between the tower and kiva and the well-built tower may have also functioned as a marker of ownership or restricted access to the kiva as opposed to a water source. This tower was also excavated and the evidence does not directly point to storage or domestic use which may also be used to argue that it functioned as a marker or ownership of land tenure or water resources. The Fishmouth Canyon tower may have originally marked a productive spring that is no longer active or was used to guard access to the two cross-over trails visible from the site. The three shrines or herraduras located near the site may also suggest the relationship between the Fishmouth Canyon site tower and the cross-over trails. The other well-built towers not associated with a water source are the Lower Butler Wash site tower and the Butler Wash Mesita site. Both are detached towers and are positioned on prominent locations on the canyon rim and may have been used as look-outs for their associated sites or markers of ownership/access of other resources.

The two poorly-built towers at sites with permanent water sources include Tower 1 at Radon Point and Tower 3 at Picket Towers. It is possible that in each case, these towers could have originally been impressive buildings despite their use of unshaped stone and lack of mortar. These two towers do however, directly overlook
the springs at each site and while they may not have been spectacular structures, the point is that they were closely associated with the water.

**Summarizing tower variability**

The cross tabulations presented in the section above present some intriguing patterns that relate to tower variability. The first few cross tabulations pertaining to tower construction established two basic tower types: well-built towers and poorly-built towers. Well-built towers had a strong tendency to be tall while poorly-built towers tended to be short. Although this pattern is interesting to consider, because of the limitations inherent in estimating original height, the categories of tower construction only included masonry shaping and the presence and absence of mortar.

The next series of cross tabulations looked at the relationship between towers and the site. Both detached and integrated towers tend to be well-built. Tower-kiva complexes also tend to be well-built but the small sample size limits my abilities to investigate this relationship to a high degree of accuracy. Towers that were well-built were found most commonly at small/medium sites and tower complex sites. By comparison, poorly-built towers were most common at large sites and community centers. Detached towers were found at all site sizes although both integrated towers and tower-kiva complexes were found commonly at large sites and community centers. Integrated towers were also found commonly at tower complex sites. Looking at the cross tabulations between towers and their relationship to the landscape, the towers that are associated with a permanent water source were almost always well built.
The variability and patterns in the southeast Utah towers strongly demonstrate attributes that can be related to marking ownership or restricting/guarding access to resources, especially water. That most towers are well-built and are commonly associated with water is one of the strongest patterns that has developed out of the above analysis. These towers are most often detached but are also integrated into site-enclosing walls which may indicate added defense or a more concrete way of guarding and restricting access to the water source. The excavated well-built towers at Mule Canyon and Picket Towers suggest that these towers may have been activity areas or used as short-term habitations. In both cases the human activity at these towers suggest that the tower sentinels were manned suggesting a vigilant dedication to guarding the water source.

The poorly-built towers are found to be detached or abutted to roomblocks rather than site-enclosing walls. These towers may have functioned as storage facilities or quick defensive refuges, but their lack of shaped stone and mortar would not have made them ideal for storage facilities or places of refuge against attack. It is possible that these towers could also have been hasty attempts to mark ownership over particular resources or restricted access to certain areas within the site.

**Comparisons with the southwest Colorado and Hovenweep sample**

Identifying and assessing the full range of variability of towers across the northern San Juan region is an important contribution in that it explores intraregional variability in how towers were constructed as well as their relationship to the site and
to the surrounding landscape. The regional sample includes the towers from the four sites: Sand Canyon, Woods Canyon, Yellow Jacket and Castle Rock Pueblos as well as the six sites excavated at Hovenweep National Monument. Because of the focus on community centers in the southwest Colorado data set whereas the southeast Utah data consists of both the largest and the small sites, the available data does not allow for the in depth comparisons but there is enough information to allow for an analysis of how towers were built and used by assessing broad trends identified in both the southeast Utah and southwest Colorado/Hovenweep datasets. Attributes I am able to examine include: tower shape, tower type, association with site-enclosing walls, association with permanent water sources, and site location.

**Attributes pertaining to tower construction**

There are significant differences in the data pertaining to tower construction between the southeast Utah sample and the published literature on sites in southwest Colorado and Hovenweep. In fact, the only overlapping attribute between these two samples is tower shape. Since towers in southeast Utah are predominantly circular, a comparison with the rest of the region is useful for addressing the full range of tower shapes.
Attribute 2: Tower shape

<table>
<thead>
<tr>
<th>Tower shape</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circular</td>
<td>36</td>
<td>66.7</td>
</tr>
<tr>
<td>Rectangular</td>
<td>9</td>
<td>16.7</td>
</tr>
<tr>
<td>Square</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>D-shaped</td>
<td>7</td>
<td>13.0</td>
</tr>
<tr>
<td>Irregular</td>
<td>1</td>
<td>1.9</td>
</tr>
<tr>
<td>Total</td>
<td>54</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 5.24: Frequencies of different tower shapes in the southwest Colorado/Hovenweep sample.

Although circles remains the most common tower shape, there is more variety in tower shape in the southwest Colorado and Hovenweep towers than in southeast Utah (See Tables 5.5 and 5.24). Although part of this may relate to the slightly larger sample size, I believe there are other cultural reasons which points to this divergence. Of particular note, there were no rectangular, D-shaped, or irregular shaped towers in the southeast Utah sample. The one irregular shaped tower in the Hovenweep and southwest Colorado sample is located at Castle Rock Pueblo and was constructed between a boulder and cliff wall which gave it its irregular shape. The square tower is from Hovenweep and represents a unique tower structure that has been rarely duplicated. Interestingly, D-shaped towers represent 13% of the entire sample in southwest Colorado and Hovenweep and are the third most common tower shape.
Attributes pertaining to tower association with the site

The attributes I was able to compile from the southwest Colorado and Hovenweep dataset that pertain to how towers are associated with the site include tower type and site-enclosing walls. I am not including site type in this discussion because the sample is inherently biased towards community centers and thus a predominant amount of the tower data will come from these sites rather than an even distribution among different site sizes. As discussed before, tower types describe how towers are associated with other site architecture. Lastly, the association between towers and site-enclosing walls has been addressed in the literature from southwest Colorado (Kenzle 1993, 1997); the contribution of this discussion is important in that it assesses the patterns and differences in the relationship between towers and site-enclosing walls which may relate to ideas of defense or used to limit access.

Attribute 1: Tower types

<table>
<thead>
<tr>
<th>Tower type</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detached</td>
<td>29</td>
<td>53.7</td>
</tr>
<tr>
<td>Integrated</td>
<td>15</td>
<td>27.8</td>
</tr>
<tr>
<td>Tower-kiva complex</td>
<td>10</td>
<td>18.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>54</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Table 5.25: Frequency of tower types in southwest Colorado/Hovenweep sample.

The proportions of tower types in southwest Colorado and at the Hovenweep sites is very similar to the patterns displayed by towers in the southeast Utah study.
area (see Tables 5.15 and 5.25). Detached towers are by far the most common tower type, representing over 50% of the entire sample of 54 towers (compared to 62% in southeast Utah). Integrated towers characterize 27% of the sample in both southeast Utah and southwest Colorado and Hovenweep. In both study areas, tower-kiva complexes are found in the lowest numbers.

