

**Fortaleza de Quirihuac:  
A Chimú Fortress in the Middle Moche Valley**

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# **Chapter 1: Introduction**

## **Preface**

Nestled around the summit of Cerro de la Compañía in the Middle Moche Valley of Perú, the partially collapsed rubble and walls of Fortaleza de Quirihuac provide a silent but imposing testimony of ancient conflict and imperial power. Standing on the parapet walls among sling stones that have rested in place for nearly 600 years, one can experience the commanding view of the valley below that no doubt was instrumental in the reasoning behind building a fortress in such a foreboding location. Miles and centuries away from its last occupation, I was first introduced to this site in a “Principles of Archaeology” class at UNC Chapel Hill when Dr. Brian Billman discussed the wide range of fortified sites that he encountered during his survey of the Moche Valley in the 1990’s. His survey data situated the site as a part of the Chimú Empire; a massive coastal polity that dominated the Moche Valley from the 1100’s up to its conquest by the Inka in the mid 1400’s. Nearly a two hour hike from the closest water source or any substantial vegetation, Fortaleza de Quirihuac illustrated a great example of sacrificing location for defensibility and I immediately knew I wanted to be the first person to deliberate on why the Chimú Empire invested time and energy into building the site. As could be expected, the endeavor of investigating Fortaleza de Quirihuac proved to be a rewarding physical and mental challenge that “hooked” me on the discipline of archaeology; dooming me to a life of dirty clothes, dusty glasses, and weathered fedoras.

## **Introduction**

Over the course of two summer field seasons and with financial assistance from MOCHE Inc., Nancy and Jim Mullins, a Summer Undergraduate Research Fellowship

(SURF), and a Julia Crane Award, I completed a map of Fortaleza de Quirihuac's architecture and conducted limited surface collections to answer a series of questions I had about the site. I first had basic questions about the site's function regarding who lived there, when it was occupied, and whether the occupations were temporary or more permanent. These could be addressed by combining the map and ceramic data I collected with the corpus of archaeological literature already written on the Chimú Empire. I also had broader questions about how the site fit into the Chimú Empire and what the site could tell archaeologists about Chimú imperial strategies in the Moche Valley. Many of these questions required much more research to answer, but this investigation of Fortaleza de Quirihuac provides a framework that can be used to refine future research questions that may shed more light on the broader implications of the site. While my final product is easily the most thorough assessment of Fortaleza de Quirihuac that has been done to date, I hope that further investigations into the site and others like it may clarify, correct, and strengthen the shortcomings of a work that was limited in time and resources. I also hope that continued work with the large number of fortified sites in the Moche Valley may better our understanding of fortifications and imperial strategies in the Andean region in general.

This Honors Thesis in Archaeology presents my deliberations on the function of Fortaleza de Quirihuac through an analysis of architectural and ceramic data. I begin with an introduction to the ecology of the Moche Valley, the archaeological history of the Chimú Empire and its antecedents, and a summary of the current scholarly discussion regarding fortifications and conflict in the Andes. After an outline of my research methods, I then move on to a discussion of the architectural and surface collection data that were recorded from the site. Following this, I then move through a series of analyses regarding these data that serve

to shed light on the site's function. Finally, I complete this thesis with my conclusions regarding Fortaleza de Quirihuac's function, propositions regarding its possible roles in the Chimú Empire, as well as the potential it holds for future investigations.



## Chapter 2: Contextualizing Fortaleza de Quirihuac

Before addressing the data collected at Fortaleza de Quirihuac, it is first necessary to put the site into a context of space and time by explaining the ecology and history of the Moche Valley as well as the current scholarly discourse about fortifications and conflict in the Andes. One of thirteen river valleys on the north coast, the Moche Valley has a diverse ecology that has shaped the nature and scale of its long human history. On the north coast of Peru, the Moche Valley has played a massive role in human activity with many influential polities and cultures like the Moche and Chimú. Finally, the archaeological interpretation of fortifications as evidence for conflict has been an issue of much debate; especially in the Andes. It is only within the context of these debates and the history of human activity and engagement with a distinctive coastal ecology that Fortaleza de Quirihuac can be properly assessed.

### The Ecology of the Moche Valley

The unique ecology of Peru is characterized by a “vertical ecology” that is composed of zones that occur at different elevations. These progress with elevation from the coast, into the Andean highlands, and finally end in the beginning of the Amazon rainforest on the eastern slopes of the Andes. Moving inland and eastward from the coast, these zones include the *Costa* (0-500 m), *Yunga* (500-2300 m), *Quechua* (2300-3500 m), *Suni* (3500-4000 m), *Puna* (4000-4800 m), *Cordillera* (4800-6768 m), *Selva Alta* (400-1000 m), and *Selva Baja* (80-400 m). For the purposes of this paper, the *Costa* and *Yunga* will be most important in understanding the ecology surrounding Fortaleza de Quirihuac (Vidal 1996).

The *Costa* is an arid region beginning at the shores of the Pacific and ending around the foothills of the Andes. On its coast, Peru has some of the richest marine fisheries in the

world. These fisheries are fed by phytoplankton that thrive off of the nutrient rich waters upwelled by the Humboldt Current from the deep waters at the Antarctic edge of the Pacific. Additionally, the low temperature of the water is thought to cause the coast and much of the western slopes of the Andes to see little to no rainfall (Moseley 2001). The coast eventually gives way to river valleys that cut through the western edge of the Andes. These valleys contain rich alluvial soils that, although normally too dry for agriculture due to lack of rain, can be exploited through canal construction. The dichotomy between rich farmland and inhospitable desert that this creates is a vital feature of the ecology of the coast and has had important consequences in the long history of human occupation in Peru's coastal river valleys (Moseley 2001).

The *Yunga* zone takes up where the *Costa* ends; moving up the foothills of the western slopes of the Andes. This zone can be further specified into a subzone called the *Chaupiyunga* (800-1200 m) that has especially fertile soil. A combination of soil fertility and optimal temperatures for growing make the *Chaupiyunga* ideal for growing some of the most important Andean domesticates; coca and maize (Vidal 1996). The coca plant (*Erythroxylum coca*) has served an incredibly important role as a ritual drug and stimulant for millennia across the Andes. Upriver of the Moche Valley; the Upper Moche Valley and Sinsicap Valley are situated in the *Chaupiyunga* zone and were prime coca-growing areas. Direct access to the coca from these regions is thought to have been a prehistorically important motivator for coastal expansion through conquest, alliance, or trade, into the upper valley areas.

A periodically occurring environmental phenomenon called the El Nino Southern Oscillation Event (ENSO) has had devastating effects for millennia across the Andes,

especially on the north coast of Peru. During ENSO events, the Humboldt Current is disrupted and warm waters from the coast of Ecuador creep to the northern Peruvian coast (Mackenzie 2003). With these warmer waters come torrential rainfall and flooding on the coast and droughts in the highlands. Additionally, the warm water kills off much of the marine life that depends on the cold and nutrient-rich waters from the Humboldt Current upwell. While only lasting a few months and occurring every two decades or so, these events are disastrous for coastal populations who depend on the ocean as an important source of protein and whose homes are destroyed by the flooding. Although little is still known about what causes ENSO events, they clearly have had and continue to have a large impact on human settlement in the Moche Valley.

### **Human Settlement and Prehistory in the Moche Valley**

The human settlement of Peru and South America in general can date as far back as 13,000 years before present. The discovery of the incredibly well preserved riverside site of Monte Verde in Chile presents an excellent and famous example of this early occupation in South America (Moseley 2001). However, settlement in the Moche Valley and elsewhere was generally sparse in this first phase of human activity known as the Archaic Period that dated from 13,000 to around 3,000 BC. This phase was characterized by hunter-gatherer groups that have been defined by different lithic traditions like Northwestern or Paijan. The Paijan Tradition produced several sites in the Moche Valley and elsewhere on the northern and southern coasts of Peru. This tradition was geographically isolated to the coast and seems to have had a maritime adaptation relying partly on fishing (Moseley 2001). Its maritime and coastal tendencies place Paijan as a possible predecessor to many of the later developments of human activity in the Moche Valley and the rest of the Peruvian Coast.

At the tail end of the Archaic comes what is known as the Preceramic Period (~3,000-1,800 BC), during which human activity became more extensive, populations grew, and the domestication of plant and animal species began. In the Moche Valley, the sites of Padre Aban and Alto Salaverry have been placed as belonging, respectively, to the beginning and ending of the Preceramic. Both sites illustrate a lack of ceramics, a continuation but possible decrease in population mobility, and a dependence on some of the earliest domesticates like cotton and gourds (Pozorski S 1979). Gourds would have been used for storage and cotton would have been spun into fishing nets; making them “industrial domesticates” (Pozorski S 1979). Elsewhere in Peru during the Preceramic, monumental architecture was seen in the Kotosh Tradition in the northern highlands and continued on the coast with the construction of large pyramid complexes (Moseley 2001). These monumental sites show increased complexity in social organization and labor mobilization and began long standing Andean traditions like the use of U-Shaped pyramid complexes and public architecture.

The Initial Period (1,800-900BC) and Early Horizon (900BC-200CE) followed the Preceramic in the regional chronology of the coast. In the Moche Valley, a part of this time period is called the Guañape Phase, and is split into Early, Middle, and Late (1,800-1,300BC, 1,300-800BC, 800-400BC, respectively). The Guañape Phase saw the beginning of canal construction moving from the middle valley in the Early Guañape down the coast in the Middle and Late (Billman 2002). The construction of canals goes along with more extensive use of domesticates and a gradual move towards sedentary lifestyles. Along with canal construction, many monumental sites emerged in the valley; the largest of which was the Caballo Muerto complex (Billman 2002, Pozorski T 1980). These monumental constructions

are more evidence for increased social complexity and present the possibility of multiple tiers of political organization within the valley at an extremely early date.

At the end of the Early Horizon, the regional chronology of the coast progresses with the Early Intermediate Period (200-600CE) and the Middle Horizon (600-1000CE). In the Moche Valley, the end of the Early Horizon and these other periods are separated by several different phases including Salinar (400-1BC), Gallinazo (1-200CE), Early Moche (200-400CE), Middle Moche (400-800CE) and Late Moche (800-900CE) (Billman 2002). By the Salinar Phase, the monumental construction of the Guañape was replaced by a shift towards clusters of settlements in more defensive locations. These clusters were separated by buffer zones and are thought to have been joined in some sort of loose confederacy with the cluster around Cerro Arena in the middle valley as the dominant polity (Billman 2002, Brennan 1980). In regard to this paper, this phase is most notable because it produced some of the first fortifications in the Moche Valley. While many of the settlements of this time were in defensive locations, some, like the Sinsicap Valley site of Cerro Cantegallo, also had evidence of actual fortifications.

Following the Salinar Phase, the Gallinazo Phase in the Moche Valley featured a revival of monumental architecture at the central polity of Cerro Oreja (Billman 2002). This site featured a much more complex political organization than the clusters of the previous phase and may have had more extensive control of parts of the valley. In addition to Cerro Oreja, clusters of highland settlements around Cerro Leon and in the Sinsicap Valley suggest a migration of highland people into the valley (Figure 1). Billman suggests that this migration may have resulted in violent interaction at times, and this is supported by the defensibility of many of these highland settlements and their grouping into clusters (Billman

2002). This trend continues into the Early Moche phase and it is not until the Middle Moche Phase that a radical change in settlement is seen. During this period, the Southern Moche state emerged from the Cerro Oreja polity and unified the middle and lower Moche Valley; moving the capitol further towards the coast to Moche. The emergence of this state coincides with the abandonment of many of the highland communities that were seen earlier (Billman 2002). Also, this period saw the construction of Huaca del Sol and Huaca de la Luna, some of the largest monumental constructions in the New World. While it produced few fortifications, the Southern Moche state was no doubt an expansive and influential polity on the north coast and its impact can be seen in adjacent valleys and further northward. However, by the Late Moche Phase, the Southern Moche state had faded in its influence and power and its center in the Moche Valley seemed to have moved to Galindo (Bawden 1982, Mackey 1982).



**Figure 1 - A view of the Moche Valley and several important sites discussed using Google Earth**

## The Chimú Empire: Origins and Chan Chan

The end of the Middle Horizon (900-1000CE) and onset of the Late Intermediate Period (1000-1476CE) was the period of time during which the Chimú Empire emerged, expanded, and was eventually conquered. In the local chronology, this can be separated into Early Chimú (900-1000CE) and Middle to Late Chimú (1000-1476CE). Although the origins of the Chimú Empire are still poorly understood, there are numbers of lines of evidence that show some level of continuity from Late Moche centers like Galindo. Conklin and Bawden both argue that Galindo shows some architectural similarities with the later Chimú capitol of Chan Chan (Conklin 1990, Bawden 1982). This seems a plausible relation as Cerro Galindo was later used as a Chimú fort that overlooked the mouth of the Moche Valley. Either way, it is generally thought that there is some manner of cultural continuity between the Moche and the Chimú.

The Chimú Empire's capitol of Chan Chan is easily the most intensively studied Chimú site and was among the largest urban centers in Peru during its time of occupation. The site of Chan Chan is composed of a large urban sprawl consisting of lower, middle, and upper class residences that surround a ceremonial, administrative, and political center of numerous pyramids, or *huacas*, and nine adobe mud brick compounds called *ciudadelas*. The *ciudadelas* of Chan Chan are believed to have been the palaces of the great Chimú lords and are thought to have served as areas of residence, public ritual, and administration. Each *ciudadela* is thought to have represented one or more generations of Chimú kings; with a new *ciudadela* being built after the death of its previous owner (Day 1982, Kolata 1990). However, these structures seemed to have continued to be used after the death of the kings who inhabited them, showing continued economic, ritual, and political importance of a

Chimú lord after death (Day 1982, Kolata 1990). These *ciudadelas* had a number of plaza areas of varying sizes that are thought to have served a role in public rituals for different members of the Chimú administration and urban population. Also, u-shaped rooms called *audiencias* are present in abundance in the *ciudadelas* of Chan Chan and administrative Chimú sites within and outside of the Moche Valley (Keatinge & Conrad 1983). While Moore has challenged the *audiencia*'s role in controlling stored goods, it is still believed that these structures were administrative in function (Moore 1992, Moore 1996, Topic J 2003). The Chimú Empire is believed to have used a redistributive economic system in which "taxed" goods or labor would be brought to or mobilized by the capitol or regional centers and used as the state directed (Day 1982b). The urban population of Chan Chan outside of the *ciudadelas* was integrally involved in this system and partially represented a population of craftspeople that would turn raw goods collected by the state into fine goods that added to the wealth and prestige of the nobility and upper elites (Topic J 1982, Topic J 1990). The upper elites of urban Chan Chan most likely represented members of the state bureaucracy that were necessary to control the movement of goods and people in and out of the capitol (Topic J 2003). The city of Chan Chan was no doubt the center of the Chimú Empire and represents a material reminder of its economic and political power and complexity.

### **The Chimú Empire: Stages of Expansion and Consolidation**

In order to increase the wealth of its capitol at Chan Chan, the Chimú Empire is thought to have extended its economic base through numerous stages of expansion. By 1470CE, the Chimú Empire was able to influence nearly 1,000 km of the Peruvian coast stretching from Tumbes in the north to Chillón in the south (Topic T 1990). This expansion was achieved through military and/or diplomatic subjugation and influence; often using



administrative centers and fortifications to facilitate and secure the collection and transportation of goods to and from the capitol. Numerous models have been constructed regarding territorial expansion and consolidation within the Chimú Empire, with the most recent being that formed by Moore & Mackey (2008). While this model is the most contemporary and deals with the entire Empire, an earlier model constructed by Theresa Topic gives the most complete view of Chimú imperial consolidation and conquest within the Moche Valley itself (1990). For the purposes of this paper, the part of the model provided by Theresa Topic that focuses on the Moche Valley will be used, while Moore & Mackey will be used for Chimú expansion and consolidation outside of the Moche Valley. This synthesis holds value in that it includes the most recent literature represented in Moore & Mackey's model, while also maintaining Theresa Topic's extensive data on the Moche Valley that is much more relevant to Fortaleza de Quirihuac.

In the Moche Valley, the Chimú Empire began with an early stage of consolidation between 900 and 1000 or 1050 CE that stretched up to the juncture of the Rio la Cuesta and the Rio Moche at the boundary of the *costa* and the *chaupiyunga* (Topic T 1990). This early stage of consolidation included the construction of fortifications at the mouth of the Moche Valley at the strategic points of Cerro Galindo and Cerro Oreja (Figure 1). In addition, this stage saw the construction of the fortification of Cerro Pedregal further up the valley as well as a large wall that is thought to have spanned the valley floor at the boundary of the *costa* and *chaupiyunga*. This wall is thought to have been more of a boundary marker than an actual fortification because of its projected length of nearly 1 km (Topic T 1990). In conjunction with these fortifications, evidence of local administrative centers and canal building in the Moche Valley also promote an emphasis on consolidation during this period

(Keatinge & Conrad 1983, Keatinge 1974, Keatinge 1975). Other than the political consolidation of much of the Moche Valley it is also plausible that the neighboring Chicama and Virú Valleys would have been allied or loosely subjected to the early Chimú state (Topic T 1990). It is important to note that the area surrounding Fortaleza de Quirihuac is encapsulated by this first stage of expansion and consolidation in the Moche Valley.

