Unearthing the Dead: An Investigation of Mesoamerican Chultun Burials at Archaeological Sites in Belize

By

Abigail Card

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Committee:

Kirsten Mink, Ph.D., Thesis Advisor

Sarah Robey, Ph.D.

H. Carrie Bottenberg, Ph.D.

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Abstract

Chultuns are often a subject of debate within the Mesoamerican archaeological community. These bottle-shaped subterranean structures are man-made chambered pits often found near residential complexes. Their primary function has not been able to be defined by researchers due to several issues. An interesting use found for these structures is as burial sites. This study focuses on a sampling of 62 individuals from various Maya chultun burials in Belize. The chultun burials span across 10 maximal site locations including Cahal Pech, Xual-Canil, Nohoch Ek, La Milpa, Cerro Maya, Minanha, Chaa Creek, Blue Creek, Caracol, and Ka'Kabish. Through the creation of a chultun burial database using archaeological field reports and a spatial analysis this research established potential connections and points of comparison between the chultun burials. In doing so, this study provides a starting point for future research into chultun burials and their relevance to Maya mortuary archaeology.

Keywords: maya bioarchaeology, chultun, funerary practices, subterranean features, Belize

Table of Contents

List of Tables

List of Figures

Introduction

The Maya were once one of the primary inhabitants of Central America, particularly the Yucatan Peninsula, from roughly 2000 BCE to 1524 CE (Sharer and Traxler 2006). The regions in which they lived includes the modern-day countries of Mexico, Honduras, El Salvador, Guatemala, and Belize (Sharer and Traxler 2006). During their occupancy, they developed complex political, social, and religious practices that influenced their interactions with the world around them. Religious ideals and doctrines affected their perceptions of geographical features across the vast landscape of Central America. As a result, they began to venerate subterranean features such as chultuns, artificial bottle-shaped subterranean chambers, in their rituals as burial places (McAnany 1995). Chultuns commonly appear across the regions where the Maya resided. There are a number of these artificial subterranean features present in the archaeological sites of Belize. Some of which, but not all, contain human remains.

These subterranean features as a whole are debated by researchers as to their significance and similarities (Jurasek 2023). Some researchers believe that these artificially chambered pits primarily acted as water or food storage features in times of scarcity, drought, or famine (Jurasek 2023). The main problem with this idea is the level of humidity caused by the limestone bedrock and occasional plaster lining of the chultuns. In an experimental study conducted by Puleston (1971) in the Southern Maya Lowlands, chultuns were found to be unsuitable for the storage of most types of food. Only one local food crop was found to be successfully stored in this type of environment, *Brosimum alicastrum* (the breadnut) (Puleston 1971).

Another possible function of chultuns includes the storage of fermented goods such as pickled food products and alcoholic beverages (Dahlin and Litzinger 1986). There are also a number of secondary uses for chultuns with the main one being the interment of human remains.

Across several decades, human remains being found within chultuns at archaeological sites has been relatively frequent (Jurasek 2023). Outside of basic discussions in field reports, there has been little investigation by researchers into chultuns functioning as burial spaces.

This research produced a database that collates the archaeological data and associated occurrences of chultuns acting as burial spaces within the country of Belize and analyzed the geographic as well as socio-cultural data points for comparison. The database developed by this

Figure 1. A map of the country of Belize with the relevant archaeological sites noted using red triangles.

project facilitates analyzes of deposits of human remains at the archaeological sites of Cahal Pech, Xual-Canil, Nohoch Ek, La Milpa, Cerro Maya, Minanha, Chaa Creek, Blue Creek, Caracol, and Ka'Kabish based off of the corresponding field reports or other similar data sources (Figure 1). All of these sites vary greatly from one another ranging from terrain to hierarchal significance. Each chultun and set of remains were individually categorized into fields that tracked specific burial locations within each site, key information about the remains themselves (biological and taphonomic data), and the associated grave goods.