That detached towers are by far the most common tower type in the southwest Colorado and Hovenweep dataset, making up over 50% of the sample. Excavated towers in southwest Colorado include ones at Castle Rock Pueblo and nearly all of the towers at the Hovenweep sites. Artifacts and features documented at these towers suggest that they were used for food processing or perhaps domestic functions (Kuckelman 2000; Winter 1980). The detached tower at Castle Rock Pueblo is also thought to be defensive due to its location backed up against the sandstone butte at the site (Kuckelman 2000). Integrated towers, the next most frequent context for towers suggests that the physical abutment of towers to other architectural features was a strong component of site layout. Excavated integrated towers at Castle Rock that are integrated with the site-enclosing wall suggest a domestic or defensive function. That tower-kiva complexes are found in greater numbers in southwest Colorado and Hovenweep than southeast Utah is to be expected as this tower type was first constructed in Mesa Verde Proper and the surrounding area during the Pueblo II period, before towers began to spread through out the northern San Juan region (Lipe and Varien 1999:391-320; Varien 1999).
Attribute 19: Association with site-enclosing walls

<table>
<thead>
<tr>
<th>Tower sites with an enclosing wall</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>4</td>
<td>40.0</td>
</tr>
<tr>
<td>No</td>
<td>6</td>
<td>60.0</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Table 5.26: Association of towers sites with site-enclosing walls in the southwest Colorado/Hovenweep sample.*

Four of the 10 sites in the Southwest Colorado and Hovenweep sample have site-enclosing walls. Not surprisingly, these include the large sites and community centers found in southwest Colorado: Sand Canyon Pueblo, Castle Rock Pueblo, Yellow Jacket Pueblo and Woods Canyon Pueblo. Enclosing walls are common features of large Pueblo III community centers although it is interesting that between these four sites, only three towers were found to abut the site-enclosing wall despite the commonly perceived association of towers and site-enclosing walls (Kenzle 1997; Lipe and Ortman 2000).

The three towers that are integrated with a site-enclosing wall are found at Sand Canyon Pueblo. These towers have also been excavated and the artifact and feature assemblages recovered and documented from each tower suggest a domestic component. The D-shaped tower that abuts the outside of the site-enclosing wall is thought to be defensive given its unique location outside of the site wall (Kuckelman 2007). One of these towers (Tower 101) may also have had ritual significance because of the niches found in the wall and the sandstone animal effigies found in the room fill (Kuckelman 2007). The site-enclosing wall towers at Sand Canyon thus
demonstrate a combination of domestic and defensive features suggesting that perhaps they functioned as structures that housed guards or lookouts that limited access in and out of the community.

At Woods Canyon Pueblo, four of the 15 towers at the site are found on the canyon rim and were built right inside of the enclosing wall. Although they are not architecturally associated with the enclosing wall, their prominent location above a majority of the site architecture, which spills onto the talus slope below, it is possible that these towers functioned in a similar fashion as the towers at Sand Canyon which could have been used to guard access to the site or the spring at its base.

**Attributes pertaining to tower association with the landscape**

The relationship between towers and the surrounding landscape has implications for how towers were conceptualized and how they functioned. There are two attributes relating to this relationship that overlaps between the southwest Colorado and Hovenweep sample and the southeast Utah sample. These variables include the association of towers with permanent water sources and the location of tower sites on the landscape. Tower sites in the southeast Utah sample were associated with water more than 60% of the time and I wanted to determine if this same pattern was found in the southwest Colorado and Hovenweep dataset.
**Attribute 16: Association with a permanent water source**

<table>
<thead>
<tr>
<th>Towers sites associated with a permanent water source</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>9</td>
<td>90.0</td>
</tr>
<tr>
<td>No</td>
<td>1</td>
<td>10.0</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Table 5.27: Distribution of tower sites associated with permanent water sources in the southwest Colorado/Hovenweep sample.*

The relationship between the presence of towers and permanent water sources in the southwest Colorado and Hovenweep sample overwhelmingly supports the pattern between towers and water sources. In the southwest Colorado and Hovenweep sample, 90% of the tower sites were associated with permanent water sources. The only tower site not associated with a permanent water source is Castle Rock Pueblo (although the site is located in reasonable proximity to McElmo creek). The strong association with towers and permanent water sources is mirrored in the southeast Utah data where 60% of tower sites are also found near water. Of the 54 towers in the southwest Colorado/Hovenweep sample, 60% of the towers are found at the nine sites found to be in close proximity with a water source. The towers at these sites are predominantly detached structures situated on prominent locations on the landscape. At Sand Canyon, three of these towers are abutted to the site-enclosing wall and at Yellow Jacket Pueblo, a one tower at Yellow Jacket is located adjacent to the site spring. Many of the towers mentioned at these sites have been excavated. In particular, the feature and artifact assemblages at the Hovenweep tower sites suggest
domestic or food processing activities. Some of the excavated Sand Canyon towers also show a domestic function. This pattern is strengthened by the excavated tower at Picket Towers in southeast Utah which also sat overlooking a permanent spring and whose artifact and feature assemblage suggested short term domestic use and food processing. The similarities in these tower locations close to water, abutted to site-enclosing walls and with possible domestic or food processing functions suggests that these towers may have guarded or restricted access to the water source.

The outlier tower sites in the southwest Colorado and Hovenweep sample that are not associated with a permanent water source is Castle Rock Pueblo. The towers at Castle Rock Pueblo were detached structures located at the base of the sandstone butte. The location of the towers at this site are thought to be defensive but the excavated tower at Castle Rock Pueblo suggests that it was an area for food processing. It is possible that they were used to overlook and guard access to other important resources (possibly farmland) or were used for food processing or storage. Kuckelman (2003) also suggests that the Castle Rock towers were used as places of refuge if the site were to be under attack.
As would be expected, 90% of the tower sites in the southwest Colorado and Hovenweep sample are found at prominent landscape locations such as canyon rims, mesa tops and canyon heads. This is not surprising as most sites in the Pueblo III period clustered on canyon rims and canyon heads (Lipe and Varien 1999:303). As discussed in previous comparisons, it is interesting that there is a propensity to build towers at this very visible location. Building upon earlier attribute patterns, these towers located in prominent locations are also often found at sites with permanent water sources. If towers were built to guard or limit access to a water resource, their highly visible location on canyon rims, mesa tops or canyon heads would be an added benefit.

The tower site located at a lower elevation is Castle Rock Pueblo. However, while it is true that the majority of the site architecture is located on the flatland of McElmo Canyon, the site is backed to the North by a large sandstone butte that is
thought to have been used as a lookout and for defensive measures (Kuckelman 2003). Therefore, even at a site in a canyon bottom, the tower is still associated with a prominent defensible landscape feature.