The years between 1130 and 1200 CE saw a second stage of expansion and consolidation within the Moche Valley (Topic T 1990). During this stage, the Chimú expanded inland to the Upper Moche Valley, and possibly into the La Cuesta and Sinsicap tributaries. A push past the previous boundary at the *chaupiyunga* border is shown by a series of forts that string the Upper Moche Valley and are thought to have been representative of a Chimú push towards controlling trade routes between the coast and highlands (Topic T 1990, Topic & Topic 1982). In addition, the control of coca growing zones in the upper parts of the Moche Valley is also thought to have been a “powerful incentive” for this stage of expansion (Topic T 1990). While still tentative, the presence of Chimú fortified sites in the Sinsicap Valley like Cerro Huancha and Cerro Ramon could also represent an attempt by the Chimú to have full control over one of these important coca growing zones (Alicia Boswell personal communication). Either way, the area surrounding Fortaleza de Quirihuac in the Middle Moche Valley was firmly under Chimú control by 1200 CE, and likely had been for 100 years.

Outside of the Moche Valley, the Chimú Empire had several stages of expansion that moved north and south along the coastal river valleys of northern Peru (Figure 2). While Theresa Topic has much earlier dates for the external conquests of the Chimú Empire, more recent research by Moore & Mackey has created a later three stage process for this period of

outward expansion (Topic T 1990, Moore & Mackey 2008). This process can be outlined as follows: expansion north to the Jequetepeque Valley by 1320 CE, expansion south to Mánchan and the Casma Valley at around 1350 CE, and a final expansion north from the Jequetepeque Valley to the La Leche Valley that occurred from 1360-1400 CE (Moore & Mackey 2008, Mackey & Klymyshyn 1990). The final period of expansion would have included the conquest of the massive and influential Lambayeque Valley complex and the incorporation of its center at Túcume (Shimada 1990, Donnan 1990). In addition to this territorial expansion, it is thought that by 1450 CE some influence may have been extended to Tumbes in north in the form of trade or elite interaction (Moore & Mackey 2008).

Ethnographic and historical documents place the Inka conquest of the Chimú Empire at 1470 CE. This conquest was a violent one in which the Chimú lord Chimú Capac resisted Inka subjugation and was routed in battle (Ramírez 1990, Moore & Mackey 2008). During the following Inka administration of the Chimú Empire, it is clear that the Chimú political structure was mostly dismantled, leaving only lower level positions in place (Ramírez 1990, Moore & Mackey 2008). While the Chimú Empire was disassembled in many respects, symbols of its previous power and wealth remained in not only the great ruins of Chan Chan but also in the fortifications it left behind as a result of its strategies of conquest and consolidation.

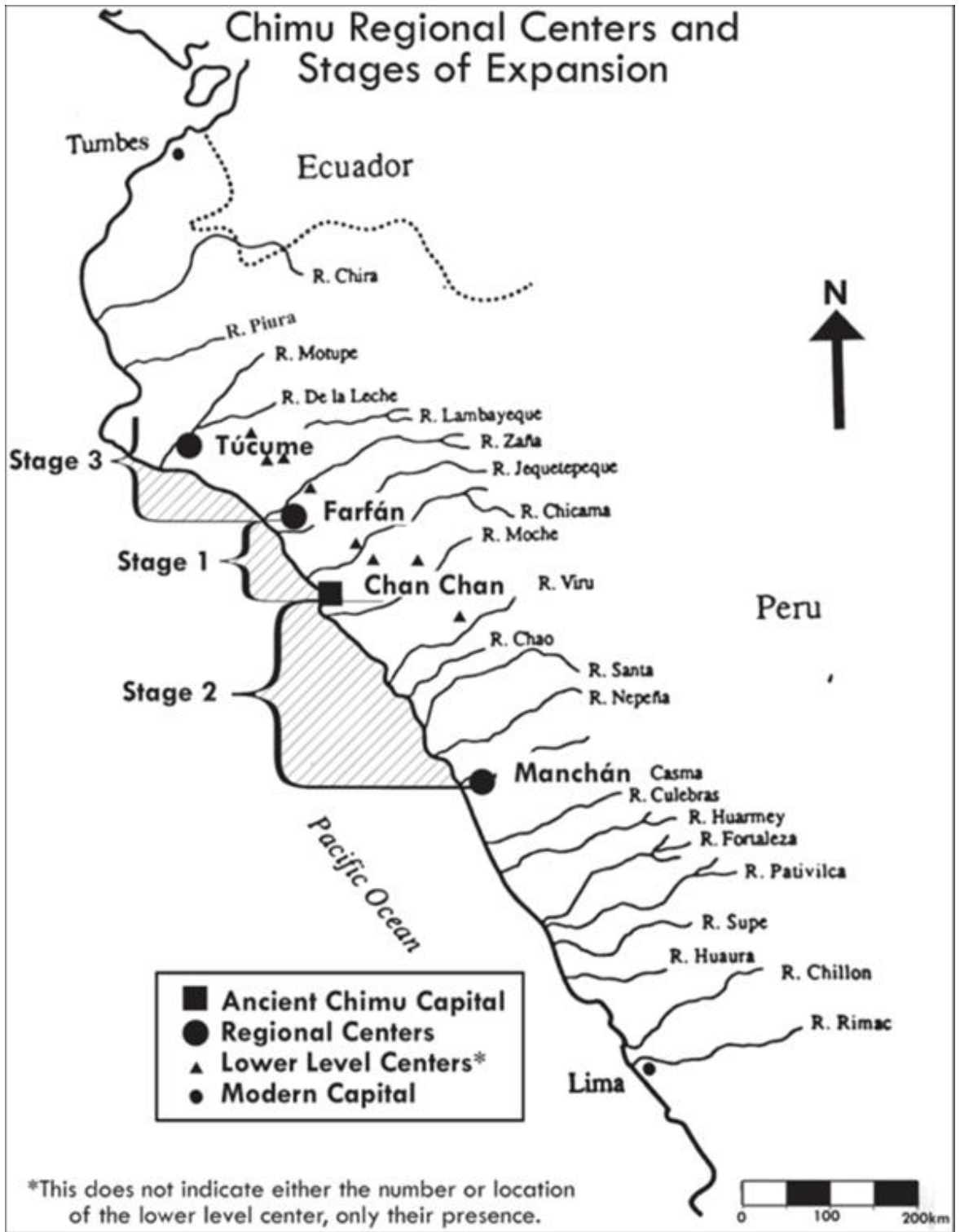


Figure 2 - Stages of Chimú expansion from Moore & Mackey 2008

## **Studying Fortifications in Archaeology**

In archaeology, fortifications are easily the most durable and conspicuous lines of evidence that point towards warfare or conflict in a region. However, deciding what is a fortification and what is not is a difficult task and requires knowledge of certain characteristics that can indicate a defensive function. In a recent article titled “Bastions and Baffles”, Keeley et al. (2007) discuss some such characteristics that can be widely applied to suggest that a structure had defensive purposes in the past. The most telling and unequivocal indicators suggested are v-shaped ditches, baffled or “defended” gates, and bastions. Unfortunately, these characteristics are not always present on fortifications and therefore many archaeologists must rely on more ambiguous indicators; construction in a defensive/strategic position, the presence of parapets, moats associated with walls, walls with sling stone piles, and many others. The ambiguity of these features stems from their occurrence in contexts that do not involve conflict. For example, an area that may be contemporarily interpreted as a strategic or defensive position may have actually had ritual significance in the past that better justified its location. Additionally, walls can serve a variety of non-defensive purposes, and as is stated by some archaeologists: “sometimes a wall is just a wall” (Keeley et al. 2007). To complicate the interpretation of fortifications even more, most defensive structures served a multitude of purposes in times of peace and in fact were likely used for these purposes more than they were used as fortifications. While identifying fortifications is a difficult task, it is paramount in the understanding of prehistoric conflict and is absolutely necessary in my assessment of Fortaleza de Quirihua. As I will argue later in this paper, Fortaleza de Quirihua has multiple lines of evidence that point to a primarily defensive motivation in the construction of its walls.

## Fortifications and Conflict in Andean Archaeology

Andean archaeology presents an excellent example of the complexity of identifying fortifications and the wide range of opinions surrounding the interpretation of defensive architecture and the nature of warfare in a specific region. One approach employs the modern Andean tradition of *tinku* as the framework for interpreting conflict in the past (Topic & Topic 2009). *Tinku* is a highland tradition in which two communities engage in a highly formalized “battle” at a specific time and place. These conflicts usually produce few casualties and are fought to settle community disputes (Topic & Topic 2009). In addition, it is believed that *tinku* also has great ritual importance in that the spilled blood from battle serves as the male counterpart to the feminine Andean conception of earth. In this way, *tinku* is believed to be integral in maintaining balance and cohesion not only between communities but also between humans and the earth (Topic & Topic 2009).

The Topics have applied this form of conflict to their interpretation of some Early Horizon fortified hilltop sites in the Santa Valley as well as the fortress of Chankillo in the Casma Valley. These sites are located on the mountains overlooking the valley below and the majority of the forts do not indicate permanent settlement within their walls. The Topics point out features like easily accessible doorways, incomplete fortified wall coverage, lack of parapets, limited or absent sources of food or water, and the long distance from settlement in the valley below as detrimental to their function as defensive (Topic & Topic 2009). As a result of their problematic application to defensive roles, the Topics assert that these sites were actually staging areas for ritual battles, similar to those seen in modern *tinku*, which would have involved local communities (Topic & Topic 2009). They use an ethnographic example of a staged battle at the Inka fortress of Sacsahuaman outside of Cuzco in which

Inka forces engaged with captured Ecuadorians as an example of the use of fortifications in ritual battles (Topic & Topic 2009). Also, the Topics make sure to note that considerable variation likely existed with this use of fortifications in the Andes; citing contemporaneous forts in the Virú Valley that more likely served a defensive function that did not involve a *tinku*-like ritual battle (Topic & Topic 2009).

In addition to the arguments for a *tinku*-like use of fortifications in the Early Horizon, the Topics and other scholars promote a similar interpretation of other evidence of conflict in the Moche Valley. This argument implies a form of *tinku* involving staged battles between Moche elites and mostly cites depictions in Moche iconography. However, it is important to note that the apparent lack of Moche fortifications has been used as evidence supporting the interpretation of violence depicted in Moche iconography as *tinku*-like (Topic & Topic 2009). In contrast to the Early Intermediate Period, the Topics argue that the onset of the Late Intermediate Period saw an explosion in the number of fortifications in the Moche Valley that correlated with the forming and expansion of the Chimú Empire and a change in how war was fought (Topic & Topic 1990). Unlike the staged *tinku*-like battles among Moche elites, conflict now likely involved large Chimú armies that were probably recruited through an Andean labor tax called *mi'ta*. The Topics argue that during this period, defensive features were used by the Chimú to protect their conquests and conversely were used by local groups to resist Chimú expansion (Topic & Topic 2009). While the Topics' argument for *tinku*-like battle in the Moche Valley does not carry on to their interpretation of Chimú fortifications like Fortaleza de Quirihuac, it is nonetheless important to address the views of those that question the Topics' argument for an early *tinku*-like use of fortifications in the Andes.

The opposing view to that presented by the Topics regarding the interpretations of fortifications in the Andes is one that focuses on fortifications as archaeological markers of conflict or at least the perceived threat of violence. Arkush & Stanish use a comparative approach to challenge some of the interpretations made by the Topics on the defensive utility of certain features common in the forts of the Early Horizon and fortifications in general (Arkush & Stanish 2005). First, they state that “incomplete” fortified wall coverage of a given site does not necessarily disprove that the walls at the site were defensive in function. In fact, often sections that prove more difficult to access are lacking in fortification because their location already lends a defensive edge (Arkush & Stanish 2005). Similarly, they argue that a lack of parapets does not negate a military or defensive function. In many cases, parapeted walls were usually just those that were most vulnerable to being scaled or attacked by invaders (Arkush & Stanish 2005). Additionally, multiple doorways in fortifications could imply the use of sally ports for counterattacks or may be the result of later occupations in which defense was less vital (Arkush & Stanish 2005). Finally, countless numbers of historical and ethnographic documents show that isolated fortified sites that have no evidence of prolonged occupation can be interpreted as refuges. The lack of resources available at these sites is usually not problematic because sieges are rare phenomenon and, especially in enemy territory, it is costly to maintain armies in the field for long periods of time (Arkush & Stanish 2005). With this said, Arkush & Stanish challenge the view that *tinku*-like warfare is the only explanation for many of the Early Horizon fortifications. This debate surrounding the function of Early Horizon fortifications is important in complementing the theory put forth by Keeley and can further help to address the defensive nature of the walls found at Fortaleza de Quirihuac.



A synthesis of the methods of interpretation provided by Keeley et al., the Topics' argument regarding a change of the nature of warfare in Chimú times, and interpretations by Arkush and Stanish is represented in this paper. The interpretations of defensive architecture provided by Keeley et al. are used in order to address the extent to which certain parts of Fortaleza de Quirihuac served defensive roles. While I am skeptical about the Topics' argument for early *tinku*-like warfare on the coast and in the Moche Valley, their argument regarding the change of the nature of warfare from Moche to Chimú times is especially important in the discussion of Fortaleza de Quirihuac's construction. Finally, Arkush & Stanish provide a complementary framework to that of Keeley et al. and will similarly be used to assess the fortifications of Fortaleza de Quirihuac. Now that Fortaleza de Quirihuac has been thoroughly contextualized in space and time and the scholarly debate surrounding fortifications in archaeology and the Andes has been discussed, it is necessary to move to the presentation and interpretation of the data collected at Fortaleza de Quirihuac.

## **Chapter 3: Methods**

### **History and Methods of Map Data Collection**

The map of Fortaleza de Quirihuac was one of the first forms of data collection done at the site and provides important insights into the site's function. In Brian Billman's 1990's survey of the Moche Valley, the site was first mapped as the fortress component of the site called VA or MV-55. The probable defensive nature of its architecture was immediately evident and was a main factor in the future investigation of the site. In 2010, I was awarded a Summer Undergraduate Research Fellowship to create a map of the site and proceeded to finish mapping nearly three quarters of the fortress with the indispensable help of Evan Surridge, and Raphael Ruiz. The following year I was given the Julia Crane Award to complete the map and went on to finish mapping the main fortress component of the site with the help of Evan Surridge, Dana Bardolf, David Kellner, Dakota Meyers, Breanna Lujan, and Zack Lange. Brian Billman and MOCHE Inc. were instrumental in providing me with food, lodging, transportation, and other assistance throughout this project.

In order to create a map of the site, a method of compass and tape mapping coupled with the use of GPS waypoints was used. Because of the long hike required to reach the site and its challenging topography, a total station would have been nearly impossible and impractical even if possible. The map was drawn on paper with a 1:100 meter scale and began with the GPS Waypoint 101. Architecture was then drawn off of this waypoint using a compass to orient a measurement and a tape measure to produce lengths and this process was repeated at all other waypoints. When moving to a new area of the site, a new waypoint would be drawn by taking the compass and tape measurement from a previous waypoint. Also, GPS points were taken at every waypoint in order to orient the site in ArcMap and

check the accuracy of the compass and tape measurements after creating the digital version of the map. A Garmin GPSmap 60CSx was used and an accuracy of  $\pm 1.5$  meters was considered acceptable due to time and battery constraints. Architectural features were drawn from waypoints when possible and information regarding the condition and nature of the features was noted. Architectural condition was recorded with a solid line for a well preserved feature, a dotted line for a mildly eroded feature, and a dashed line for a nearly or completely eroded feature. In addition, architectural characteristics like parapets, doorways, pathways, terraces, and some wall heights were noted during the mapping process. The drawn map was then digitized and georeferenced in ArcGIS10, maintaining all of this information while allowing for easier manipulation of the data (Figure 3). All numerical map analyses were done using wall lengths and information from the digital map of Fortaleza de Quirihuac in ArcMap.

### **History and Methods of Artifact Data Collection and Analysis**

During the second summer of field work at Fortaleza de Quirihuac, selective surface collections of artifacts were conducted in order to gain a greater understanding of site chronology and activities. Brian Billman's 1990's survey of the Moche Valley previously took limited sample of ceramics from the site for chronological approximation, but the collections conducted in 2011 were much more extensive. With the help of Robby Valderamma, Matteo Valderamma, Kyle Forrester, and Lauren Kowalik, 264 pottery sherds and 4 sling stones were collected from 11 different designated collection areas in Fortaleza de Quirihuac during the summer of 2011. This collection was done with the permission of Jesus Briceño, a Trujillo representative of the Instituto Nacional de Cultura of Peru (INC).

The method used to record and plan the surface collections was Brian Billman's PD system used for all projects involved in the Moche Origins Project or MOP. This system used the label of PD for surface collection zones, the label of FS for artifact type, and ended with artifact number. An example of a label for an artifact would be 3101-01-01, which would translate to PD (surface collection unit) 3101, FS (artifact type) 01, and artifact 1 (only from that PD-FS combination). Only two FS categories were used: diagnostic sherd (01) and lithic (02). The PDs on Fortaleza de Quirihuaac started at 3101 for convenience and encompassed either terraces with compounds, individual compounds, or areas of wall-fall from nearby terraces. At every PD, 100% of rim sherds and decorated sherds were collected from the surface. Sherds not considered diagnostic (those lacking rims or decoration) were not collected because of time constraints and the limited information they could offer for the purposes of this study. The only lithics collected were four sling stones.