Additionally, this research developed an interactive map denoting the specific geographic contexts for each burial location. In combination with the chultun burial database, this allows for a broader perspective of the similarities and differences between each occurrence of chultuns containing human remains. Through the evaluation of the data provided by the analyses discussed above, this paper aims to define the commonalities more concretely, if any, between the incidences of Maya chultun burials from varying archaeological sites across Belize. The data generated by this study could be used to further build on the existing evidence present in the ongoing argument regarding the function of chultuns and the purpose of using them as burial spaces.

Literature Review

Cultural Chronology of the Maya

The timeline of the Maya can be broken down into three prominent periods: the Preclassic period (also known as the Formative period), the Classic period, and the Post-Classic period (Jurasek 2023). Archaeological literature mainly focuses on the Classic period (Jurasek 2023; Scherer 2017). Often modern notions of Maya society and culture are based on

information derived from the Classic period (Jurasek 2023). Each of these prominent periods can be broken down into additional, more specific date ranges (Table 1). For this research, the Classic and Post-Classic periods are the focus.

Period		Estimated Date Range
Contact/Colonial		A.D. 1500+
Post-Classic	Late	A.D. 1350-1500
	Middle	A.D. 1250-1350
	Early	A.D. 900-1250
Classic	Late/Terminal	A.D. 600-900
	Early	A.D. 250-600
Preclassic	Late/Terminal	300 B.C.-250 A.D.
	Middle	1000-300 B.C.
	Early	2000-1000 B.C.
Archaic		8000-1000 B.C.

Table 1: Time periods of the Maya Civilization (based on a table from Jurasek (2023)).

In the Archaic period, the Maya culture began to progress through existing hunter-gatherer groups in Yucatan Peninsula (Coe and Houston 2022; Demarest 2005; Jurasek 2023). This involved the preliminary cultivation of staple food crops, basic animal domestication, and the potential establishment of village living systems. The Preclassic is when Maya village settlements became permanent, the cultivation of staple crops continued, the creation of prestige goods began, and a basic government system was put in place. (Coe and Houston 2022; Demarest 2005; Jurasek 2023; Sharer and Traxler 2006).

The Classic period was the height of the Maya civilization with individual cities and villages coming together and consolidating (Demarest 2005; Jurasek 2023; Sharer and Traxler 2006). It led to the development and refinement of skills like mathematics, astronomy, and the visual arts (Demarest 2005; Sharer and Traxler 2006). During the Late/Terminal Classic period, there was a catastrophic collapse of Maya society and a disappearance of the Maya population from their primary cultural centers (Webster 2012). There is no known definitive or singular reason for this collapse. The Post-Classic period is the final era within the cultural timeline of the

Maya prior to the intrusion of Spanish Conquistadors during the Contact/Colonial period. The Post-Classic period involved the development of more complex, long-distance trade patterns following the aftermath of the Classic collapse (Demarest 2005; Jurasek 2023; Sharer and Traxler 2006). This allowed for an influx of diversity from other cultural groups (Coe and Houston 2022; Demarest 2005).

Maya Burial Practices

At the height of their power during the Classic period, the concepts of death and dying became largely significant features of Maya culture (Jurasek 2023). According to Scherer (2015), the ancient Maya did not inter their dead in a manner akin to cemeteries, as is common place in Western society. Instead they preferred use preexisting structures such as residences and a variety of other types of architectural constructions (Gillespie 2002; Scherer 2015). This method of burying the deceased began as early as the Early/Middle Pre-Classic and continued well into the Classic and Post-Classic periods (Gillespie 2002; Welsh 1988). This practice also evolved into the building of funerary shrines and ritualistic constructions, such as great-temple pyramids, for the elite member of Maya society (Gillespie 2002; McAnany 1998). The idea of housing the dead in various building structures leans into the concept of ancestor veneration (McAnany 1995). Ancestor veneration involves the implementation of ritual behavior in an effort to connect with and worship the deceased members of their lineage (McAnany 1995). This practice was a hugely significant feature of this society during the Classic period (Adams 1977; Gillespie 2002; Leventhal 1983; McAnany 1995; Welsh 1988).