**Pattern recognition**

Although in both the southeast Utah sample and the southwest Colorado and Hovenweep sample, circular towers dominate the shape category, there is more variation in tower shape in southwest Colorado and at Hovenweep. Because towers originated in the eastern sub-regions (Varien 1999), inhabitants not only had more time but also perhaps more creative license to experiment with tower shape and context or variety in symbolic ideas or different learning frameworks. By contrast, the towers in southeast Utah may represent the condensed canon for how towers should look based on the idea that perhaps the reasons for towers required specific shapes. This standardization took the shape of circular, square and sub-rectangular towers.

As with the southeast Utah sample, detached towers are the dominant tower type. As discussed above, detached towers that have been excavated suggest a combination of domestic, food processing and defensive features. The single detached tower that was excavated in the southeast Utah sample at Picket Towers demonstrated a similar suite of features that suggested a domestic and food processing function. There are similar proportions of integrated towers in both the southwest Colorado/Hovenweep and southeast Utah samples. More of the integrated towers in southwest Colorado are integrated with site-enclosing walls while the integrated towers in southeast Utah tend to be integrated into both site-enclosing walls and with
roomblocks. The only excavated integrated towers in either sample are at Sand Canyon Pueblo. These towers are integrated with the site-enclosing wall and their architecture and feature/artifact assemblage suggest a domestic and defensive nature. Tower-kiva complexes make up the smallest percentages in both southeast Utah and in southwest Colorado and Hovenweep. This small number may be because not many tower-kiva complexes were built in the later Pueblo III period.

Four of the 10 sites in the southwest Colorado and Hovenweep sample had an enclosing wall. Although it is difficult to compare the percentages of tower sites with enclosing walls between the southwest Colorado/Hovenweep and southeast Utah sample because of the concentration of community centers in the southwest Colorado sample, it is interesting to look at the attributes exhibited by the towers that are integrated with site-enclosing walls. The artifact and feature assemblages from the excavated towers at Sand Canyon Pueblo that are integrated with the site-enclosing wall suggest a domestic and defensive function. Paired with their architectural relationship to the site-enclosing wall, itself a feature meant to create a boundary and guard access to the site, suggests that perhaps the towers at Sand Canyon may have been used by individuals to limit the comings and goings of inhabitants and outsiders at the community. Similar to the Sand Canyon site, Ruin Spring is a community center site located at a canyon head in southeast Utah and also has several towers integrated with the site-enclosing wall. It would be an interesting comparison if these towers could be excavated to see how their architecture and artifacts/feature assemblage compares with the enclosing wall towers at Sand Canyon Pueblo.
The data from southwest Colorado and Hovenweep in regards to the relationship between towers and permanent water sources is similar to the patterned relationship found in southeast Utah. Both samples demonstrate a strong positive correlation between the presence of a permanent water source and towers. This is perhaps one of the patterns that may hold a significant clue as to tower function. The clear association between towers and permanent water sources across the northern San Juan region strengthened by the excavated towers at the Hovenweep sites and Sand Canyon Pueblo suggest that towers may have functioned to guard or limit access to the water source. They show evidence of food processing or domestic functions that may be interpreted as short-term occupation of the towers for people who guarded the water source. The towers at Sand Canyon integrated with the site-enclosing wall strengthens the argument that towers were structures meant to guard access to the site and perhaps the spring as well.

The last overlapping attribute category that can be compared across the southwest Colorado/Hovenweep and southeast Utah sample is the relationship between towers and site location. Both samples reveal that towers are predominantly found on canyon rims and other elevated locations such as canyon heads and mesa tops. There are also towers found across all categories of site location in both samples suggesting that towers can be found in all different geographic landscapes that I have defined. However, the predominance of towers at elevated locations on the landscape creating a heightened visibility, combined with their relationship with permanent water sources supports the assumption that these towers were meant to be visible markers that guarded access to natural resources such as water sources.
There appears to be both strong patterns and wide disparities between the towers of southwest Colorado, Hovenweep and southeast Utah. While looking at the trends of towers as a whole, there are considerable overlaps on frequencies and relationships of towers with the site and with the landscape. However, looking from a contextual angle and addressing towers through their relationship with other architecture, there appears to be considerably more variation in how towers relate to the site and to the landscape.

**Summary**

The sum of the previous chapters in this thesis was a theoretical and methodological build up to the culmination of my research analysis which has been presented above. This chapter has outlined and presented the frequencies and proportions of the available data across the northern San Juan region with obvious emphasis on data from southeast Utah. The analysis of these attributes was aimed at identifying patterns and variability in tower construction, context, and relationship to the social and natural landscapes of the Pueblo III period. The cross tabulations presented above represent an attempt to create categories of towers based on evidence from the archaeological record rather than a top-down approach of addressing towers through preconceived notions of context or function. The categories I have created have allowed me to introduce comparisons that relate to capacities in which towers may have functioned which will be discussed in the following chapter. The additional data supplemented by the southwest Colorado and Hovenweep data demonstrated
similarities and intraregional differences among towers from distinct sub-regions of the northern San Juan.
Chapter 6

Conclusions and Future Research

In this concluding chapter I return to the primary goals that have guided the research of this thesis. In Chapter One, I defined my goal as assessing the variability in towers with a secondary aim at understanding how towers functioned and the creation a more refined definition of towers that better encompasses their variability. The foundation for understanding this variability is a discussion of the natural and social context in which towers proliferated.

To briefly summarize the themes demonstrated in Chapter Two, the northern San Juan region during the late Pueblo II and Pueblo III periods out of which towers developed was rife with social reorganization, violence and environmental downturn, leading to the ultimate depopulation of the region. The combination of these factors produced significant changes in settlement patterns, site layout, demographics and architecture that made the Pueblo III period unique from earlier time periods. Newly aggregated sites clustered around defensive locations such as canyon rims and heads (Glowacki 2006; Kuckelman et al. 2002; Lipe and Varien 1999). New architectural forms such as plazas, D-shaped structures, multi-walled structures, site enclosing walls, and towers suggested new means of establishing and maintaining relationships between community members and outsiders (Glowacki 2006; Kenzle 1997; Kuckleman 2000; Lipe and Ortman 2000; Lipe and Varien 1999).

Chapters Two and Four discussed in detail the locational and architectural attributes demonstrated by each site in both the southeast Utah and Hovenweep and
southwest Colorado samples. Using the attributes introduced in Chapter Three, I looked at tower construction as well as the relationship to tower sites and to the natural landscape. Through analysis of the frequencies and percentages of each attribute, I detected patterns in tower construction, architectural context and location that were discussed in Chapter Five. To address tower variability across sites in southeast Utah, these patterns were used to assess a series correlations between different tower attributes to clearly emphasized which patterns were strongly demonstrated. The result of these comparisons produced overt patterns in construction and context that remained relatively consistent within the southeast Utah sample and similarities across the northern San Juan region.