All lab analyses were conducted by the author in the weeks after collections were taken in the summer of 2012. All artifacts were washed and photographed, with rim profiles drawn for all sherds that were not too eroded to determine orientation and diameter. A significant amount of data were collected in the lab including weight, exterior surface color, interior surface color, paste color, temper, form, neck height, interior surface treatment, exterior surface treatment, thickness, rim diameter, percent of rim present, decoration, and additional notes. The forms determined in the lab were preliminary and more thorough analyses of form types were done later with reference to Keatinge's dissertation and other works (Keatinge 1973, Topic & Moseley 1983). This will be discussed in detail in the next chapter. The dimensions of the four sling stones were taken as well as their weight. While not

all of the information collected was used in this specific study, all lab work was done very thoroughly to enable future use and assessment of the information collected.

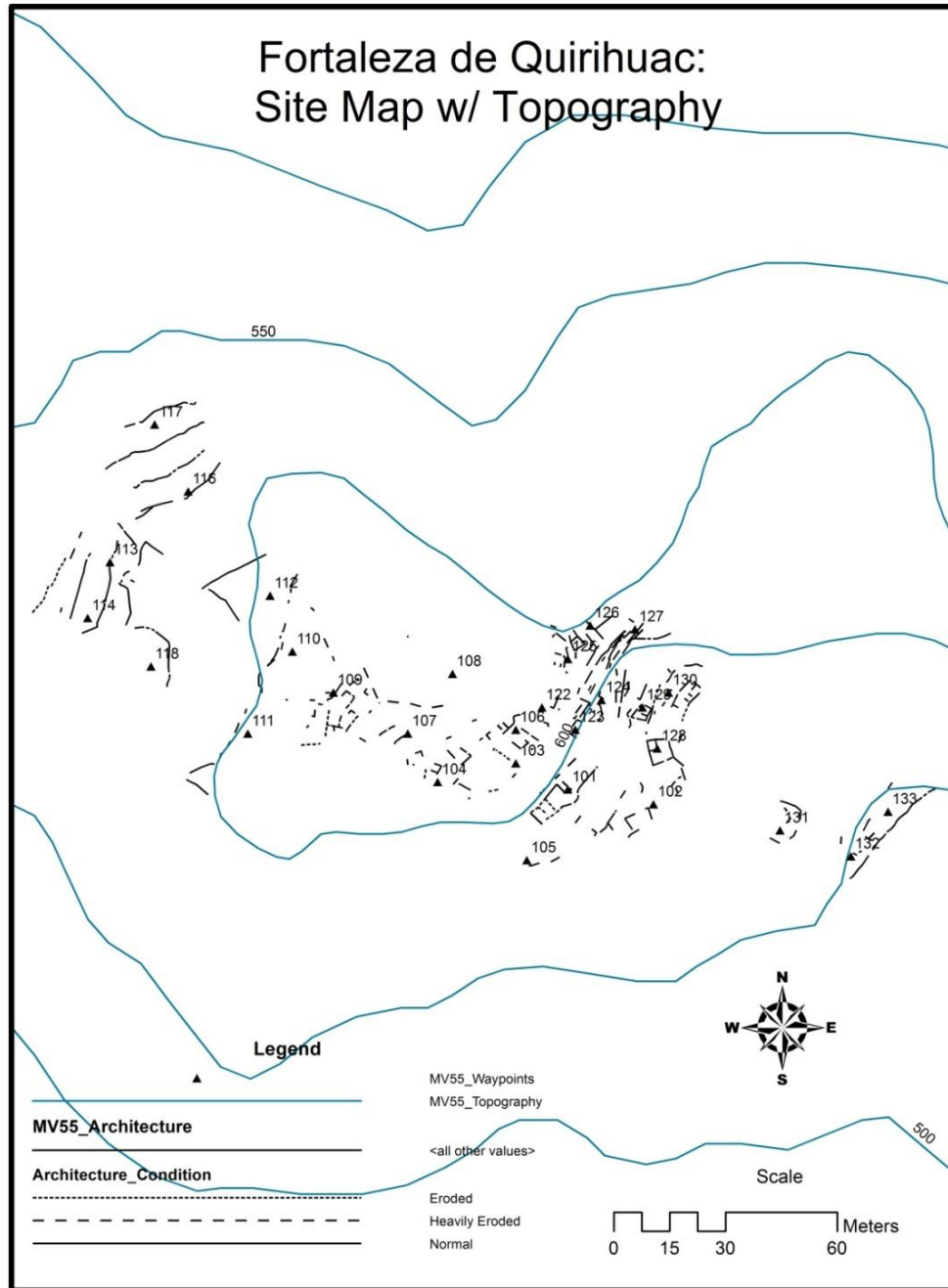


Figure 3 - An overview map of Fortaleza de Quirihuac with all waypoints labeled.

## **Chapter 4: Data**

### **Site Overview**

Fortaleza de Quirihuac is located at the summit of Cerro de la Compañía (~640masl) in the Middle Moche Valley overlooking the modern communities of Quirihuac and Bello Horizonte. The elevation of the site ranges from 550masl to 630masl and the topography is incredibly steep and variable (sometimes  $>20^\circ$ ) with sheer cliff faces in some areas. The top of Cerro de la Compañía consists of two main peaks of around 640masl on the eastern and western sides of a saddle (620masl) that is between the summits. This saddle eventually broadens out into a large quebrada that goes from the top of the mountain down to the northern edge of valley floor. The site itself starts at about 550masl on this main quebrada, moves up the quebrada, onto the saddle, across the western peak, and then stretches partially down the several quebrada chutes on the northwestern side of the mountain. While a total of 1.3 hectares of architecture were mapped on Fortaleza de Quirihuac, more defensive and other architecture associated with the site can be seen around the peak of Cerro de la Compañía. Most of this architecture was too dangerous to access as a result of erosion and steep slopes but the total site size could be conservatively estimated at around 1.5-2 hectares. The site preservation was moderate to good; while some looter holes were present, the majority of the destruction of architecture was likely caused by seismic activity that partially destroyed some terracing and fortifications. All of the architecture consisted of stone masonry constructed with materials that were most likely quarried locally.

### **Summary of Map Data**

Fortaleza de Quirihuac can be arbitrarily separated into three main sections; the southeastern quebrada chute and main saddle, the central series of terraces and western peak,

and the northwestern fortified hillside (Figure 6). For convenience these three sections will be referred to as Section One, Section Two, and Section Three, respectively.

The ascent to the site from the valley floor begins in a northwesterly direction up the main quebrada and through an associated Chimú settlement until one reaches the main southwestern wall and the beginning of Section One (Figure 7). This section stretches from the main southwestern wall, up the quebrada, and onto the main saddle of the mountain. The principle parapeted wall at the base of this section spans 35 meters across the entire quebrada at about 550masl, probably measured to 3-4 meters in height, and had evidence for sling stone piles. It is important to note that the quebrada that this wall overlooks is the only plausible route from the valley floor to Fortaleza de Quirihuac. The rest of the section is bordered by cliff faces, steep ridges, and other largely impassable terrain that leaves the quebrada one of the only methods of ascent. After a possible lookout on a platform terrace, the site most likely continued up the quebrada another 50 meters from the main southwestern wall but the architecture is mostly hidden by wall-fall from terraces above or has been damaged beyond recognition. The rest of Section One is characterized by large terraces 3-4 meters in height that stretch across the quebrada or flatten areas of the ridge on its southwestern side. These terraces have evidence for several structures built on top of them, and have some possible patio spaces. Most surface sherds can be found either on top of the terraces or in their associated wall-fall. At the top of Section One, the saddle of the mountain was broadened by numerous closely packed terrace walls that could represent several stages of construction, a possible series of stairs, reinforcing walls to a weak original, or a variety of other things. Unfortunately they are far too eroded to interpret meaningfully.

Section Two consists of a series of terraces that are built on and around the western peak of Cerro de la Compañía (Figure 5, Figure 8). These terraces house a number of structures and patio spaces, with the patio spaces being much better defined and larger than those in Section One. The distribution of surface sherds is similar to Section One although a lower density is found on the patio areas. The terraces in this section level a significantly larger area but the terrace walls are much more eroded than in Section One. The western peak of the mountain is separated by two smaller peaks with a saddle between. The majority of the architecture on the eastern half of Section Two represents construction on this saddle. The smaller peaks on either side have little to no architecture that was visible although looting, especially on the western sub-peak, obscured this. It is important to note that much of the northern and southern borders of this section are sheer cliff faces, thus the only way it could be accessed would be from the other two sections.

Section Three consists of a series of parapeted and non-parapeted defensive walls that guard the methods of ascent from the opposite side of the mountain (Figure 4, Figure 9). While this area of the site will be discussed in considerably more detail during its analysis, it is important to note here that virtually no artifacts were found on the surface of the parapets or around the walls in this section except sling stones. Two sling stone piles were found inside the central bastion and river cobbles can be found in some of the wall-fall below blown out parapet walls. Finally, the walls represented in this section guard against the only known and passable routes to the peak from this side of the mountain.





**Figure 4 - Photo looking southeast towards the northwestern walls of Section Three.**



**Figure 5 - View looking southwest towards the Section Two terraces from the eastern peak.**

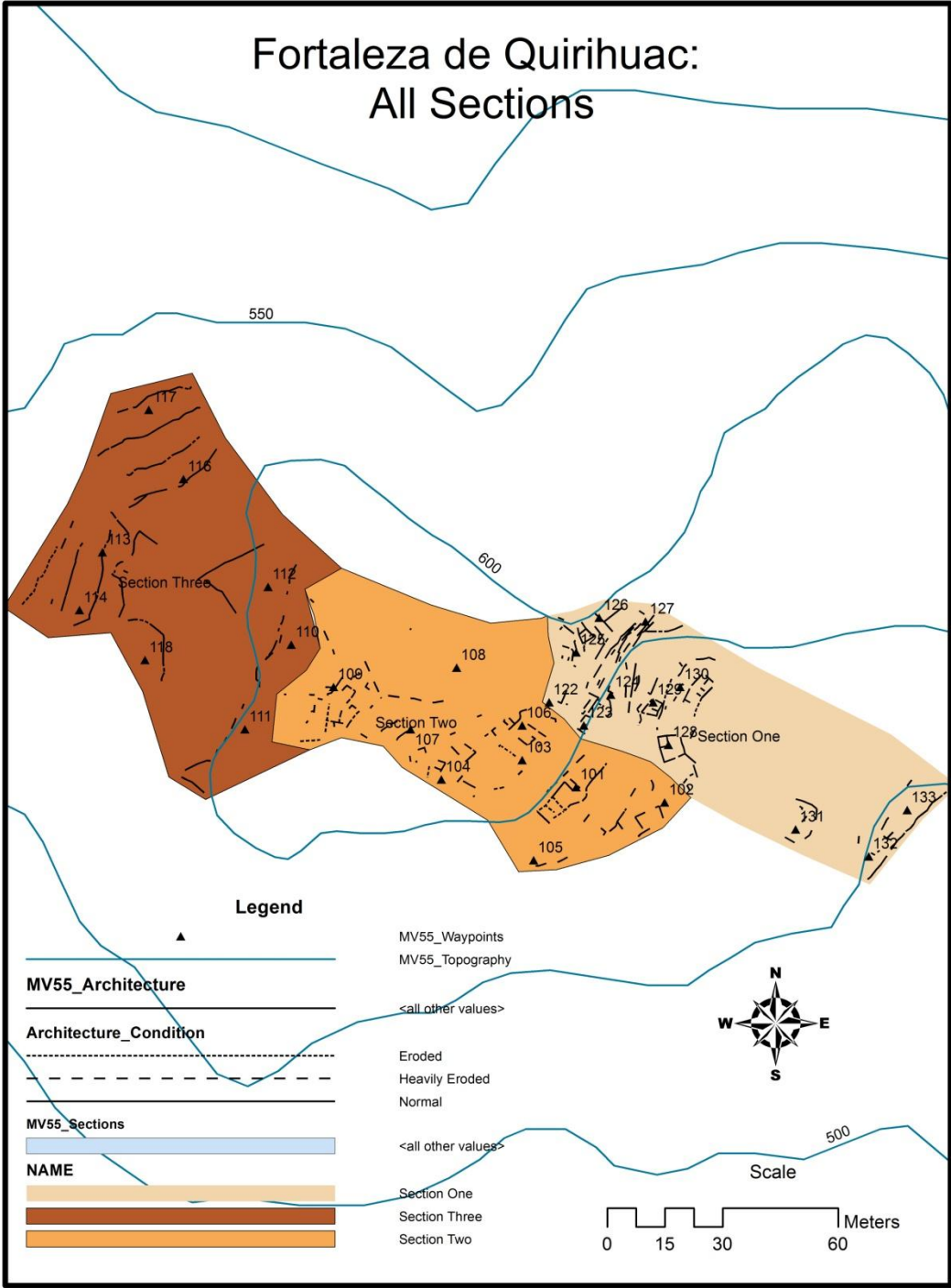


Figure 6 - All sections of Fortaleza de Quirihuc.

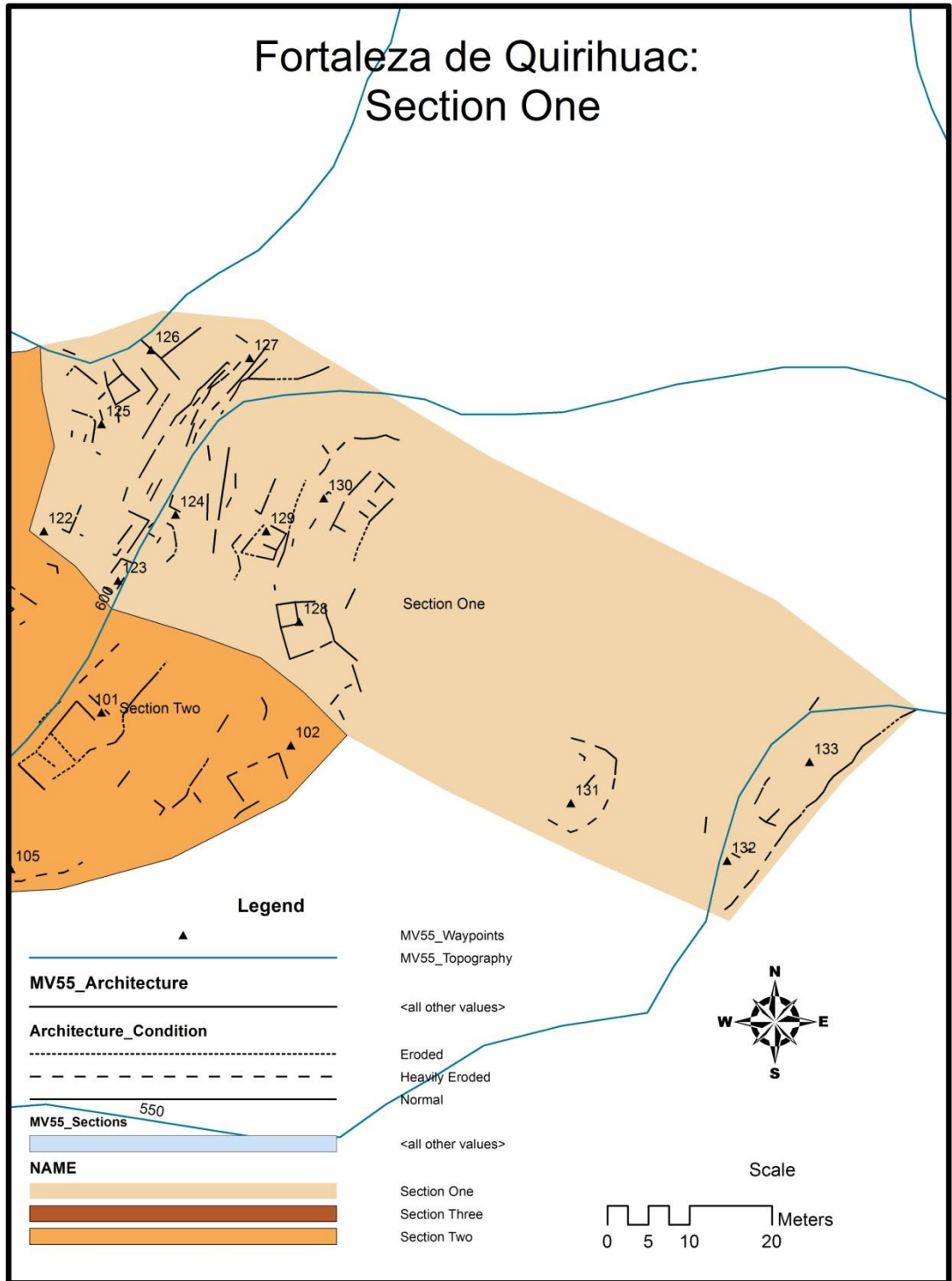


Figure 7 - Section One.