The use of subterranean features as burial spaces was also popularized during the Classic period. This category includes the use of underground as well as man-made geological features such as chultuns (*chultunobs*), cenotes (sinkholes), and caves being used by the Maya to entomb

deceased individuals (Jurasek 2023; Scherer 2017). Examples of this are seen across the Maya region, from the Midnight Terror Cave in Belize to Actun Tunichil Muknal (also in Belize). The use of subterranean features as burial spaces relates back to the myths and cosmology of the Maya. Leaving remains or sacrificing individuals in these locations were a part of rituals that attempted to garner the favor of deities associated with rain, fertility, or the underworld (Moyes 2018). These practices were especially important to their belief system during times of famine and drought.

History of Chultun Burials

A chultun is a large, bottle-shaped artificial pit with one or more chambers dug out of limestone bedrock (Cagnato 2017; Jurasek 2023; Molica-Lazzaro 2024). There is heavy debate regarding the original function of chultuns as many of the theories (food/water storage, fermented goods, etc.) posed by researchers have been either disproved or heavily disputed (Jurasek 2023). Although it is not explicitly a primary function, one known use of a chultun is as a burial space. In a survey completed by Carlos (2018) of 142 chultuns in the Southern Maya Lowlands, approximately 20.4 percent of the chultuns "utilized burials as their final function".

There is minimal discussion regarding chultuns as burial spaces. This is abnormal as the initial reporting surrounding chultuns, as early as 1913, noted them as often containing human remains (Jurasek 2023). Burials within chultuns have continued to be noted in archaeological reports throughout the Maya region for several decades with minimal acknowledgement of their potential relationship with Maya funerary practices. This makes them a recent addition to the existing debate on chultuns and to the overall literature on the mortuary practices of the Maya.

Few researchers have completed in-depth analyses of chultun burials, and their function within the context of Maya cosmology. These investigations often focus on a singular occurrence or a small sample size of burials from a singular site. After these analyses, no further research is typically conducted at the original site locations. Nonetheless, the incidences of chultuns and chultun burials across the Maya region are frequent. This project seeks to work towards filling this gap in the literature. These investigations specifically work toward developing a cross-comparison between chultun burials in Belize. Determining if there is a pattern informs our understanding of Maya burial practices and the Maya on a deeper level.

Site Backgrounds

This investigation of Maya chultun burials encompasses a number of sites across the landscape of Belize. The following are the sites included in this research: Cahal Pech, Xual-Canil, Nohoch Ek, La Milpa, Cerro Maya, Minanha, Ka'Kabish, Chaa Creek, Blue Creek, Caracol (Figure 1). The sites chosen for this project were selected due to availability and accessibility through Google Scholar as well as directly through archaeological project websites. The field reports that were open access or institutionally available through Idaho State University provided the site information that informed this study. Other field reports were unusable due to problems with having full access to report details or entirely missing information regarding skeletal data. This caused the sites selected for this study to be based on availability rather than being discreetly selected.

Cahal Pech

Cahal Pech is a moderately-sized archaeological site positioned on the southern outskirts of the modern Belizean city of San Ignacio (Powis 1996). Located in the Cayo District, this area

represents a portion of the Upper Belize River Valley region of western Belize. This geographical area, as its name suggests, is home to both the Macal and Mopan Rivers. The site core for Cahal Pech is located on a steep hill overlooking the Maya Mountains and the Belize River Valley (Powis 1996; Zweig 2010). It spans roughly a 1.5-hectare area and comprises of approximately 34 structures boasting a variety of architectural constructions including temple pyramids, large