This concluding chapter discusses the most important contribution of this thesis which is built on how the attributes introduced in Chapter Three, recorded in Chapter Four and examined in Chapter Five have provided information that allows me to create a more refined definition of towers and assess the function of towers. Identifying patterns of traits exhibited by towers has created a category of architecture that we define as “towers” in order to better evaluate what they are and how they were used. I discuss how this particular study relates to the ever-increasing amount of research concerning the later decades of northern San Juan region occupation. I also raise an appeal for future archaeological research to consider towers, not only individually, but across the landscape, as an effective and profitable avenue of research that can contribute to a broader understanding of prehistory.
What is a tower, revisited

When I began this research project, I based my definition of towers as those proposed by other scholars (Johnson 1999; Kuckelman 2000; Winter 1981). These definitions were loosely based on the fact that towers are supposed to be taller than they were wide. I identified towers based on the presence of high piles of rubble, which were often circular. However, in many cases, I had to be selective about what I called a tower during my research because many past archaeologists have lumped a huge variety of unknown piles of rubble into the tower category.

I have critically examined the variation among towers with reference to architectural construction and location in order to better develop tower classification. The results of data manipulation in Chapter Five revealed that there are very clear and consistent commonalities in tower construction, their relationship to sites, other architecture, and location on the landscape. Below, I have created a definition that encompasses the variability of towers across the northern San Juan region and that reinforces the identification of towers as a distinct feature class. To summarize the variability that I have found in towers across the northern San Juan region I discuss the two tower construction types that I have identified. I also discuss the variability in towers based on the types established by other scholars (detached, integrated, and tower-kiva complexes). The benefit of analyzing towers from these two separate approaches has allowed me to address towers from a construction and contextual view.
A new tower definition

Some archaeologists have ruminated that the variability in construction, size, and location suggests that the term ‘tower’ is an architectural label rather than encompassing both a structure type and a specific function (Kuckelman 2000; Winter 1977, 1981). Kuckelman (2000: paragraph 27) goes so far as to say,

“even as an architectural label, however, its use [tower] is somewhat arbitrary and dependent on the perception of the beholder. Given the great range of shapes, locations, and evidence of use, it is possible – even likely – that the buildings archaeologists call towers were actually thought of and referred to as several different types of buildings by the ancient Puebloans”.

That said, from an archaeological point of view, our perception of towers must be considered to be an effective classification for research and categorized to the best of our ability. Below, I have condensed the patterns exhibited by the tower data in Chapter Five to create a definition of towers that extends beyond the current definition of towers as being taller than they are wide (Johnson 1999:324; Kuckelman 2000:paragraph 26; Schulman 1950:289).

Tower architecture

The frequencies of attributes described in Chapter Five suggests that the tower canon consisted of an above ground structure found to be circular 75% of the time. The data suggests that most towers stood more than 2.5 meters in height, although the possibility that these structures were unfinished or had their stone removed and reused means that it is likely that they were taller. The interior space of most towers roughly measured 3.5 meters in diameter. At face value this would mean that towers
were wider than they were tall but given the limitations of assessing a tower’s original height, I believe that most towers would have stood taller than they are wide. The interior diameter of circular towers measuring 3.5 meters separates them from other structures such as kiva or habitation structures (Lipe 1989; Smith 1998). Tower wall width also separates towers from other Pueblo III structures. The average wall width of towers in southeast Utah is 50 centimeters, which is 20 to 30 centimeters wider than other architecture during this time period (Rohn 1977). Although this width may not have been visible from the outside, the large sandstone blocks and slabs used for tower masonry certainly were.

*Well-built towers*

Most towers in the southeast Utah sample were well-built, meaning they demonstrated a combination of shaped stone and wet-laid masonry. These towers commonly have double coursed or compound masonry walls. While detached towers make up a significant proportion of this tower type, integrated towers are almost exclusively well-built. These towers are found primarily at canyon rims and at tower complex sites. There is a strong association between these towers and the presence of permanent water sources as well as a relationship between well-built towers and site-enclosing walls.

*Poorly-built towers*

In all, there were three poorly built short towers; they were characterized by unshaped stone and dry-laid masonry. Only detached towers make up this category.
These towers commonly have a wide interior diameter and only exhibit single coursed masonry walls. These towers are found predominantly at large sites and community centers and commonly located along canyon rims and canyon heads.

**Tower types and associated architecture**

Another way of addressing towers is by looking at their context in association with other site architecture. The archaeological literature has long distinguished towers by how towers were architecturally and physically associated with other structures (Deiderichs and Glowacki 2007; Fewkes 1923:145-146; Morley and Kidder 1917:42; Schulman 1950: 289; Winter 1981:29). The types that I have used throughout this thesis (detached, integrated and tower-kiva complexes), represent three distinct contexts in which towers relate to other architecture. The correlations presented in Chapter Five suggested that the variability of these tower types to other architecture also extends to their construction as well as their relationship to sites as a whole and to how they interact with the surrounding landscape.

**Detached towers**

Of the 40 towers in the southeast Utah sample, 25 were detached towers. They tended to be well-built although they varied considerably in height. Their average interior diameter is approximately 3 meters. Detached towers are found more often at large sites and community centers. In both the southeast Utah and southwest Colorado and Hovenweep samples, detached towers tend to be found predominantly on canyon rims. A very small but not insignificant portion of detached towers in
southeast Utah found on canyon rims are associated with low wall alignments which I have identified as a wing wall feature. Detached tower viewshed does not differ substantially from any other tower type. Detached towers also tend to be found at sites associated with a permanent water source in southwest Colorado, Hovenweep and southeast Utah.

*Integrated towers*

I identified 11 integrated towers in the southeast Utah sample which are commonly both well-built and tall, although their enhanced viewshed does not seem to give them a visibility advantage against any of the other tower types. Their interior diameter on average measures within the norm for southeast Utah towers in the sample. Integrated towers in southwest Colorado, Hovenweep and southeast Utah are commonly found at large sites, community centers and tower complexes. Within the southeast Utah sample, all integrated towers were found to abut (rather than bond with) other architecture suggesting that they were earlier or later architectural additions. Integrated towers were found more commonly to abut site-enclosing walls rather than roomblock architecture. Integrated towers are commonly found on canyon rims and at sites associated with a water source across the northern San Juan region. At those sites with a permanent water source in southeast Utah, integrated towers were more likely to be found connected to the site-enclosing wall.
**Tower-kiva complexes**

The small sample of four tower-kiva complexes in the southeast Utah sample makes it hard to generalize about them although the additional data from southwest Colorado and Hovenweep does help illuminate particular patterns. In southeast Utah, tower-kiva complexes vary in height but are always well-built. In both the southwest Colorado, Hovenweep and southeast Utah samples, tower-kiva complexes are most often found at large sites and community centers. While in southeast Utah this tower type is found at sites located on canyon rims or flat land, in southwest Colorado and Hovenweep, tower-kiva complexes are predominantly found on canyon rims. In both samples, tower-kivas are typically found at sites associated with a permanent water source.