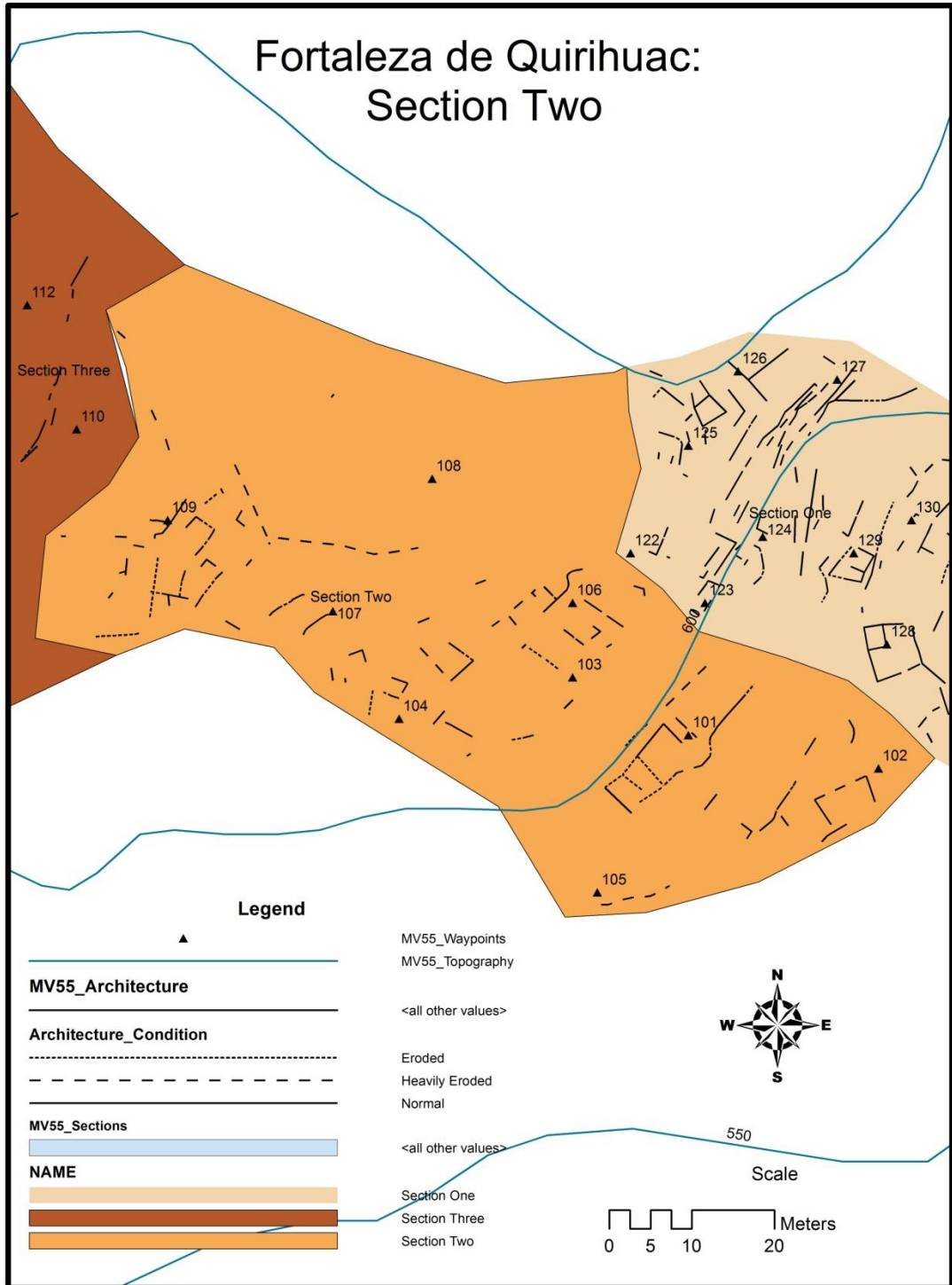
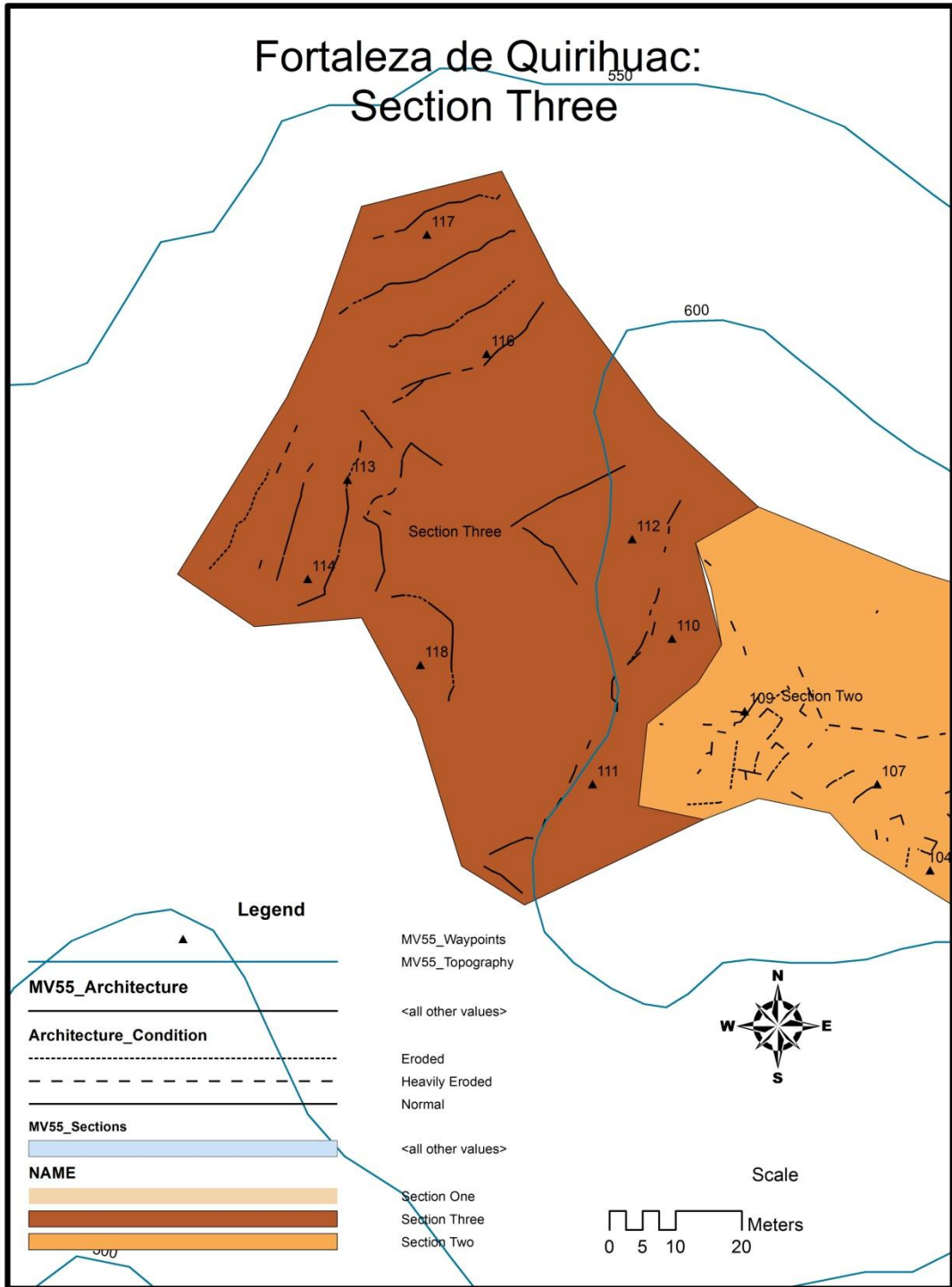


Figure 8 - Section Two.





**Figure 9 - Section Three.**

## Overview of Collection Units

A total of 268 artifacts were collected from 11 PDs on Fortaleza de Quirihuaac (Figure 10). As the PDs are described, exact numbers of artifacts collected in each unit can be seen in Table 1. PD 3102 was situated on the saddle described on the northwest side of Section Two (Figure 11). It consisted of a compound enclosed on the northwest and southeast sides by terraces and contained several possible structures and a patio space on its southeastern side. PD 3101 represented the wall fall from PD 3102's northwestern side and most artifacts collected here are assumed to have originally been associated with PD 3102. Similarly, PD 3103 represented the wall fall from the southeastern patio space of PD 3102. It is important to note that PD 3103's sparse artifact number likely coincides with the generally lower artifact densities found on the patio spaces of Fortaleza de Quirihuaac.

Skipping the next terrace unit, PD 3104 represented the terrace enclosing waypoint 103 (Figure 12). This consisted of a large patio space on the southwestern side with structures interrupted by several looter pits on the northeastern side. While the patio yielded few artifacts, the majority were found in backfill from looter pits among the structures to the northeast. PD 3105 represented the wall fall from the terrace of PD 3104. The majority of the artifacts collected from this PD again were situated closer to the wall fall below the possible structures with fewer below the patio. PD 3106 was the next terrace southeast of PD 3104 and represents a similar layout except the patio space is smaller and the patio area and structure area are flipped. Again, the majority of the artifacts were found among the structures on the southwest side of the PD. PD 3107 represented the wall fall from the terrace of PD 3106 and followed similar patterns of artifact frequency as described in other wall fall PDs at Fortaleza de Quirihuaac.

Moving to Section One, PD 3108 represented the compound enclosing waypoint 128 that was composed of a main structure with a small room in its northeastern corner. The southern half of this PD was a small patio space and all of the artifacts collected were in or around the structure. PD 3109 was a similar, but smaller, compound that enclosed waypoint 129 and consisted of two large rooms. The artifacts collected were spread evenly across the PD, although those collected on the patio space to the north could have been wall fall from the terraces above. PD 3110 encompassed the entire fortified wall on the eastern side of the site and the artifact distribution was even throughout (Figure 13). Four sling stones were collected from a pile on the southwestern edge of the wall, composing the only lithic material collected. Finally, PD 3111 was a single ceramic figurine head collected at waypoint 124 (Figure 19).

**Table 1 - Artifact collection numbers at different PDs.**

<b>PD #</b>	<b>Ceramics Collected</b>	<b>Lithics Collected</b>
3101	27	0
3102	43	0
3103	8	0
3104	25	0
3105	42	0
3106	23	0
3107	33	0
3108	8	0
3109	26	0
3110	28	4
3111	1	0
<b>TOTAL</b>	<b>264</b>	<b>4</b>

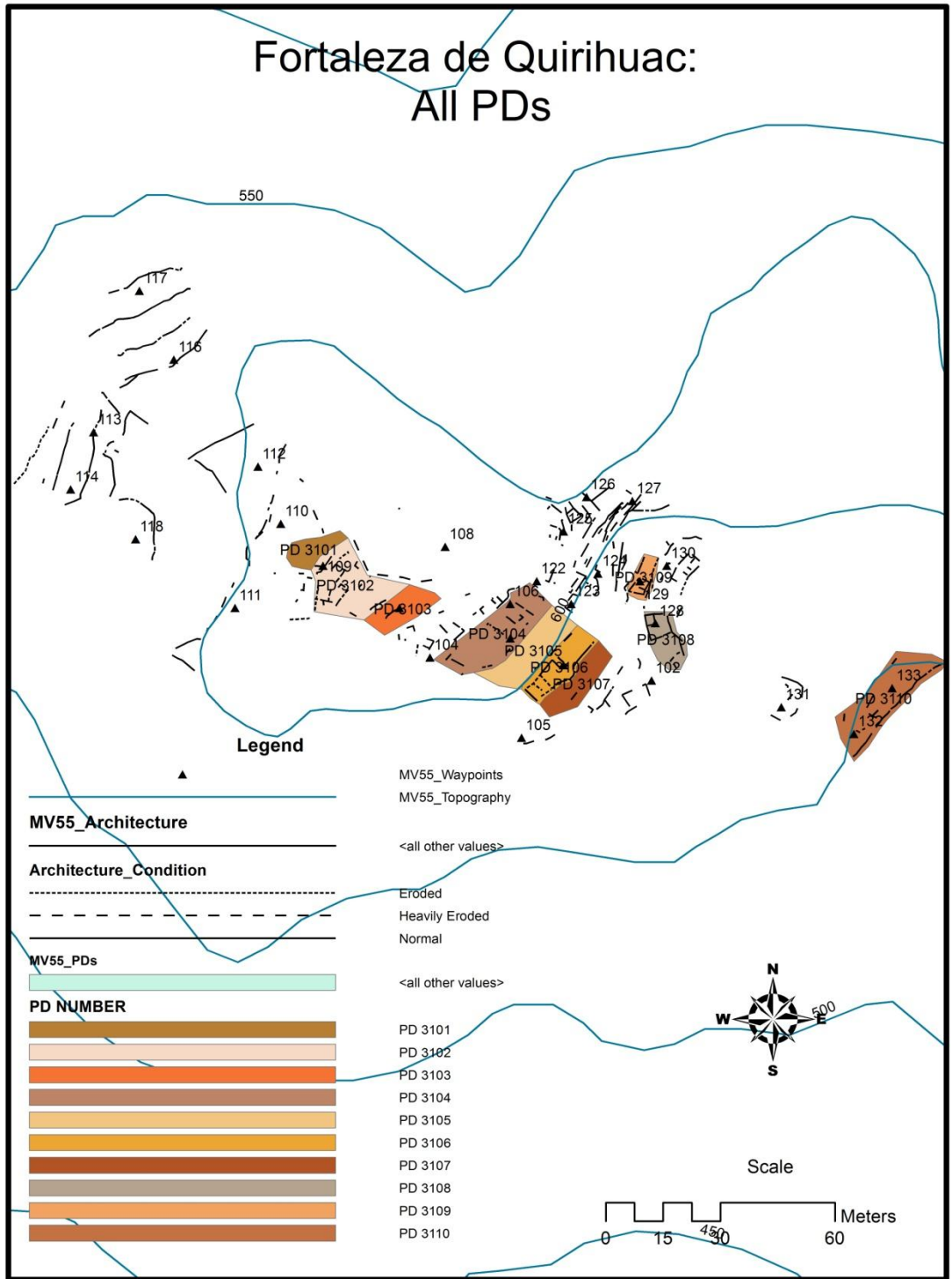


Figure 10 - Map with all PDs.