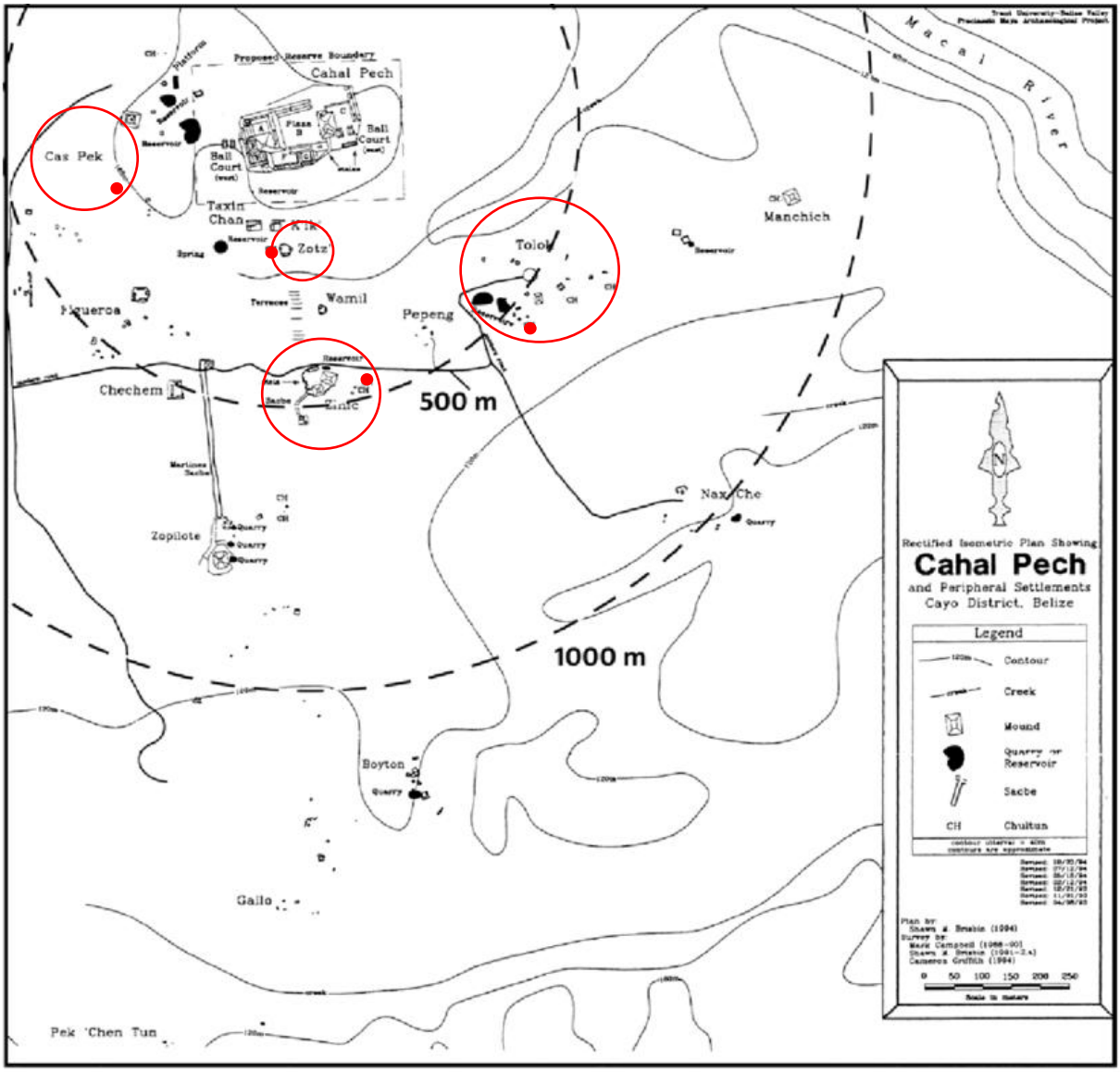

Figure 2. Map of Cahal Pech and surrounding settlements with the Zotz, Tolok, Zinic, and Cas Pek groups demarcated using red circles (Awe et al. 2014). The corresponding chultun burials from the area are noted using red dots.

public plazas, small elite courtyards, and two ballcourts (Figure 2) (Awe et al. 1990, 1991; Awe and Healy 1994; Ball and Taschek 1991; Healy et al. 2004; Zweig 2010).