**Tower summary**

The similarities emphasized in tower construction, context and location suggests that towers were a pervasive element of Pueblo III site architecture and they likely functioned in a similar capacity across the northern San Juan region’s social landscape. Although I discussed only 25 of the thousands of Pueblo II/Pueblo III sites in the northern San Juan region, many other scholars have suggested the pervasive nature of towers during this time period which suggests that the patterns presented in this thesis analysis are consistent with the larger scope of towers across the northern San Juan (Kuckelman 2002:237; Lipe and Ortman 2000:108; Lipe and Varien 1999:320; Morely and Kidder 1917:42; Schulman 1950:289; Varien et al. 1996:98).
Addressing tower function

The goal of tower attribute analysis presented in this thesis was not only to identify tower variability but also to grapple with understanding how towers functioned. Although it is impossible without excavation of all towers to develop a concrete theory of how towers functioned, the systematic look at how towers relate to the architecture around them and relation to the surrounding landscape, it is possible to gain a better idea of their role. Supported by data from excavated towers in southeast Utah, southwest Colorado, and Hovenweep National Monument, tower function can be addressed by looking at the suites of construction and contextual attributes of the towers themselves.

Defense/resource monitoring/boundary making

As suggested in Chapter Three, towers used for defense, resource monitoring or boundary making would have had a similar archaeological signature. All three of these functions are similar in their restrictive capabilities, guarding or limiting access. Architecturally, these towers should be constructed with thick fortified walls. They should be situated in a defensible location and commonly associated with a site-enclosing wall. If towers functioned to guard access to a natural resource there should also be a strong relationship between these towers and resources such as permanent water sources.

Archaeologically, the strongest patterns suggest that towers functioned as guards for permanent water sources, although other natural resources such as
farmland may also have been monitored (Johnson 1999). In southeast Utah, 60% of
tower sites are located near permanent water sources and in the southwest Colorado
and Hovenweep sample, 90% of the tower sites are associated with water. Well-built
towers exhibit the construction attributes that should be expected of a tower meant as
defensive structures to guard access to a water source or even to the site itself.

To support this argument, in southeast Utah, not only are well-built towers found in close proximity to water, they are also commonly found at prominent
locations on the landscape such as canyon rims and canyon heads. This elevated
location would have made them very visible markers; well-built structures that
implied guarded access to an important natural resource. This idea is also supported
by the fact that some of these well-built towers are also found integrated with site-
enclosing walls which are thought to be defensive features that limit access between
one side of the wall and the other (Kenzle 1993, 1997). At all tower complex sites in
the southeast Utah sample, the towers at these sites enclose the water source which
would have limited “unguarded” access to the water only from below, which was
often steep talus slopes or sheer drop offs (a natural defense). In some cases, such as
Dry Wash Overlook and Cave Towers, a small amount of domestic architecture was
also found below the canyon rim which could have acted as guards as well. At tower
complex sites, the only functional access to the water sources would be to pass by the
towers. Larger sites with lots of architecture function in a similar fashion with both
towers and domestic architecture guarding the water source and access to the site.
Sites such as Ruin Spring, Sand Canyon Pueblo, and Yellow Jacket Pueblo are three
such examples of community center sites are examples where a combination of a site-
enclosing wall and integrated towers presented a formidable boundary between a water source, the site and outsiders. Wetherill’s Chimney Rock, another large site, may not have had a site-enclosing wall, but the position of the three towers at the site suggest that they guarded access to the spring. In the case of the Comb Wash Spring site, the only way to access the spring would be from the East, past the two towers, since the spring is backed up against the impenetrable wall of Comb Ridge.

Excavated towers associated with permanent water sources across the northern San Juan region include Tower 1 at Picket Towers, four towers at Sand Canyon Pueblo and seven towers excavated at the Hovenweep sites. Three of the four towers at Sand Canyon Pueblo were integrated with a site-enclosing wall. Most of these towers were thought to be tall structures, measuring over three meters in height and all are located either on canyon rims, canyon heads or mesa tops thus giving them an exaggerated visible presence. However, if towers functioned to limit access to a water source, the tower was only part of the equation. Individuals were likely stationed at these towers to watch over the access to the water. It is possible that these towers functioned as short term living quarters where domestic needs such as food processing might have been likely activities. This argument is strengthened by the artifacts and features uncovered at all these excavated towers which suggested domestic activity as well as food processing (Hardy 1975; Kuckelman 2007; Winter 1980). In the case of Picket Towers tower complex, the idea that these detached towers were short-term houses for people may have been especially true since the associated habitation component was not located directly at the canyon head with the
towers. In the case of Sand Canyon, it is possible that the towers integrated with the site-enclosing wall also functioned to watch access to and from the site. Although only a fraction of the towers across the northern San Juan region have been excavated, the above ground attributes of the excavated towers are similar to many of the other towers I have collected in my data sets. Although I cannot assume that these excavated towers can be used as direct analogies for all towers it is possible to draw links between them and other towers. At Yellow Jacket Pueblo, the location of the towers are thought to reflect the need to guard the roomblocks and spring (Kuckelman 2003). The towers at Woods Canyon, although unexcavated, also suggest an exaggerated emphasis on visibility and four of the towers on the canyon rim are enclosed by the enclosing-wall. The towers below on the talus slope also overlook the spring. Access to the spring from above was certainly regulated by the towers on the canyon rim and the access from the canyon bottom was observed by the towers on the talus slope. The towers at Dry Wash Overlook are located on a canyon rim, directly above a spring and three of the four are integrated with a site-enclosing wall. The Ruin Spring towers are integrated with a site-enclosing wall which surrounds a canyon head community and a productive spring. The Comb Wash Spring towers are located on prominent clay knolls at the base of Comb Ridge in front of a productive spring. Although there was no enclosing wall associated with this site, one would have to pass by one of the two towers to access the water. The location of the White Triangle complex towers could not only monitor access to the spring but could also have monitored the comings and goings over the White Triangle cross-over trail. Although located against the base of the Comb Ridge talus slope, one
of these towers was built on a detached boulder, exaggerating the visibility of that particular tower and perhaps drawing attention to the site’s location. The increased visibility of this tower might also have worked in the other direction. Not only would more people see the tower but those standing on the tower would have been better able to monitor the spring and individuals on the White Triangle cross-over trail and on the road to and from the Comb Wash great house to the West.

*Outlier cases*

All but six of the 40 towers in the southeast Utah dataset are not found near a water source and only two towers at sites near a water source are poorly built. The six towers that do not fit the model argued above include the tower-kiva complex at Mule Canyon (well-built), the detached tower at the Fishmouth Canyon site (poorly-built), the detached tower at the Lower Butler Wash site (well-built), the detached tower at the Butler Mesita site (well-built), and two of the towers at O’Grosky (both are poorly-built). Some of these towers such the Fishmouth Canyon tower, the Lower Butler Wash tower and the O’Grosky towers are situated on the northern canyon rim overlooking a drainage canyon that runs off of Comb Wash to the East. Although there is no water source directly associated with these sites, there is a known spring at the head of both Fishmouth Canyon and cross-over trails in sight of all three tower sites. All of these towers are detached towers except for one of the towers at O’Grosky which is integrated with a surface roomblock. While these towers may not have been guarding access to a water source they could have been limiting
access to other resources such as farmland or even marking the location of cross over trails.

The Butler Wash Mesita tower, located on the eastern rim of the mesita in line-of-sight with the larger Butler Wash Ruins site may have been used for communication with the larger site which is located in an alcove near the wash and did not have a very expansive viewshed. The mesita tower, which commanded a large viewshed in all directions might have functioned as a look-out station rather than directly guarding or limiting access to and from the large site below.