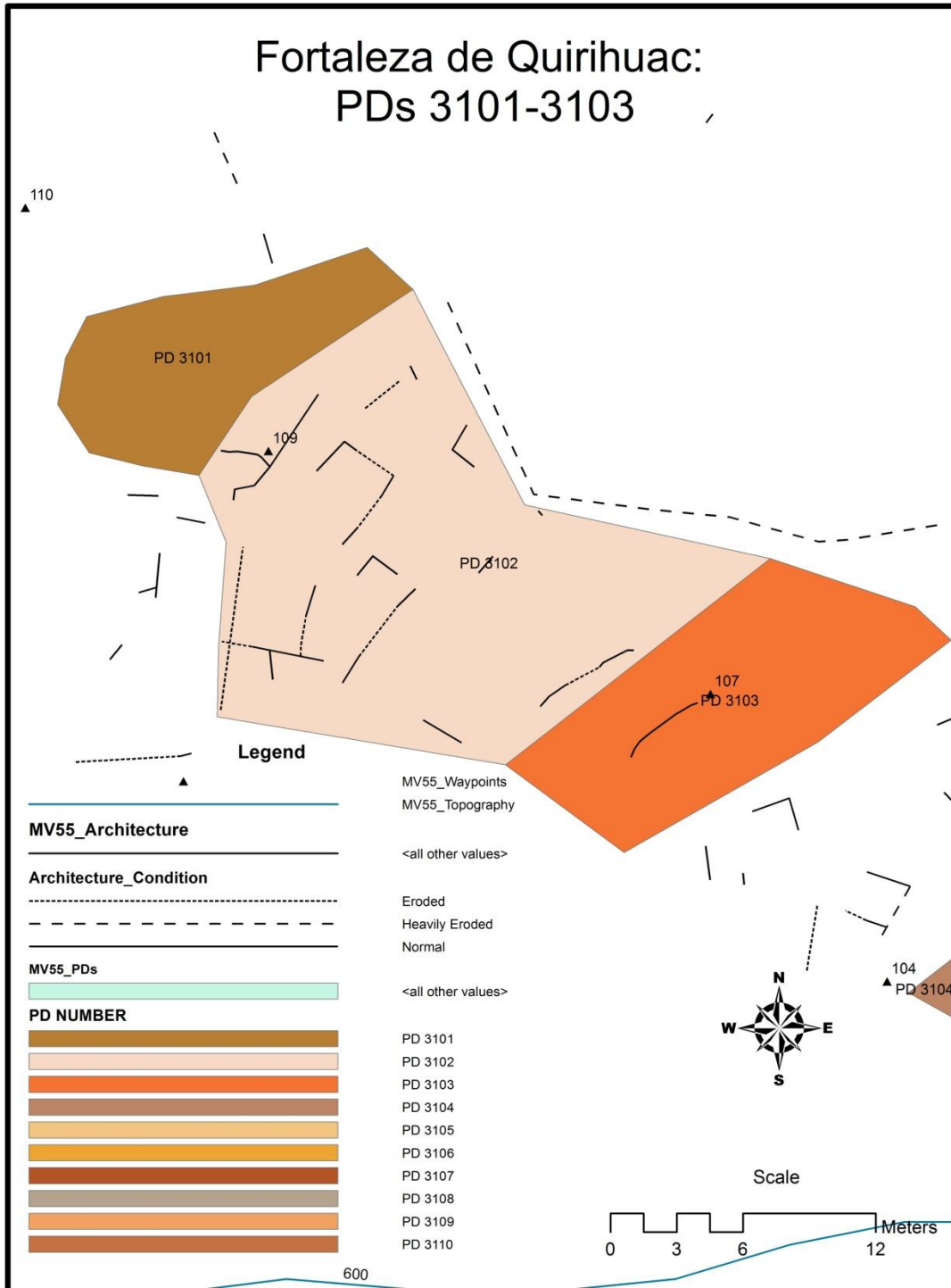


Figure 11 - Map with PDs 3101-3103

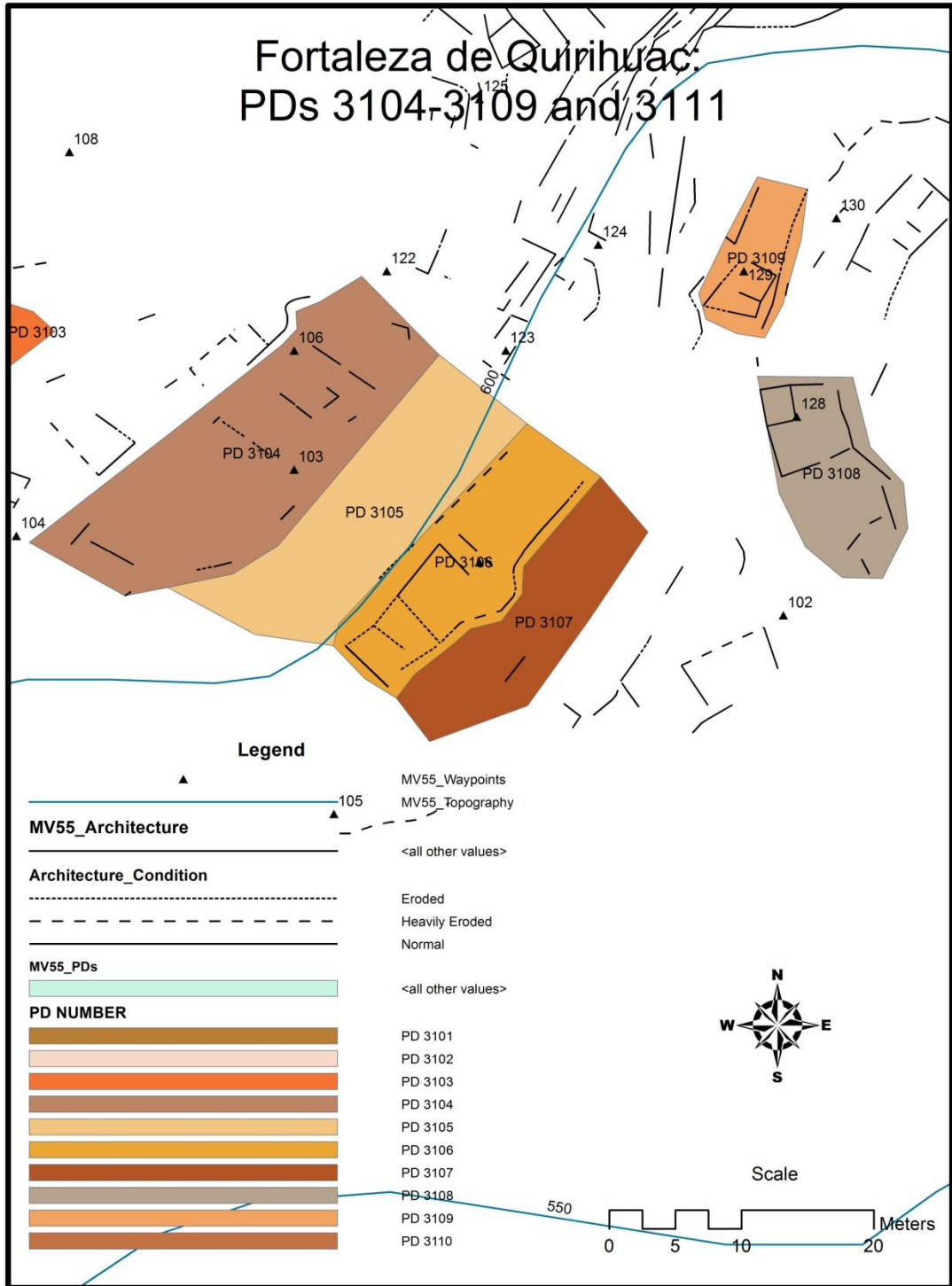


Figure 12 - Map with PDs 3104-3109. Note that PD 3111 is represented by waypoint 124.

# Fortaleza de Quirihuac: PD 3110

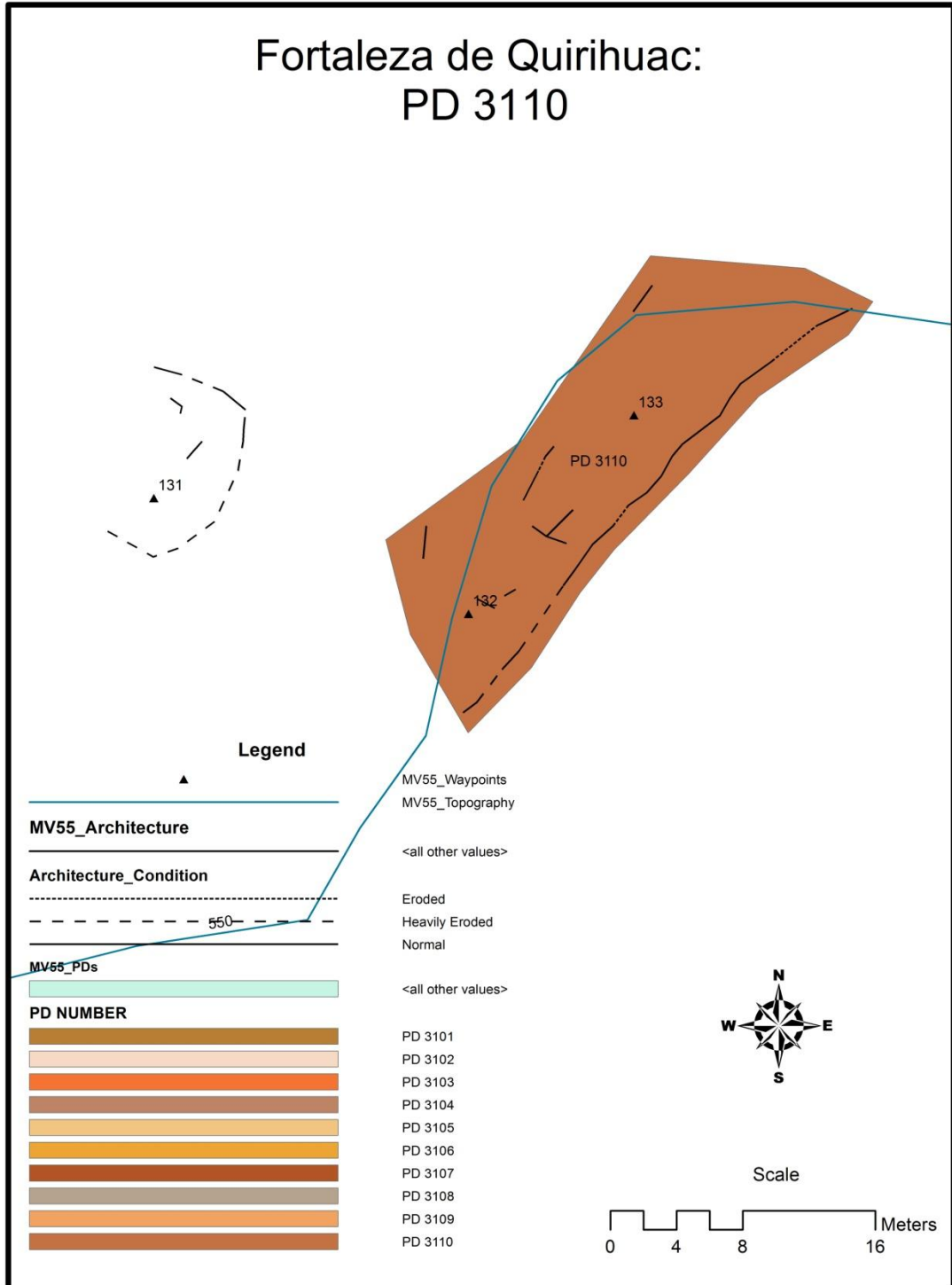


Figure 13 - Map of PD 3110.

## Summary of Artifact Data

As stated earlier, much information was recorded regarding the 268 artifacts collected from the PDs that were just described. Of the 268 artifacts collected, 52 were decorated sherds, 198 were rim sherds, 4 were sling stones, 28 were extremely eroded rims and shoulders of jars, and 14 overlapped as decorated rim sherds. A total of 198 rim profiles were drawn and were used along with data regarding rim diameter to determine their possible form. These data are presented later in the analyses regarding ceramic form frequencies at the site. Forgoing an explanation of all other artifacts, I will instead point out some trends among the decorated sherds while highlighting a few notable forms of decoration. A total of 14 decorated sherds were found with a mold impressed pattern that looks like dots or goose bumps across the surface and thus is called *piel del ganzo* (Figure 17). This pattern is common in many Chimú ceramic vessels (Keatinge 1973). A variety of other decorations were observed; a molded corn effigy, numerous incised patterns, geometric stamped patterns, and molded depictions of eyes or faces to name a few. A surprising number of figurine parts were also found: one foot, a possible ear, one humanoid head (Figure 16, Figure 19), and a possible feline mouth. In addition to the ceramics, four sling stones were collected that ranged from 40 to 70mm in diameter and 150 to nearly 800 grams in weight (Figure 18). Furthermore, two grinding stones were found among the wall fall of Section One (Figure 15). These could either represent food processing at the site or perhaps were used in wall construction. Finally, although no systematic collection or recording was done regarding faunal remains at the site, a number of the looter holes and eroded terraces exposed evidence of animal bone, fish bones, and a common shellfish found on the coast called *donax*

*peruvianus* (Figure 14). These remains were identified by the author according to experience in a 2011 excavation on the coastal Chimú site of Cerro la Virgen.



**Figure 14 - Some examples of *Donax Peruvianus* found at Fortaleza de Quirihuac.**



**Figure 15 - An example of one of the grinding stones found at Fortaleza de Quirihuac.**



Figure 16 - Artifact 3108-01-01 which is a possible mouth of a feline figurine.



Figure 17 - Artifact 3109-01-03, which is a shoulder of a vessel with a *piel de ganzo* and conch shell design.





**Figure 18 - One of the sling stones collected from PD 3110.**



**Figure 19 - Photo of PD 3111: a figurine head.**

## Chapter 5: Analysis

### Primarily Defensive Architecture

As a defensive function of Fortaleza de Quirihua is argued, it is appropriate that the analysis of data regarding defensive architecture and fortifications of the site is the first addressed. The site contains 290 to 340 meters of defensive architecture that was mapped, with the smaller estimate neglecting architecture that was heavily eroded and difficult to interpret. This architecture was then split into two categories of defensive parapet and defensive regular (Figure 20). Defensive parapet walls had clear evidence of parapets on which individuals could stand and view oncoming forces. Defensive regular walls did not have this feature but were assumed defensive mostly because of their association with parapeted walls or strategic positioning. Both wall types ranged from .5-1.5 meters thick with parapeted walls being thicker.

Defensive architecture was only recorded in Sections One and Three, with Section Three having considerably more. Section One had one large parapeted wall that, although intermingled with some possible non-defensive structures, was still determined as having a primarily defensive function. This was mainly because of the height of the wall, its parapets facing outward from the site, and its association with at least one sling stone pile. While none of these three markers alone precluded a defensive function, their association with each other suggests that at least one of this wall's functions was defensive. A closer look at the abundant proposed defensive architecture in Section Three helps support this argument.

Section Three seems to have had a more complex and layered defense consisting of several defensive non-parapeted walls that were guarded by one or more parapeted walls (Figure 21, Figure 24). These walls were determined as defensive in function because of



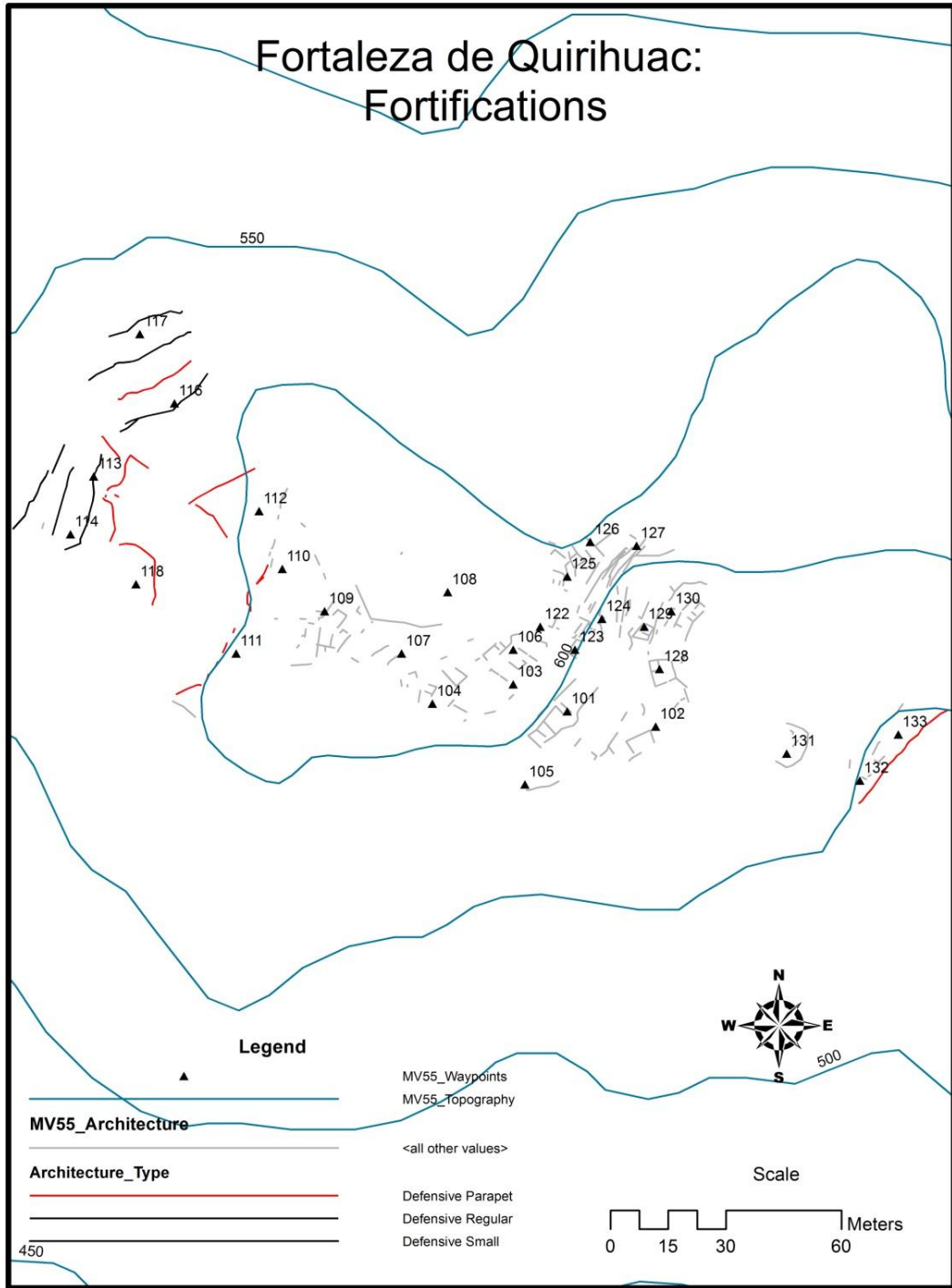
several factors. First, the proposed defensive architecture of Section Three had no associated or bordering non-defensive structures or patio areas like present in Sections One and Two. In addition, virtually no ceramics were found in this section, with the only commonly encountered artifacts being the sling stones piled adjacent to some of the parapeted walls. While the lack of structures or ceramics does not alone establish a defensive function of these walls, these data along with the sling stones suggests that something different was occurring at this section than at the others. The sling stones' positioning adjacent to the parapeted walls, however, is suggestive of their use as fortifications (Figure 23).

In addition to having sling stone piles adjacent to them, the parapeted walls all either faced outward from the site or had views of nearby parapet walls. While no formal "bastions" were recorded, the positioning of these walls created a similar effect to that created by bastions. A bastion is a salient projection of a wall in which defenders can stand and inflict flanking fire on enemies that are assaulting an adjoining wall (Keeley et al. 2007). The main utility of this feature is that it creates a "kill zone" in which attackers are vulnerable to flanking fire. The parapeted walls in Section Three, while void of formal bastions, were constructed to create a similar effect (Figure 24). Possible directions of fire were roughly estimated and it was clear that several of the walls of this section could have been protected by flanking fire that would create a kill zone (Figure 22).