Cahal Pech was occupied from the Middle Preclassic (900 BC) through the Terminal Classic (AD 900) (Awe 1992). The nearest large centers would have been Buena Vista and Xunantunich. Cahal Pech acted as a major ceremonial center and capital for the Xunantunich district of the Upper Belize Valley region throughout the duration of the occupation period of this site (Awe 1992; Willey et al. 1965). As a result, it operated under the political governance of Xunantunich. Due to its size, history of occupation, the variety of structures present and its geographical location, Cahal Pech likely housed a variety of different social classes. The site core is surrounded by a number of different structures and settlement groups that indicate the presence of mid and lower-level elites, artisans, and bureaucrats, along with lower class groups such as farmers and the working class. These smaller sites on the periphery of Cahal Pech are referred to as the Cahal Pech Settlement Group.

The first recorded reports of Cahal Pech are from the 1930s (Awe 1992). Regardless, the archaeological projects in this area did not begin until the 1950s (Zweig 2010). Linton Satterthwaite from the University Museum of the University of Pennsylvania completed initial excavation and mapping of the Cahal Pech site core (Awe 1992; Satterthwaite 1951). Research continued on the outskirts of the site until approximately 1988 (Awe 1992; Goldsmith 1993; Zweig 2010). In 1988, investigations expanded into the main site core due to problems with looting and the expansion of modern construction projects (Zweig 2010). This new research project prioritized mapping the present architecture, exploring the structures & plazas, and conducting mapping/testing on structures in the site periphery (Awe 1992; Goldsmith 1993; Zweig 2010). Excavation and analysis of this site has endured into the modern day.

Cahal Pech Settlement Group

While there are no chultun burials present in the site core of Cahal Pech, there are a number present in the Cahal Pech Settlement Group. The three chultun burials for the Zotz, Zinic, & Tolok Groups reside within 500 meters of the main site core (Villarreal 2014) (Figure 2). These groups encompass multiple family households clustered in small groups and open space mounds or cluster patios. The Cas Pek Periphery is located in a much closer proximity to the Cahal Pech Site Core than the other previously mentioned groups. It resides on the western side of the site and comprises of similar structures to those found in the Zotz, Zinic, & Tolok Groups (Awe 2013). In addition to the chultun burials that have been discovered in the Zotz, Zinic, and Tolok groups, Cas Pek also an additional chultun burial present containing one individual.

Approximately 980 meters northeast of the Cahal Pech Site Core and 200 meters west of the Macal River, the San Ignacio Resort Salvage excavation was a part of the dispersed settlements of the Cahal Pech Settlement Group that reside underneath the modern day town of

Figure 3. An aerial image of the approximate location of the San Ignacio Resort Salvage chultun burials derived from Google Maps

San Ignacio (Green-Mink et al. 2023). Research at this site was initiated in 2019 due to an employee of the San Ignacio Resort Hotel discovering two chultuns. Each chultun contained approximately one set of human remains and a collection of corresponding artifacts for each individual (Green-Mink et al. 2023). The burial salvage is located on the resort property immediately opposite the hotel's front entrance and on the other side of Buena Vista Road (Figure 3).