The Mule Canyon tower-kiva complex is not associated with a permanent water source although it might have monitored farmland close by. The tower’s original height is estimated to have been five meters (Hull 1974) which would have made it a towering feature on the landscape. This tower-kiva complex is also in direct line-of-sight with the Cave Towers site to the southwest which is associated with a permanent water source. It is possible that this tower-kiva complex did not function to monitor resources but was used for communication with other contemporary sites in the area. The tunnel between the tower and kiva might have been ceremonial where individuals could appear and disappear through the underground passage linking the tunnel and kiva. The artifact assemblage recovered from this tower included only a light density of sherds and lithics which suggests that it was not predominantly a domestic residence although it still leaves its real function unclear.

Although defense is often caught up with ideas of refuge, I believe that while towers might have been places to see people approaching, or a place for one or two individuals to defend against invaders, towers would not have made good places of
refuge. On average, the interior area of a tower is less than 9 square meters, which would have been uncomfortable for even a handful of people. The foundation level entrances on most towers would likely have been made of wood or a stone slab, something that would have been easy to remove by attackers. The wooden roofs of towers (assuming they were roofed) would have been easy to burn and even if a fire was started around the base of a tower, individuals inside would be vulnerable to the heat and smoke (VanDyke and King 2010). One example where site inhabitants met a violent end but did not seek refuge in the site’s towers is at Sand Canyon where a violent event is associated with the site’s abandonment but no human remains were found in the site’s towers (Kuckelman 2007). There are however, examples where excavated towers have revealed the bodies of people who suffered violent deaths, suggesting that the towers were not effective places of refuge (Kuckelman 2002; VanDyke and King 2010).

Food processing/storage

Although evidence strongly suggests that some towers might have been used to guard access to water sources, it is not the only function towers might have had. The artifact and feature assemblages from most of the excavated towers suggest that food processing was the dominant activity (Hardy 1975; Kuckelman 2000, 2002, 2007; Winter 1980). It is possible that towers functioned as food processing activity areas or for food storage and did not have to do with guarding access to water sources. Well-built towers would also have made effective storage facilities and the close proximity of all 40 towers in the southeast Utah sample to domestic architecture
and the foundation level entrances on most towers would have made them easily accessible for extra food storage or space outside of the domestic residence to process food. Any tower type: detached, integrated, or tower-kiva complexes could have easily fit this role. Even Tower 101, abutted to the outside of the site-enclosing wall at Sand Canyon Pueblo had a fire pit and showed evidence of food processing (Kuckelman 2007). This is interesting given the seemingly “defensive” location of this tower.

Another possibility is that for towers used for food storage. In this scenario, it would be useful to have the food off of the ground where it would have be vulnerable to animals or moisture. Evidence that backs up this assumption can be found at Sand Canyon Pueblo, where the bottom floor of Tower 1019/1008 reached only 1.2 to 1.5 meters off the bedrock (Kuckelman 2007). Possible viga sockets located 50 centimeters above the ground on the wall of Tower 2 at the Comb Wash great house may also have served a similar purpose. The idea of towers as food storage may also be wrapped up in ideas of defense. Kuckelman (2000) suggests that evidence from the excavated towers at Castle Rock Pueblo suggests the towers were predominantly used for defense, providing a place to store food provisions in case of an attack.

Social identity

All categories of towers could be understood through the broader umbrella of social identity. In the violent and socially turbulent landscape of the Pueblo III period, new forms of architecture were developed that were both integrative and restrictive. Towers represent one of the restrictive structure types but it is also possible that the
overall construction of a tower might have functioned as integrative marker of social identity, constructing towers as a way of participation in the larger Mesa Verdean cultural group. The overall circular shape of a tower, its relatively consistent height of about three meters, and its average 3.5 meter interior space suggests some level of communication and cannon for tower construction. The variability that is present in tower construction suggests that *how* towers were constructed (with or without mortar or shaped stone) mattered less than the final product on the landscape. The space provided by these towers may have been used for multiple functions but their overtly visible signature on the landscape may have been enough to imply their participation in the larger Mesa Verdean cultural world. Furthermore, because these towers are found at all site types suggests that this participation permeated all levels of organization, an attribute one might expect from a marker of social identity.

It is possible that the towers that were defensive or used as refuge, guarded access to natural resources, used for line-of-sight communication, astronomical observation or for ceremonial purposes could still have functioned as markers of social identity in the northern San Juan region, visibly stating participation in the larger Mesa Verdean cultural world. People who built towers that were used to limit access to natural resources or to sites would likely have wanted to plug into the power and identity of the larger culture group because it gave them additional legitimacy and control over granting access to resources such as water. If towers were meant to be defensive lookouts, the association between the tower structure and the Mesa Verdean culture might have deterred attackers or at least caused them to hesitate. If towers were used for storage, it might have been similar to ‘keeping up with the
Jones’’, where the large, powerful community centers in southwestern Colorado built towers so the rest of the smaller sites across the rest of the region wanted them too. The temporal continuity of circular structures in the ancestral Puebloan world suggests that the shape was an important concept. Perhaps circular towers represented the next structure in the development in Puebloan architecture; starting with pit houses, to formal kivas and to towers. It is possible that the circular shape was another way of contextualizing memory and maintaining continuity with the past and the Puebloan identity.

Although it post-dates the temporal scope of this thesis, it is interesting to note that tower structures did not transfer down to the Rio Grande when the northern San Juan region was depopulated by 1300 (Stone and Lipe in prep.) In fact, many hallmarks of ancestral Puebloan material culture such as mugs, kivas, and towers (all circular shapes) were left behind when they left the northern San Juan region (Stone and Lipe in prep.). It is thought that shedding their previous identity was an attempt to try and (sometimes unsuccessfully) blend in with their new neighbors to the south. If this is the case, then towers during the late Pueblo II and Pueblo III periods represented a visible marker of northern San Juan social identity. While the interior space of a tower might have been used for food processing, food storage or domestic activities and the tower presence near water sources might have acted to guard or limit access to the resource or to a site or monitor farmland, a tower’s overarching ideological role was a concrete hallmark of ancestral Puebloan identity.
Summary

Perhaps one of hardest but also the one of most interesting and rewarding aspects of archaeological research is the ultimate translation of the static archaeological record into the real ideas and modeled circumstances that created the social context for prehistoric individuals and communities. This transition from the static archaeological record to a reconstruction of the past has been approached through many different angles usually based on the predominant theoretical paradigm reigning at the time.

As I hope to have made clear in this study, towers provide an excellent medium by which to gauge the extent of variability encompassed by the feature class we identify as towers. The result of this research and analysis has been a systematic discussion of the variability expressed by towers in order to develop a more refined definition of the towers feature class. Furthermore, I used my examination of towers attributes to reassess the range of functions that have been attributed to towers. Lastly, I have looked at towers from an intraregional perspective in order to explore how towers varied across the northern San Juan region. This approach is the first time anyone has systematically looked at the variation and patterns demonstrate by towers between sub-regions of the northern San Juan region.