While the parapeted walls provided evidence for a defensive function through their similarities with bastions, the non-parapeted walls required a different mode of interpretation. These walls were spaced 6-8 meters apart and were positioned at these intervals below parapeted walls. Upon first consideration it would be thought that these walls would have been more advantageous to attackers because of the cover they may have provided from the

defenders' slings. However, using current figures citing the range of Andean slingers as averaging between 60 and 80 meters (Brown Vega 2009), it is clear that any slinger on the parapets of a Section Three wall could reach past the 3-4 non-parapeted walls below the parapeted walls of Fortaleza de Quirihua. In fact, it is likely this range would be increased because the slingers defending Fortaleza de Quirihua would have been firing at a downward angle while those in the study were firing horizontally. Also, these walls would have provided large barriers that would have needed to be scaled in order to reach the site, slowing any attack considerably. After scaling a non-parapeted wall the attacker would then have been forced to move forward to the adjacent wall's outward edge in order to be protected from oncoming missiles. This process would have had to be repeated until reaching the parapet walls which, as described earlier, were strategically positioned to increase the vulnerability of any attacker attempting to scale them. While not parapeted or associated with sling stones, the non-parapeted walls of Section Three would have provided equally intimidating and functional barriers to enhance the defensibility of the site.

The main value of this analysis of defensive architecture is that it reinforces the view that at least one of this site's functions was defensive in nature. With the creation of kill zones, parapet walls with associated sling stone piles and the strategic positioning of non-parapeted walls, it is clear that one of the main functions of Section Three was defensive. The parapeted wall with an associated sling stone pile in Section One provides good evidence for a defensive function, but the mixture of defensive and non-defensive architecture in that section of the site warrants further explanation that will be addressed next.



**Figure 20 - Map of fortifications. Parapet walls are highlighted in red, defensive regular walls are highlighted in black and all other construction is semi-obscured in gray.**

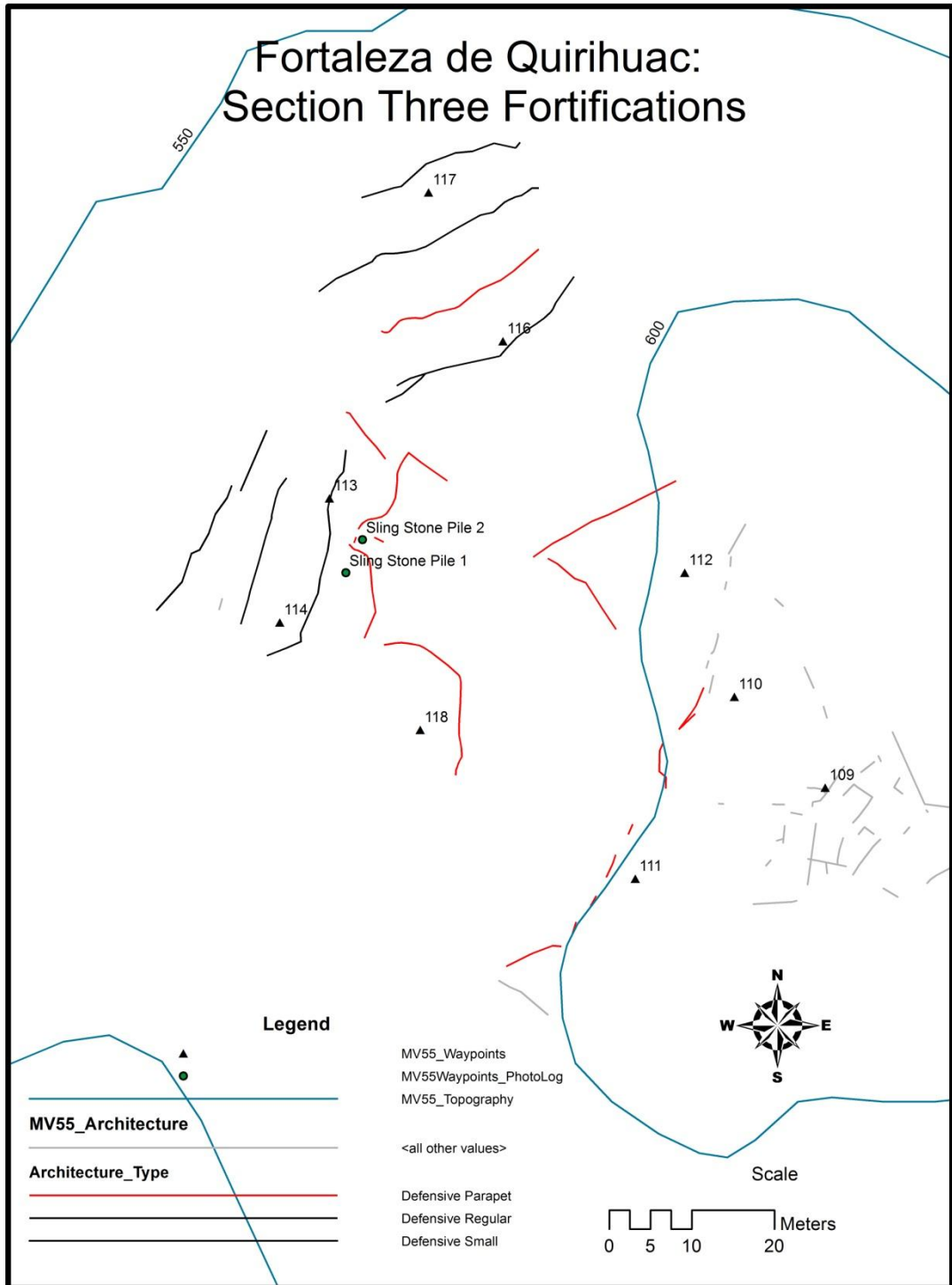
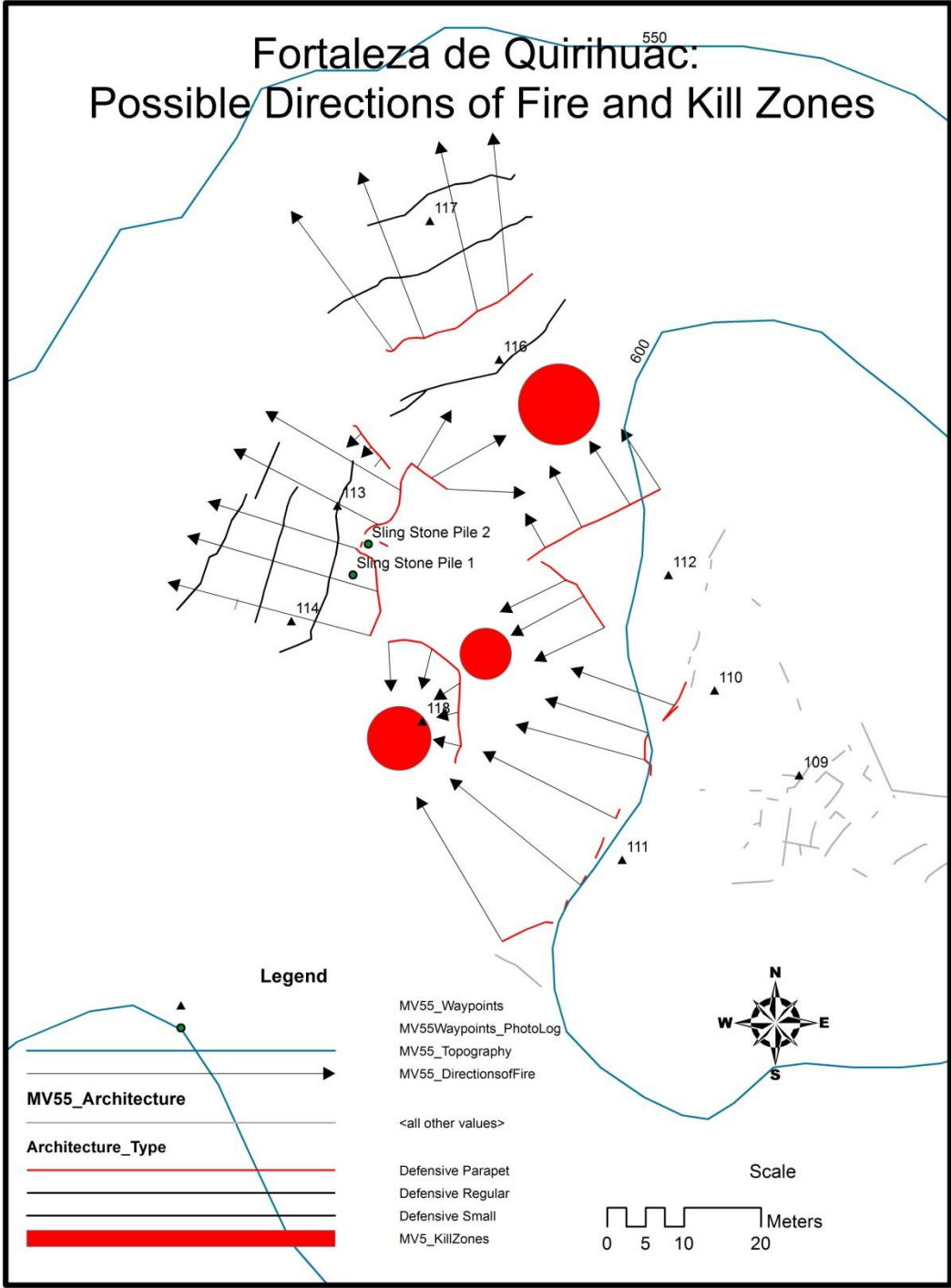


Figure 21 - Map of northwestern/Section Three fortifications. Sling stone piles are labeled.



**Figure 22 - Map of possible directions of fire and kill zones. While kill zones are only marked with red circles, they would theoretically go all the way up to the wall which they are opposite.**





**Figure 23 - Sling stone pile behind parapets in Section Three.**



**Figure 24 - Looking south from parapet walls at the southwestern-most kill zone. The individual, Robby Valderamma, is 1.6m tall.**



**Figure 25 - Standing at a parapet wall in Section Three. The individual, Robby Valderamma, is 1.6m tall.**

### **Possible Dual Purpose Architecture**

While the parapeted wall in Section One is likely defensive, Section One provides an interesting contrast to Section Three that brings up the possibility of architecture that served both defensive and non-defensive roles. In Section Three, non-defensive architecture and artifacts disappear almost entirely and are replaced by rings of strategically positioned defensive walls and sling stones. On the other hand, Section One has only one main defensive wall, tons of non-defensive architecture, and a wide variety of surface artifacts. What could account for this distinction? As noted in the site description, many of the terraces of Section One were quite high. This height could have rendered them quite difficult to scale if guarded by a determined defender or inhabitant. It is entirely possible that these terraces could have served several roles, one of which could have been defensive in situations of dire need. While no sling stones were found on these terraces, this might only indicate that this

dire need never came. In addition to being a physical barrier, these terraces could have provided psychological obstacles to any attacker. The steep slope of the site lends a more limited field of vision to those attempting to look upward from lower elevations. In combination with main defensive wall at the base of the fort, these terraces would have made an intimidating spectacle to any attacker that was planning on assaulting from the valley floor. While hard evidence for a possible use of the terraces of Section One as defensive is lacking, it is intriguing that these terraces had many features that lent defensive capabilities to likely non-defensive architecture.

### **Minimum Number of Defenders and Supporting Populations**

A final analysis that was conducted using the defensive architecture of Fortaleza de Quirihuac was a rough calculation of the number of individuals needed to man its parapeted walls. Using the lengths of the parapet walls that were mapped and estimates regarding the spacing of slingers on ancient defenses, an estimation of the minimum number of individuals necessary to defend these walls was calculated. Wall lengths were estimated at a minimum of 167 meters and maximum of 180 meters, with the minimum ignoring any walls that were heavily eroded and difficult to interpret. Also, previous scholarly consensus seems to have settled on a minimum 3 meter spacing in which slingers could stand without injuring each other (Topic & Topic 2009). Simple division established a tentative range of 55 to 60 slingers that could have manned the walls that were mapped. While it is likely that not every wall was constantly manned, even in the event of an attack, this is still a useful estimate for later analysis regarding the possibility of a garrison. However, it must be emphasized that these numbers were only produced with sections of the walls that were preserved enough to be mapped. Many of the defensive walls that likely held parapets were not mapped because they



were completely eroded away, and the actual minimum number of defenders is likely much higher.

If a conservative force of at least 55 individuals was needed to defend the site, estimations regarding the populations required to contribute to this force can also be calculated. As the Chimú Empire is thought to have used *mi'ta* for fielding military forces (Topic & Topic 2009), it is entirely possible that any garrison would be recruited from a similar pool. Usually adult males would be selected in a volume and frequency that would not greatly disturb or endanger the wellbeing of the supporting population. A common estimation for a supporting population is about 5 individuals for every adult male *mi'ta* laborer or conscript (Brian Billman personal communication). Applied to Fortaleza de Quirihuac, simple multiplication establishes that the supporting population for a theoretical garrison would have been around 275. This number could have been easily provided by the numerous communities in the valley below or the Chimú settlement that was adjacent to Section One. In the next analysis using non-defensive architecture, it is also possible that the site itself could have provided enough room for such a population. Either way, it is clear that Fortaleza de Quirihuac would have needed at the very least: 55 individuals to defend it and a base population of at least 275 to provide these defenders.

### **General Assessment of Non-Defensive Architecture**

While a defensive function is argued for Fortaleza de Quirihuac, a general assessment of data regarding the non-defensive architecture of the site is just as important as that addressing its fortifications. The non-defensive architecture at Fortaleza de Quirihuac is focused in Sections One and Two, and is mostly composed of numerous terraces with evidence for compounds and patios built upon them. The compounds on these terraces

usually are made up of several rooms and small storage areas with adjacent patio areas. Large patios are more common in Section Two but patio space seems to have been an important part of the non-defensive architecture of the site as a whole. Also, the vast majority of the sherds found in surface collections were found on or around non-defensive architecture and its associated wall-fall. The immediate importance of these data is that they present the possibility that the site could have been permanently or periodically inhabited, unlike an ephemeral refuge. Although the occupation length or frequency is difficult to address with just map data and without excavation, ceramic evidence from the surface collections will later address the possibilities regarding the nature of Fortaleza de Quirihuaac's occupation.

### **Rough Population Estimates from Site Area**

The only form of numerical analysis that was done with the data collected on non-defensive architecture was a very rough estimate of population size. Many methods of estimating population size exist when looking at prehistoric settlement, and a few are applied to the Andes (Kvamme 1997, West 1970). West presented the most relevant population approximation model when he estimated the population for Chan Chan by SIAR density (West 1970). Small irregularly agglutinated rooms (SIARs) were the households of the lower and middle class residents of Chan Chan that did most craft production and labor in the city (Topic J 1982). West uses a calculation of an average of 58 people per 1000m<sup>2</sup> in the SIARs of Chan Chan. Although Fortaleza de Quirihuaac was also Chimú and most likely contemporaneous with at least some of the SIAR occupations at Chan Chan; the site's middle valley context is completely different than that of the urban SIARs. It must be stated that using this model for population density in Fortaleza de Quirihuaac can only be regarded as a preliminary and incredibly rough estimate of population size.

While West's model is not perfect for estimating population density at Fortaleza de Quirihuaac, it was applied with interesting results. The conservative area of defined space for structures is around 3,805m<sup>2</sup> at Fortaleza de Quirihuaac. This estimate was made by drawing a tight polygon around the dense architecture of Section Two and the northwestern half of Section One (Figure 26). The application of West's model through a simple equation of cross multiplying and dividing results in a population size of 221. When considering the previous estimated garrison size of 55, the projected supporting population of 275, and a combined population of 330, the results seem a bit low. However, if a more liberal area of habitation is drawn that includes the heavily eroded but likely inhabited southeastern half of Section One; the area is increased to 5568m<sup>2</sup> and with it the population estimate to 323. Like many population estimates, these figures are rough estimates at best and wild guesses at worse, but they do shed light on several possibilities regarding how the site was occupied. If the site population was closer to the liberal estimate of around 300, Fortaleza de Quirihuaac could have possibly been inhabited by both a garrison and its supporting population within the site's walls. Conversely, if the site population was closer to the more conservative estimate of around 200, Fortaleza de Quirihuaac could have easily housed the defensive force of 55 within its walls. The main value of comparing this information with that regarding the minimum size of a defensive force is that it presents the possibility of at least a small garrison regularly occupying the site. While providing interesting results that made the housing of a garrison and the calculation of a rough garrison size possible, no evidence from architectural data pointed directly towards a garrison being present at the site. However, it is in regards to the possibility of a garrison at Fortaleza de Quirihuaac that the ceramic data recorded after surface collections provides the best evidence for a garrison being present at the site.