Xual-Canil

Xual-Canil is a medium-sized archaeological site positioned on an elevated ridge on the eastern aspect of the Macal River and approximately 3 kilometers southeast of the prominent site of Cahal Pech (Gray 2000). Constructed during the Late Classic, approximately A.D. 600-900, Xual-Canil's original purpose was believed to have been ceremonial (Gray 2000; Willey et al. 1965). This was disproven during the field seasons of the Social Archaeology Research Project (SARP). SARP determined that Xual-Canil acted as a base of agricultural operations for the site's periphery that would have been overseen by the same governance as Cahal Pech, Xunantunich (Gray 2000). The occupation of this site was short lived, but occupation of the peripheral settlement group took place before and after the construction of Xual-Canil.

Figure 4 demonstrates the site core of Xual-Canil, showing the presence of a ballcourt, the Nohol Nab Group, and the Te Tun Na Group (Gray 2000). The investigations into Xual-Canil continued into the site periphery in order to map groups such as the Choj Group and others. Originally referred to as Cayo Y, Xual-Canil was subject of little investigation by archaeologists until the Belize Department of Archaeology began researching the area. In 1995, a methodical investigation of the site core ensued to map and excavate the site (Gray 2000). The 1998 field season of SARP focused on further analyzing the Xual-Canil site core and the Xual-Canil

Settlement Group. The settlement group was were two chultuns containing human remains were identified, specifically in the Choj and Gran Maestro groups.

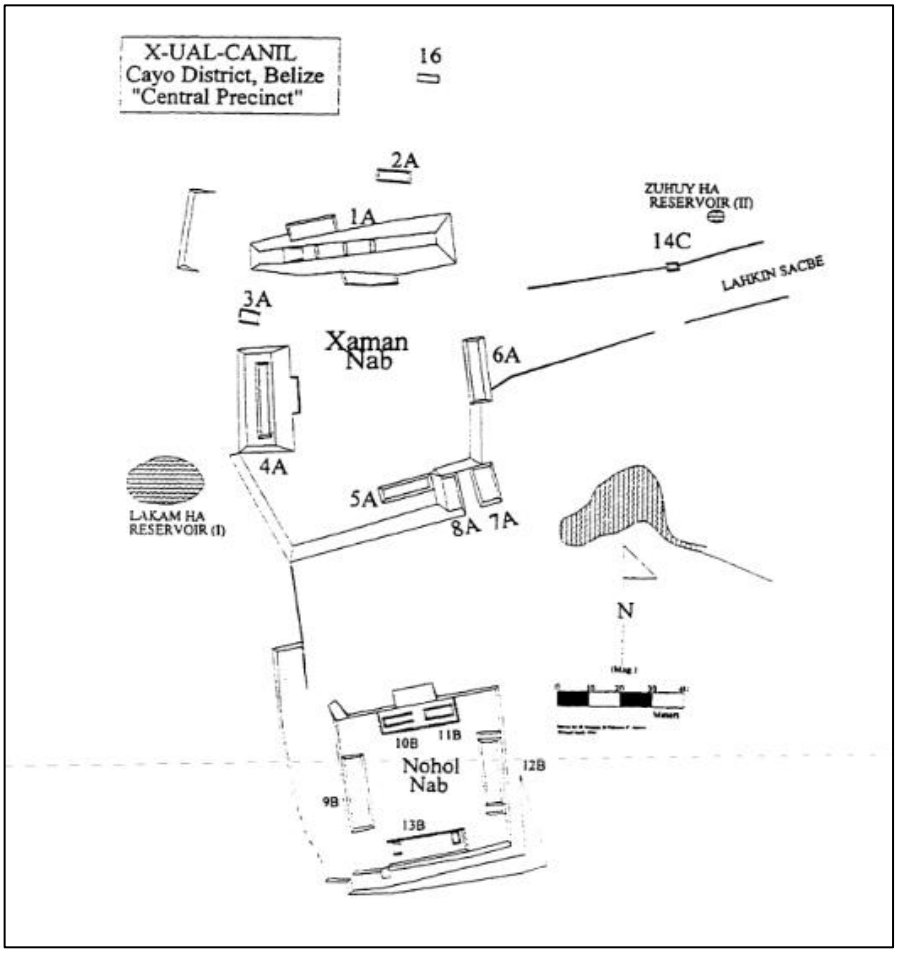

Figure 4. A map of the Xual-Canil site core (Gray 2000).