Future research

Tower research has remained, at best, patchy and insufficient. While there have been a number of in depth tower studies that have produced considerable
advances in our knowledge of towers, most of this work has concentrated on specific sites or focused with limited regional boundaries. This research has been imperative for archaeological understanding of towers in different parts of the northern San Juan region.

Given this background of compiled tower research, this study is an attempt to produce the one of the first comparisons of towers across different sub-regions of the northern San Juan region. The impacts of this study I understand to be preliminary but it is my hope that this type of comparative work becomes the norm of future studies. I challenge current and future archaeologists to take a broader approach to towers, where the larger landscape of the northern San Juan region becomes the unit of study. The prehistoric inhabitants of the northern Southwest were not confined by the arbitrary state lines that we use today to define areas of acceptable archaeological research. What archaeology needs today is a more comprehensive database of towers across the northern San Juan region; one that combines the detailed tower research across the entire region. I believe that this larger compellation of towers will allow archaeologists to accurately assess the variety and patterns apparent in towers and will permit a greater and more effective foundation for future tower studies.

Archaeology today recognizes that looking at the big picture of the archaeological record is one of the best ways to gain a better understanding of the prehistoric world. Towers present a material expression of the prehistoric mind and it would benefit archaeological thought to consider towers across the northern San Juan region.
WORKS CITED

Adams, Karen R. and Kenneth L. Patterson

Adler, Michael A.

Bond, Mark C., William E. Davis, Winston B. Hurst, Deborah A. Westfall
1992 *Cultural Resource Inventory and Evaluative Testing Along SR-262, Utah-Colorado State Line to Montezuma Creek, Navajo Nation Lands, San Juan County, Utah*. Ms. on file at Abajo Archaeology, Bluff, Utah.

Bowman, Douglas

Bradley, Bruce A.

Bradley, Richard

Brown, G.M., T.C. Windes, and P.J. McKenna

Bredthauer, Alison
2010 *42SA1725*. IMACS form. On file at the San Juan County Bureau of Land Management Office, Monticello, Utah.
Cameron, Catherine

Cameron, Catherine and Andrew Duff

Clark, David

Crow Canyon Archaeological Center

Churchill, Melissa ed.

Churchill, Melissa and Scott Ortman

Churchill, Melissa, Kristin Kuckelman, Mark Varien
Davis, William and Deborah Westfall


Diederichs, Shanna and Donna M. Glowacki

Dean, Jeffrey and Caral Van West

Digital Globe
2009  Google Earth. Image USDA Farm Service Agency.

Duff, Andrew and Richard Wilshusen

Ellis, Andrea

Ferdon, Edwin N., Jr.

Fetterman, Jerry and Linda Honeycutt

Fewkes, Walter
1921  Field-work on the Mesa Verde National Park, Colorado. In Explorations and Field-work of the Smithsonian Institution in 1920, pp. 75-94. Smithsonian Miscellaneous Collections 72(6).
Fike, Richard and Bill Civish
1973 42SA3208. IMACS form. On file at the San Juan County Bureau of Land Management Office, Monticello, Utah.

Fiori, James, Rand A. Greubel, and Alan D. Reed (editors)
1998 Archaeological Data Recovery at Four Anasazi Sites on White Mesa Along US Highway 191, San Juan County, Utah. Ms. on file, Utah Department of Transportation, Salt Lake City.

Fowler, Andrew P. and John R. Stein

Glowacki, Donna

Glowacki, Donna and Mark Varien

Green, Dee

Gregory, Herbert

Greubel, R. A.
Hardy, Dee
1975  A Description and Analysis of the Architecture and Artifacts of the Picket Fork Sites, Cedar Mesa, San Juan County, Utah. Unpublished Masters Thesis, Brigham Young University, Provo, Utah.

Hayes, Alden C.

Hayes, Alden and James Lancaster

Hegmon, Michelle

Herr, Sarah

Hull, Frank

Hurst, Winston B.

2004  Archaeological Data Recovery at Casa Coyote (42Sa3775): A Basketmaker III Pit House Hamlet on White Mesa, San Juan County, Utah. Ms. on file, Abajo Archaeology, Bluff, Utah.

2005  42SA24646 IMACS site form, USDI Bureau of Land Management site archives, Monticello, Utah.


2008  42SA5034 IMACS site form, USDI Bureau of Land Management site archives, Monticello, Utah.
In press. *The Comb Wash Campground Survey; An Archaeological Surface Inventory of 2,200 Acres in San Juan County, Utah*. Submitted to the Bureau of Land Management, Monticello Field Office by Catherine M. Cameron, Principal Investigator, University of Colorado, Boulder.

Johnson, David


Johnson, Matthew

Kelley, Jeffery

Kenzle, Susan


Knapp, A. Bernard and Wendy Ashmore

Kuckelman, Kristin, A.


Kuckelman, Kristin A. and Grant Coffey

Kuckleman, Kristin A., Ricky R. Lightfoot, and Debra L. Martin

La Plata Archaeological Consultants, Inc.
1988 42SA20393. IMACS form. On file at the San Juan County Bureau of Land Management Office, Monticello, Utah.

Lalor, Brian

Lancaster, James and Jean Pinkley

Lang, F., N. Mahaney, J. B. Wheat, and M. L. Chenault

Lekson, Stephen H.
Lekson, Stephen, ed.

Lipe, William

Lipe, William D. and Scott G. Ortman

Lipe, William D. and Mark D. Varien

Mackey, James and Richard Green

Matson, R.G., William Lipe and William Haase IV

Mobley-Tanaka, Jeannette
Morely, Sylvanus and Alfred V. Kidder

Neily, R. B.

Metzger, Todd
1993    Typology and Terminology for Native American Puebloan Architecture, a draft submitted for Division of Resources Management, Southwest Regional Office, Santa Fe, New Mexico.

Nordby, Larry
2003    Summary of Activities from the College of Eastern Utah Workshops at the Seven Towers Site (also called the Cave Canyon Towers Site). Unpublished report. Archaeological Site Conservation Program (ASCP), Mesa Verde National Park.

Ortman, Scott

Ortman, Scott and Bruce Bradley

Pierce, Christopher, Donna Glowacki, and Margaret Thurs

Potter, James M. and Jason Chuipka

Reed, Allen
1983    42SA14274 and 42SA14275. IMACS form. On file at the San Juan County Bureau of Land Management Office, Monticello, Utah.
Reyman, Jonathan E.  

Riley, Carroll L.  

Robinson, Hugh  
2006  Draft IMACS site 155-2-008 form on file, Comb Ridge Heritage Initiative Project, Blanding Utah.  
2007  Draft IMACS site CSM-2-007 form on file, Comb Ridge Heritage Initiative Project, Blanding, Utah.

Robinson, Tucker  
2008  Draft IMACS site 239-1-001 form on file, Comb Ridge Heritage Initiative Project, Blanding, Utah.  
Draft IMACS site 207-1-001 form on file, Comb Ridge Heritage Initiative Project, Blanding, Utah.

Rohn, Arthur H.  

Schulman, Albert  

Sears, Julian D.  