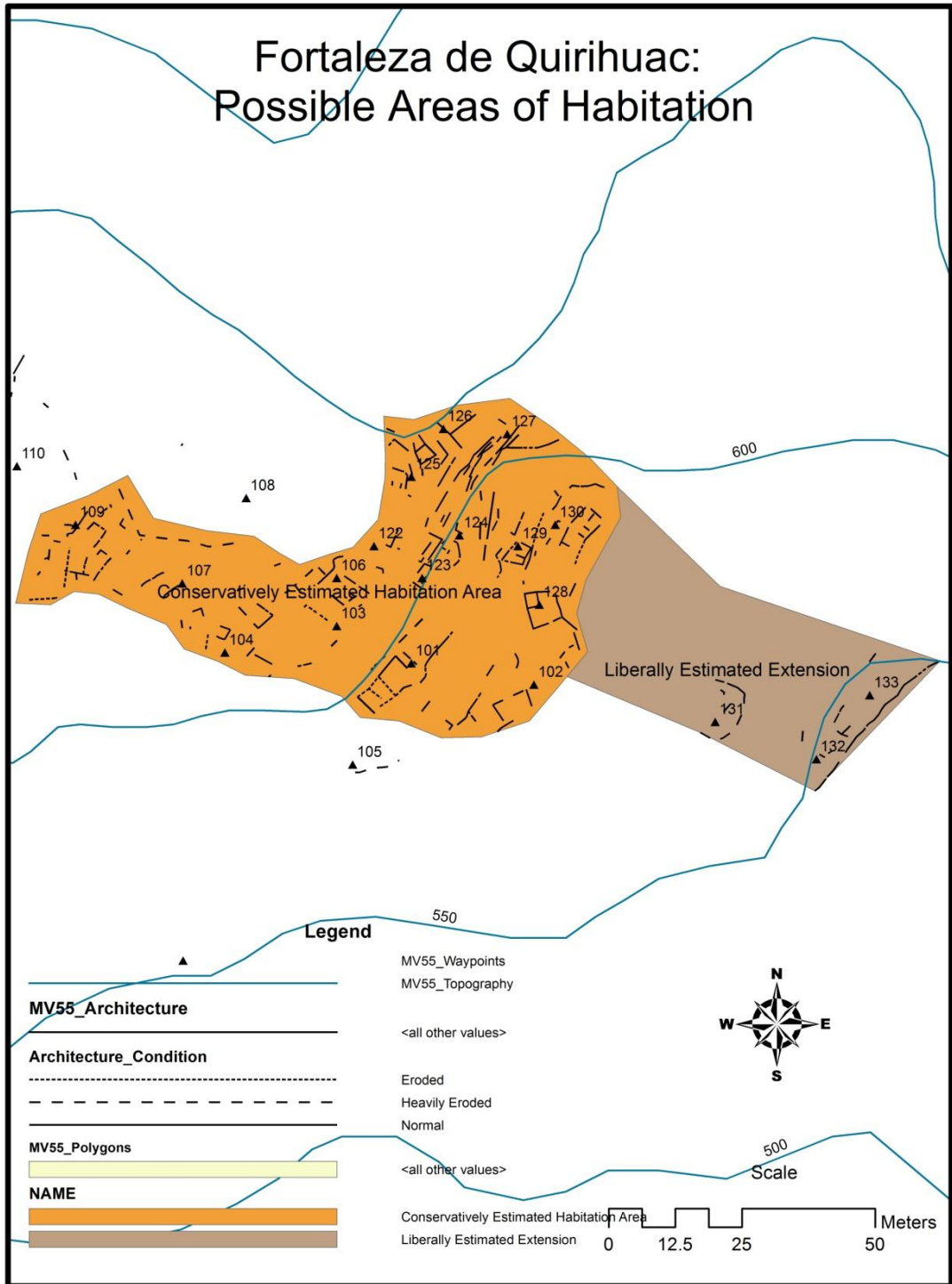


Figure 26 - Possible areas of habitation used for population estimates.

## Ceramic Form Frequencies: A Regional Perspective

Analysis of the ceramic data that were recorded after surface collections at Fortaleza de Quirihuac provided a separate and more convincing line of evidence that supported the presence of a garrison at the site. Using rim profiles, rim diameter, and other information, 193 of the ceramics that were collected at Fortaleza de Quirihuac were separated into different forms according to Richard Keatinge's Chimú typology. Keatinge wrote a dissertation in 1973 that attempted to provide a computer application to seriation dating techniques in references to three Chimú sites in the Moche Valley (Keatinge 1973). These sites were Milagro de San Jose, Cerro la Virgen, and Medaños la Joyada. Milagro de San Jose was the earliest site and represented a rural Chimú administrative center that would have been responsible for collecting local tribute in the form of *mi'ta* labor or resources. Taxed labor may have been used in the farming of the surrounding fields or nearby construction projects as is shown at the other rural Chimú administrative site of Quebrada del Oso (Keatinge 1973). Cerro la Virgen was occupied longer than Milagro de San Jose and represents a domestic context of a Chimú farming village located near possibly state-owned fields (Keating 1973). Finally, Medaños la Joyada was a Chimú-Inka fishing village that also had a domestic context but was not likely incorporated into the Chimú Empire.

While Keatinge admitted that the utility of his work for establishing Chimú ceramic chronologies was problematic and preliminary, he provided an excellent reference for the different forms present in Chimú ceramic assemblages. He separated his ceramics into 6 main forms; ollas, jars, urns, plates, bowls, and incurving bowls. Ollas are small to mid-sized vessels with restricted orifices and are cited as being used for storage, cooking, and food preparation (Figure 27). Jars are mid to large-sized vessels with restricted orifices that are

cited as being used mainly for storage but also sometimes for cooking and food preparation (Figure 28). Urns are large, thick rimmed and generally unrestricted vessels that are cited as being used mainly for storage and are known to have been widely used in the storage of water and *chicha* corn beer (Figure 29). Plates are shallow, unrestricted vessels with usually flat bases and outflaring rims (Figure 30). Bowls are deeper unrestricted vessels with a continuous curve to their body shape. Both plates and bowls were cited as being used for serving, preparing, and eating food. Finally, incurving bowls are neckless, restricted vessels with incurving rims and are cited as being used for the storage, cooking, and preparation of food (Keatinge 1973).

Using the examples Keatinge provided for these forms, 193 of the 198 rim sherds were able to be sorted into the 6 form categories. These were quantified and the frequencies of the different forms in Fortaleza de Quirihuaac were then calculated by dividing each form total by the total number of sherds represented. This produced percentages that illustrate a site-wide perspective of form frequencies. Alone, this data is generally uninteresting but when compared with the data from Milagros de San Jose, Cerro de la Virgen, and Medaños la Joyada, it gains much more meaning (Table 2, Table 3). Since Keatinge did not calculate form frequencies within his dissertation, the author independently calculated these frequencies with the raw data present in Keatinge's work. When comparing the form frequencies between the sites, several differences are striking.

Firstly, Fortaleza de Quirihuaac has a considerably lower percentage of ollas than all three of the other sites. This could be interpreted as meaning that less cooking was going on than at the other sites, or perhaps that fewer vessels were needed to feed the population at the site than at the other larger sites. It also could mean that the site was occupied for a shorter

amount of time; as cooking vessels tend to break more frequently and therefore are usually well represented in most domestic ceramic assemblages. Additionally, the percent of jars present is slightly higher than the other sites; with nearly twice the number as those in Milagro de San Jose and only around 4% more than the other sites. This slightly higher frequency of jars may show a moderate emphasis on storage, perhaps of food. An emphasis on the storage of food could be explained by the lower percentage of cooking vessels and therefore a dependence on imported food. The importation of food seems very likely given the lack of agricultural potential on the site along with the limited evidence for imported coastal foods like *donax peruvianus*.

The percentage of urns at Fortaleza de Quirihuac is two times larger than Cerro la Virgen, which is the highest in relation to the sites assessed by Keatinge. This definitely argues for a great emphasis on storage of either water or *chicha* beer. As appealing as cold corn beer would sound if one was stationed on a mountaintop fortress in the Peruvian desert, water seems much more likely. This especially makes sense when taking into account that the closest water source to Fortaleza de Quirihuac was a two hour hike away to the valley floor. With this in mind, it is clear that water needed to be imported to the site. If the importation of water to the site is accepted, it is not much of a stretch to support the argument that the jars described in the previous paragraph were likely filled with imported food. In both cases it is clear that food/water needed to be and was imported to the site and then likely stored for later consumption.

While bowls and incurving bowls provide few interesting comparisons due to low percentages, it is immediately noticeable that the percentage of plates is considerably higher in relation to the two domestic sites assessed. It is also clear that the percentage of plates at

Fortaleza de Quirihuac is very similar to that at the administrative center of Milagros de San Jose. This shows an emphasis on the serving of food; either for feasting or for feeding large groups of *mi'ta* laborers. In the context of Milagros de San Jose, these plates were likely used for both of these purposes. However, at Fortaleza de Quirihuac feasting seems like an unlikely activity given the lack of ritual spaces or public architecture. This being said, the high number of plates at Fortaleza de Quirihuac most likely represents the feeding of *mi'ta* laborers or, in its case, conscripts. In summary, Keatinge's ceramic data and form frequencies provide compelling insight into site activities and function when applied to the data collected at Fortaleza de Quirihuac. The analysis of the form frequencies at Fortaleza de Quirihuac in comparison with other Chimú sites suggests that the site depended on imported water, likely depended on imported and stored food, and may have been inhabited by some manner of state laborers or conscripts. When considered along with the non-defensive architecture of the site, the ceramic data provide better and more direct evidence pointing towards the possibility of *mi'ta* conscripts being stationed at the site.

**Table 2 - Graph represents numbers of different forms collected at the sites discussed.**

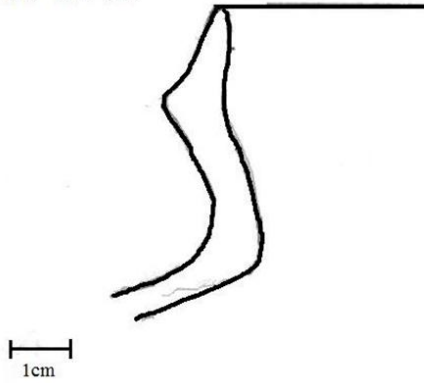
Site	Ollas	Jars	Urns	Plates	Bowls	Incurving Bowls	Totals
Milagro de San Jose	137	37	16	124	3	8	325
Cerro la Virgen	353	104	63	48	32	9	609
Medanos la Joyada	414	142	55	58	8	40	717
Fortaleza de Quirihuac	39	48	40	58	7	1	193

**Table 3 - Graph represents percentages of different forms collected at the sites discussed.**

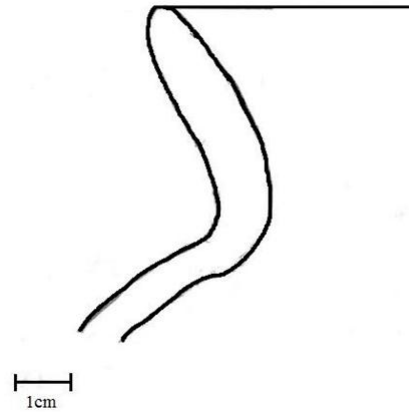
Site	Ollas	Jars	Urns	Plates	Bowls	Incurving Bowls	Totals
Milagro de San Jose	42.15%	11.38%	4.92%	38.15%	0	2.46%	100.00%
Cerro la Virgen	57.96%	17.08%	10.34%	7.88%	5.25%	1.48%	100.00%
Medanos la Joyada	57.74%	19.80%	7.67%	8.09%	1.12%	5.58%	100.00%
Fortaleza de Quirihuac	20.21%	24.87%	20.73%	30.05%	3.63%	0.52%	100.00%



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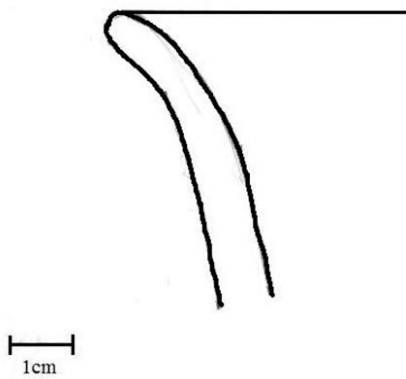


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**Figure 27 - Two examples of ollas from Fortaleza de Quirihuaac according to Keatinge's typology. Rim diameter ranged from 6-18 cm.**

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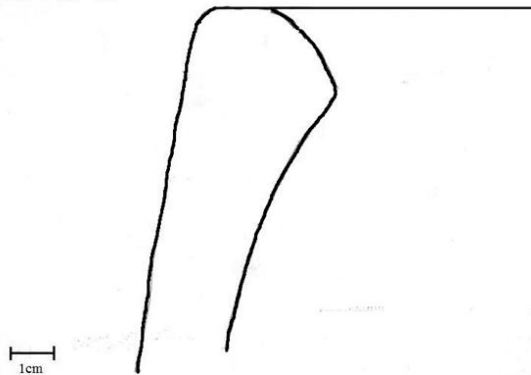


3110-01-04

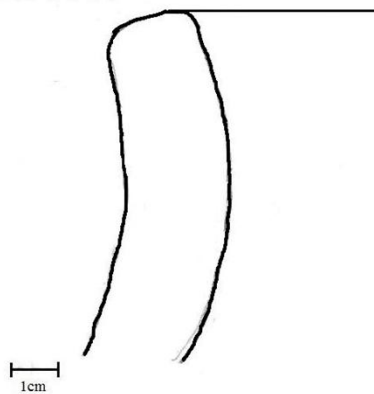


**Figure 28 - Two examples of jars from Fortaleza de Quirihuaac according to Keatinge's typology. Rim diameter ranged from 10-35 cm.**

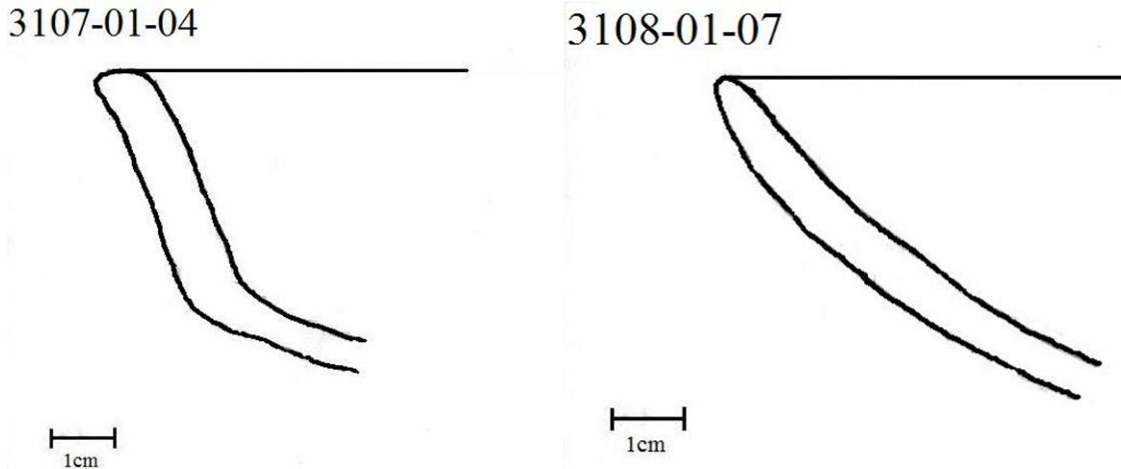
3102-01-40



3106-01-18



**Figure 29 - Two examples of urns from Fortaleza de Quirihuaac according to Keatinge's typology. Rim diameter ranged from 25- >50 cm.**



**Figure 30 - Two examples of plates from Fortaleza de Quirihuac according to Keatinge's typology. Rim diameter ranged from 14-30 cm.**

### **Possibilities for Site Chronology with Ceramic Data**

The final mode of analysis with ceramic data collected at Fortaleza de Quirihuac was a preliminary attempt to date the site within the Chimú period. Since Keatinge's dating method is problematic, a method based on rim forms developed by Topic and Moseley for Chan Chan was tested with interesting results. Topic and Moseley used stratigraphic analysis of ceramics from the SIARs of Chan Chan to establish a vague chronology of 5 phases (Topic & Moseley 1983). These phases were dated relative to the construction of the ciudadelas of Chan Chan as well as numerous other Chimú architectural traditions and constructions. The phases also had broad date ranges that could only be vaguely associated with periods of 50 to 100 years (Table 4, Topic & Moseley 1983). While many of the early phases are poorly represented in this chronology, it still provides a framework that can be used when attempting to relatively date Fortaleza de Quirihuac.