Xual-Canil Settlement Group

Similarly to Cahal Pech, there are currently no identified chultun burials present in the site core of Xual-Canil. The Choj Group and the Gran Maestro Group house two chultuns where approximately 8 individuals have been interred (Gray 2000). As seen in Figures 5 and 6, they contain housing structures similar to ones found in the Cahal Pech Settlement Group discussed above along with a plaza in the Choj group (Gray 2000).

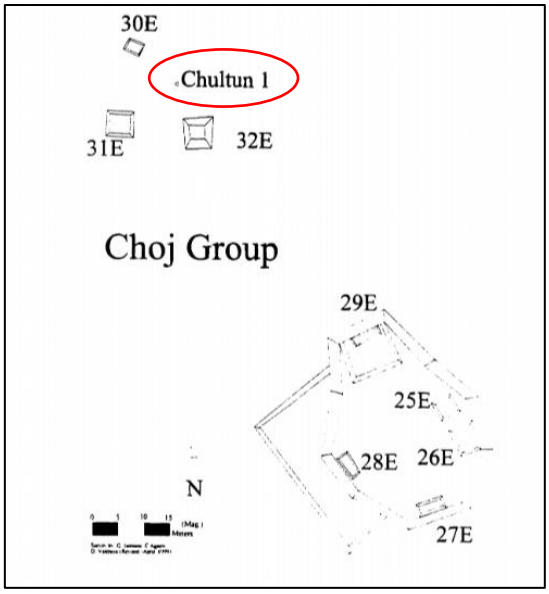

Figure 5. A map of the Choj Group at the archaeological site of Xual-Canil (Gray 2000). Chultun 1, which contains human remains, is circled in red.

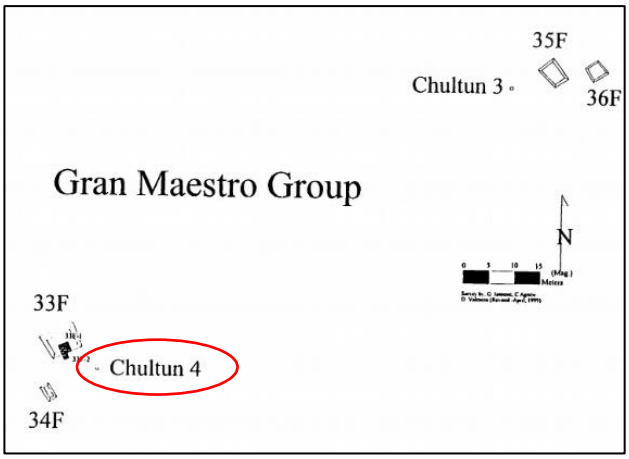

Figure 6. A map of the Gran Maestro Group at the archaeological site of Xual-Canil (Gray 2000). Chultun 4, which contains human remains, is denoted using a red circle.

Nohoch Ek

Almost centered between the Macal and Mopan Rivers, the archaeological site of Nohoch Ek is situated on the northern edge of a limestone knoll (Ball and Taschek 2003). Based on investigations conducted William Coe and Micheal Coe in 1949, this site is representative of a minor center. As seen in Figure 7, the site core consists of two main structure groups, Group A and Group B, and an artificial aguada (watering hole). Across these two groups there are nine buildings and one chultun containing roughly two sets of human remains (Ball and Taschek 2003). In the site periphery there is an additional group, Group C, which consists of six structures and a single two-chambered chultun.