Smith, Earl  
1964  *AR-43-06-33*. Archaeological Site Inventory. On file at the San Juan County Bureau of Land Management Office, Monticello, Utah.  
1968  *42SA5024*. Archaeological Site Inventory. On file at the San Juan County Bureau of Land Management Office, Monticello, Utah.
Smith, J. E.

Smith, Rachel

Stone, Tammy and William Lipe

Swentzell, Rina

Tainter, Joseph A. and Bonnie B. Tainter

Thompson, Ian
2004 *The Towers of Hovenweep.* Canyonlands Natural History Association, Moab, Utah.

Thompson, Ian, Mark Varien, Susan Kenzle, Rina Swentzel

Till, Jonathan D.
in prep. *Excavations at Site 42Sa27732, A Pueblo III Period Habitation.* Abajo Archaeology, Bluff, Utah.

Toll, Wolcott
Van Dyke, Ruth M.
2004  Memory, Meaning, and Masonry: The Late Bonito Chacoan Landscape. 
*American Antiquity* 69(3):413-431.
2004  Chaco’s Sacred Geography. In *In Search of Chaco: New Approaches to an 
Archaeological Enigma*, edited by David Grant Noble, pp. 79-85. School of 
American Research Press, Santa Fe.

Van Dyke, Ruth M. and Anthony King
2010  Escaping Corruption, Connecting Worlds: A Symbolic Interpretation 
for Pueblo III Towers in the Northern San Juan. Ms. submitted to Kiva, 
November 2007; accepted pending revisions, July 2008.

Van West, Carla R. and Jeffrey S. Dean
2000  Environmental Characteristics of the A.D. 900-1300 Period in the Central 

Varien, Mark D.
1999  Regional Context: Architecture, Settlement Patterns, and Abandonment, in 
*The Sand Canyon Archaeological Project Testing version 1.0*, edited by Mark 
D. Varien, Crow Canyon Archaeological Center, Cortez, Colorado.
2002  Persistent Communities and Mobile Households: Population Movement in the 
Central Mesa Verde Region, A.D. 950 to 1290 in *Seeking the Center Place*, 
edited by Mark Varien and Richard Wilshusen, pp. 163-184. The University 
of Utah Press, Salt Lake City.

Varien, Mark and Richard Wilshusen
2002  A Partnership Research in the Central Mesa Verde Region. In *Seeking the 
Center Place*, edited by Mark Varien and Richard Wilshusen, pp. 3-23. The 
University of Utah Press, Salt Lake City.

Varien, Mark D., Scott G. Ortman, Donna M. Glowacki, and C. David Johnson
2007  Historical Ecology in the Mesa Verde Region: Results from the Village 

Varien, Mark D., William D. Lipe, Michael A. Adler, Ian M. Thompson and Bruce A. 
Bradley
1996  Southwestern Colorado and Southeastern Utah Settlement Patterns: A.D. 

Westfall, Deborah A., Roger A. Moore, and Mark Owens
2003  Archaeological Investigations at Sites 42Sa17725 and 42Sa20971 on the Bluff 
Bench and Big Bench, San Juan County, Utah. Ms. on file, Abajo 
Archaeology, Bluff, Utah.
Wilcox, David R. and Jonathan Haas  


Wilshusen, Richard  

Wilshusen, Richard and Jeannette Mobley-Tanaka  

Wilson, Curtis (ed.)  
1973 *Highway U-95 Archaeology: Comb Wash to Grand Flat Volume II*. A Special Report for the Department of Anthropology, Department of Anthropology, University of Utah.

Winter, Joseph  
1977 *Hovenweep 1976*. Archaeological Report No. 3. Anthropology Department, San Jose State University, San Jose California.

APPENDIX A

Tower recordation form

Site Name: _______________________________

Site Number/Temp. number: 42SA__________

Tower # ___

Photo numbers (digital): ____________________

1. **Tower Type:** Detached  Integrated  Tower-kiva complex
2. **Shape:** Circular  Square  Rectangular  Sub-rectangular
   D-shaped  Irregular
3. **Material Preparation:**  Shaped  Unshaped
4. **Horizontal wall coursing:**  Single  Double  Compound
5. **Presence or absence of mortar:**  Dry-laid  Wet-laid
6. **Average wall width (meters):** __________
7. **Interior area (meters):** ______________
8. **Location of entrance:** __________________
   Orientation of entrance (direction): ______________
9. **Height of currently standing masonry (meters):** __________
10. **Estimated original height (meters):** ______________
11. **Evidence for multiple stories (describe):**
12. **Evidence of roofing (describe):**
13. **Bonding/abutment (integrated towers):**
14. Wing walls (detached towers):
   Length (meters): ____________
   Height (meters): ____________
   Width (centimeters): ____________
   Presence/absence of mortar: ____________

15. Viewshed (describe):

16. Association with a permanent water source:
   Name of spring/seep: _________________________
   Distance from tower site (meters): ____________

17. Site size:  Small  Medium  Large  Community Center  Tower complex
   Number of rooms: ____________
   Number of kivas: ____________
   Describe:

18. Geographic location:  Canyon rim  Canyon head  Base of talus slope
   Canyon bottom/flats
   Describe:

19. Association with site-enclosing walls:
   Present at site:
   Integrated with tower:
   Describe:

Other comments:
## APPENDIX B

### Tower Coding Form

**Attribute 1: Tower Type**
- 01 – Isolated
- 02 – Integrated
- 03 – Tower-kiva complex

**Attribute 2: Tower Shape**
- 01 – Circular
- 02 – Rectangular
- 03 – Square
- 04 – Sub-rectangular
- 05 – D-shaped
- 06 – Irregular

**Attribute 3: Material Preparation**
- 01 – Shaped
- 02 – Unshaped

**Attribute 4: Horizontal wall coursing**
- 01 – Single course
- 02 – Double course
- 03 – Compound

**Attribute 5: Presence/absence of mortar**
- 01 – Wet-laid
- 02 – Dry-laid

**Attribute 7: Entrance**
- 01 – Floor
- 02 – Door absent/obscured
- 03 – North
- 04 – South
- 05 – East
- 06 – West
- 07 – Northwest
- 08 – Southwest
- 09 – Northeast

**Attribute 12: Evidence of Roofing**
- 01 – Yes
- 02 – No

**Attribute 13: Bonding/Abutment**
- 01 – N/A or not measured
- 02 – Abutted
- 03 – Bonded
### Attribute 14: Wing wall
- 01 – Yes
- 02 – No

### Attribute 15: Viewshed
- 01 – 360 degree view
- 02 – 180 degree view
- 03 – one direction view

### Attribute 16: Associated Permanent Water Source
- 01 – Yes
- 02 – No

### Attribute 17: Site Type
- 01 – Small habitation
- 02 – Medium habitation
- 03 – Large habitation site
- 04 – Community center
- 05 – Tower complex

### Attribute 18: Site Location
- 01 – Canyon rim
- 02 – Canyon head
- 03 – Canyon bottoms/flats
- 04 – Base of talus slope
- 05 – Mesa top

### Attribute 19: Connected to enclosing wall
- 01 – site without enclosing wall
- 02 – site with enclosing wall, tower connected
- 03 – site with enclosing wall, tower not connected