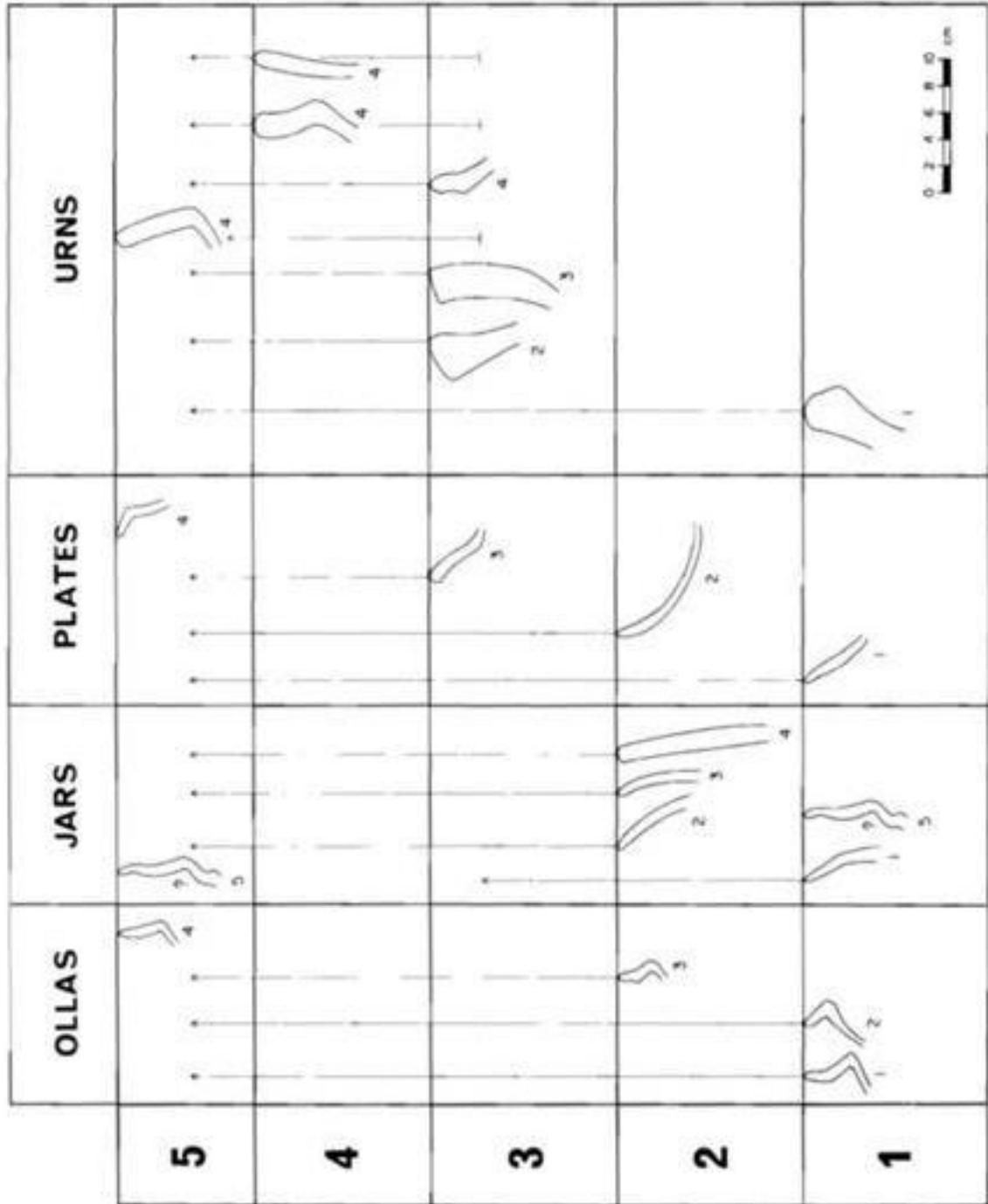
Upon comparison with the already established ceramic forms of Fortaleza de Quirihuac it is immediately apparent that the large number and variety of urns at the site parallels with that represented in Phase 3 (Urns 2-4, Table 5). In addition, a unique plate

variety (Plate 3, Table 5) that is also common at Fortaleza de Quirihuac is represented as starting in Phase 3. These forms are well represented at Fortaleza de Quirihuac, as can be seen in the examples provided earlier of ceramic forms found at the site. This being said, it can also be seen that a number of other forms from earlier phases can be associated with the site (Ollas 1-3, Jars 2-4, Urn 1, Table 5). However, these forms continue into later dates that are contemporary with Phase 3 and even Phase 5. In addition, the sudden appearance during Phase 3 of many of the urn types that are represented in Fortaleza de Quirihuac supports the premise that the site was likely occupied no earlier than this phase. While the occupation of the site can tentatively be dated to Phase 3, it is entirely possible that the site was occupied before this time period.

Topic and Moseley place early Phase 3 at around 1100 CE, which corresponds roughly with the second stage of Chimú expansion in the Moche Valley that was described by Theresa Topic (Topic & Moseley 1983, Topic T 1990). However, it is important to note that Phase 3 continues until 1300 CE. In addition, all of the ceramics in Phase 3 that are represented in Fortaleza de Quirihuac also are seen in the Phase 4 and Phase 5 which span from around 1350 to 1470 CE. This puts Fortaleza de Quirihuac's possible occupation at somewhere between 1100 and 1470 CE and makes it impossible to state with any certainty that the site did in fact date to Phase 3 and not any of the later phases. Either way, this tentative chronological placement of the site is useful in addressing when the site was likely occupied; although conclusions on construction and abandonment can only be established through excavation or radiocarbon dating.



Table 5 - Topic and Moseley's ceramic chronology for Chimú phases. Note Plate 3 and Urns 1 and 3 when comparing them with their correlates at Fortaleza de Quirihuac in Figures 30 and 29.



## **Possible Contemporary Settlements around Fortaleza de Quirihuac**

The final mode of analysis that was done with information regarding Fortaleza de Quirihuac used Dr. Brian Billman's 1990's survey data to provide a map and list of nearby Chimú sites that could have been contemporary with Fortaleza de Quirihuac (Figure 31). First and foremost, Fortaleza de Quirihuac had an associated hamlet, called VA-55, which spread down the main quebrada of Cerro de la Compañía from the parapeted defensive wall in Section One (Billman nd). This site's immediate proximity to Fortaleza de Quirihuac suggests that they were likely contemporary at one point. In addition to its associated hamlet, Fortaleza de Quirihuac was within one kilometer of nine other Chimú sites. Four of these nine Chimú sites were located directly on the main quebrada of Cerro de la Compañía and could have easily accessed Fortaleza de Quirihuac. These four sites, VA-52, VA-54, VA-56, and VA-57, were an assortment of settlements and hamlets with only one, VA-57, having possible fortifications (Billman nd). Although proving that these sites were contemporary with Fortaleza de Quirihuac would require further surface collections or ceramic analysis of the stored collections from the 1990's survey, it is likely that at least some of these sites were contemporary with Fortaleza de Quirihuac. Either way, the large number of Chimú settlements around Fortaleza de Quirihuac shows that the area likely was densely populated during Chimú times.

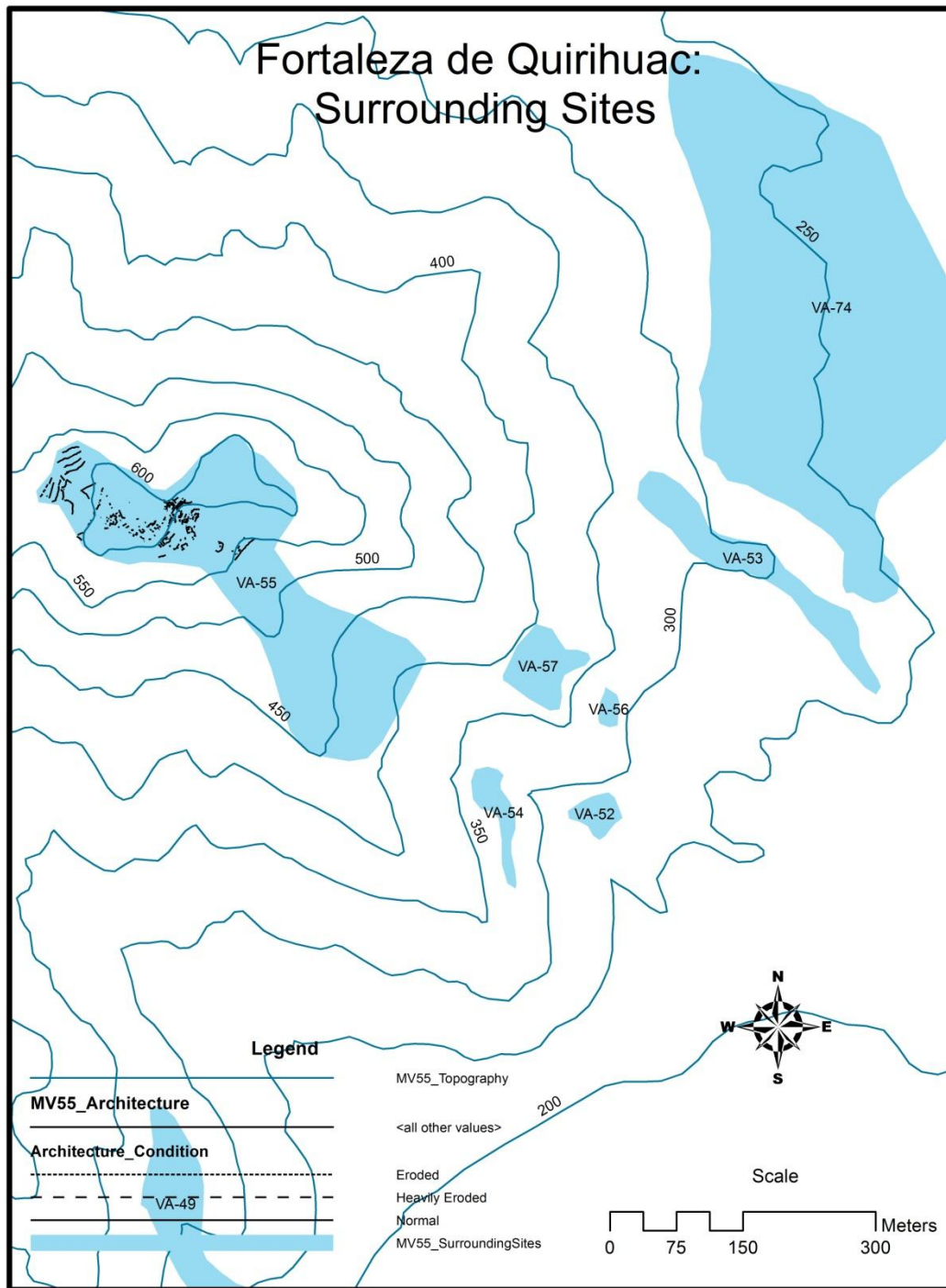


Figure 31- Map of Chimu sites surrounding Fortaleza de Quirihuac.

## Chapter 6: Discussion and Conclusions

### Conclusions from Data Analysis

The first conclusion that can be made about Fortaleza de Quirihuaac regarding the data that has been analyzed in this work is that it surely had a defensive component to its function. This conclusion can be made because a significant amount of defensive architecture has been identified in the site at strategic locations. This architecture fulfills many of the expected features of defensive fortifications like parapets, adjacent sling stone piles, strategic positioning, and even the possibility of intentional construction to create kill zones. In addition to the site's strategic positioning and commanding view of the valley below, the only routes to the peak were effectively blocked off by fortifications. Therefore, it is clear that the main purpose for the construction of the fortifications at Fortaleza de Quirihuaac was for defense and any other uses were likely only secondary.

Multiple lines of evidence point to Fortaleza de Quirihuaac being permanently or periodically inhabited by state-recruited laborers that perhaps served as a garrison. The large number of structures and patio spaces consistent with domestic architecture within the fortified walls of the site show that the site had the potential to be occupied semi-permanently. When compared with the minimum number of individuals needed to defend the parapet walls, this architecture was more than enough to house such a force. Ceramic evidence suggested the probability of at least a semi-permanent occupation; as vessels consistent with water and food storage were present at the site. Also, a high number of serving vessels and an absence of public architecture made *mi'ta* laborers a likely population that would have occupied the site. When the defensive function of the site is acknowledged and the Chimú use of *mi'ta* taxes for military conscription is assumed, this evidence all



points towards the site being occupied, at least periodically, by a garrison of conscripts. This being said, male conscripts would not have made up the entire population. This will be addressed in the following section on Fortaleza de Quirihuac and the Chimú Empire.

Finally, while the ceramic chronology of Topic and Moseley produced mixed results, it did provide enough to make several conclusions about the site. By dating the likely occupation of the site in the nearly 400 year span of time after the first phase of expansion by the Chimú Empire, it can be concluded that the site was probably not involved in the consolidation of the Moche Valley. Therefore, the site was likely constructed as a part of the second stage of consolidation and expansion that took place much further up the valley or any time after this stage up to Inka conquest.

With the data collected, three main conclusions were made regarding Fortaleza de Quirihuac. At least one component of the site's occupation was defensive; as evidenced by numerous architectural features and sling stone piles. Also, the site was likely occupied by a garrison of *mi'ta* conscripts; as evidenced by the presence of habitation areas, storage vessels, and high number of serving wares. Finally, ceramic data indicate that the site was not Early Chimú and likely was occupied between 1100 and 1470 CE. While these are the only relatively conclusive results of this investigation, the conclusions made here incite intriguing questions about Fortaleza de Quirihuac and encourage the future study of fortifications in the Moche Valley.

### **Fortaleza de Quirihuac and the Chimú Empire**

The chronological placement and characteristics of Fortaleza de Quirihuac provoke interesting hypotheses and questions about the Chimú Empire and how the site would have fit into the surrounding social landscape. First, since there is no question that one of the many

roles this site likely played was defensive in nature, it is then important to consider what exactly Fortaleza de Quirihuac would have been defending. The Chimú settlement component of VA-55 that borders the site is a convenient and possible answer. Fortaleza de Quirihuac could have easily provided refuge for the populations of VA-55 or any of the other numerous Chimú settlements around Cerro de la Compañía. In addition, the goods that would have belonged to or been produced by the surrounding populations could have been protected during times of need in Fortaleza de Quirihuac. This could include valuables owned by local elites, or foodstuffs that would have fed local populations. However, the lack of large scale and formalized storage space within the site suggests that this would have been secondary to the protection of individuals. Therefore, it is likely that the population of Fortaleza de Quirihuac was not isolated to just male conscripts. During times of conflict the fortress itself could have and likely did house many families. Even when not acting as a refuge, support personnel and their families would have been needed to feed and supply the possible garrison. While it could have been, and likely was, used as some manner of refuge for surrounding populations, Fortaleza de Quirihuac no doubt had many other functions.

The possibility of Fortaleza de Quirihuac as a refuge seems rather interesting when compared with its chronological placement as being used after the original consolidation of the Moche Valley by the Chimú Empire. Why was the construction and use of a garrisoned fort deemed necessary in an area that had likely been under Chimú control for at least 100 years? One possibility immediately comes to mind. With a clear view of several Chimú forts that worked up the Moche Valley towards the Upper Moche and Sinsicap Valleys and other Chimú forts that worked down the Moche Valley towards Chan Chan, it is possible that Fortaleza de Quirihuac could have been one of a chain of outposts that served to alert the

capitol of invasions or hostilities. Testing this possibility would require viewshed analysis similar to those used by Arkush in the Colla region in the Southern Highlands of Peru (Arkush 2009, 2011). Even if it served as an outpost, why would Fortaleza de Quirihuac need to be so heavily fortified when it was firmly within the Chimú heartland? This question is the most intriguing because it presents the possibility that the Chimú Empire may have had a weaker hold over the Moche Valley than previously thought or that highland invasions might have been able to penetrate quite far.

Another possibility is that this site was built at the very end of the Chimú Empire's existence and represents a reaction to the growing presence of the Inka Empire in the highlands around the Moche Valley. In this situation, the site could have still played the previously described role as an outpost except the invaders would have been the Inka or highland groups driven into the valley by the Inka. The absolute dating of Fortaleza de Quirihuac would do well to clarify its more specific role in the Chimú Empire and would require excavations to produce radiocarbon data or refined assemblages of ceramics. While the data collected in this study can do little to address the site's exact function conclusively, further investigation at the site and other Chimú fortifications in the Moche Valley could produce results that would better explain how Fortaleza de Quirihuac fit into the Chimú Empire.

### **The Potential of Future Studies of Fortifications in the Moche Valley**

This investigation of Fortaleza de Quirihuac contributes to a trend of interest in fortifications and conflict in the Andes and illustrates the potential of a reassessment of fortifications and warfare in the Moche Valley. Arkush has recently done extensive investigations regarding the role of warfare and fortifications in the political and social

composition of the Colla Region around Lake Titicaca (Arkush 2009, 2012). These studies have shed much light on some unique ways that political organization and warfare can shape and influence each other within a region (Arkush 2009, 2012). Also, Brown Vega has begun a recent project that aims to investigate a number of fortifications on the central coast of Peru (Brown Vega 2009, Brown Vega et al. 2009). Although still in process, this project will no doubt contribute greatly to the current understanding of fortifications on the coast, especially those from the Early Horizon. While many investigations of specific fortified sites in the Moche Valley have been conducted, only the Topics have conducted a comprehensive regional study (Topic & Topic 1983). While this study is no doubt valuable, I believe a reassessment of the fortifications of the Moche Valley with more modern perspectives and technology is warranted. Such an investigation could provide valuable insights into how fortifications were used in the Moche Valley and would be especially useful in assessing the use of fortifications by the Chimú Empire. I hope this investigation of Fortaleza de Quirihuac represents only the beginning of a more thorough assessment of Chimú fortifications of the Moche Valley and what they can tell archaeologists about how the Chimú Empire protected its heartland.

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