Nohoch Ek began development in the Early Preclassic and continued to progress well into the Late/Terminal Classic with minimal occupation during these periods (Coe and Coe

1956). During the Late Classic many of the structures of the large “plaza group” were constructed. Nohoch Ek is believed to be a large and formalized residential compound (Ball and Taschek 2003). This differs from original theories regarding the site representing a minor ceremonial or ritual space for lower class groups that lived further away from the large cultural center such as Cahal Pech (Coe and Coe 1956). Ball and Taschek (2003) posit that Nohoch Ek is

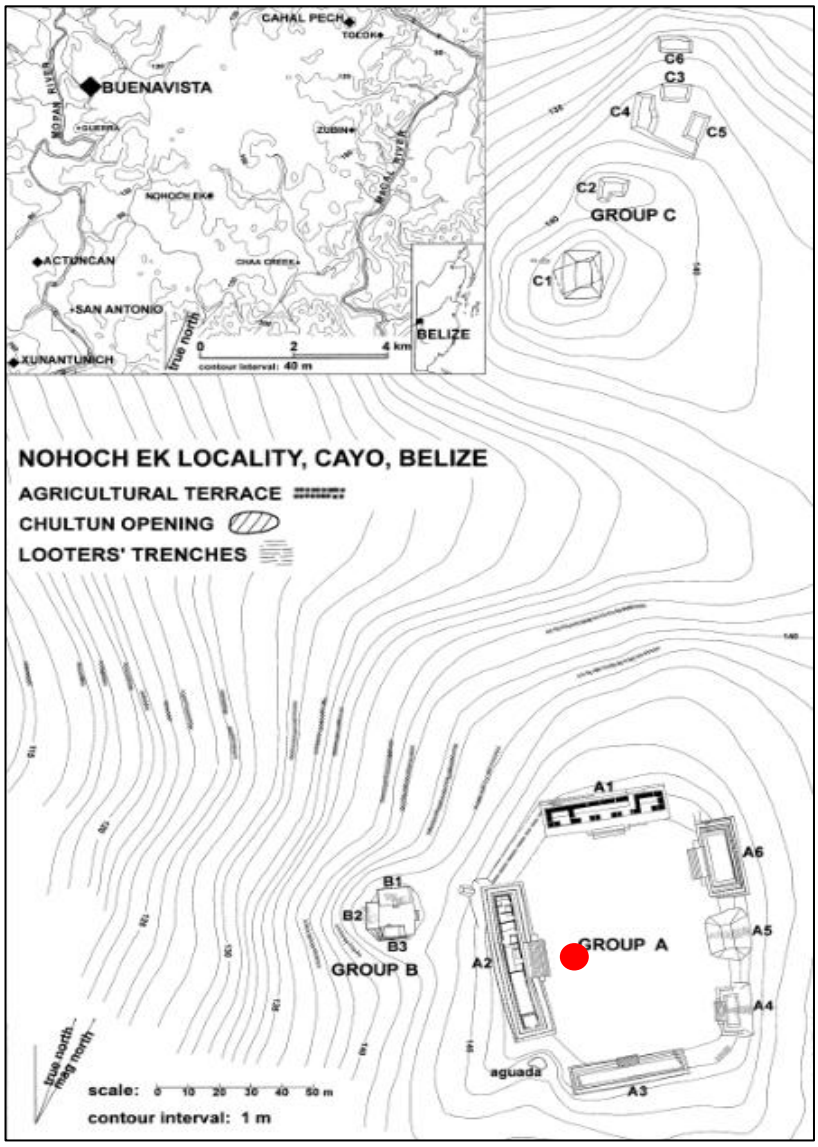

Figure 7. A map of the archaeological site of Nohoch Ek including the site core and periphery (Ball and Taschek 2003). The chultun burial is noted using a red circle.

not only a residential compound but rather a sort of "manor" similar to early medieval manors of Western Europe and the British Isles.

Beyond the research completed by Ball and Taschek (2003) and Coe and Coe (1956) there has been minimal investigation into the archaeological assemblages present at Nohoch Ek. This is presumably due to its position as a minor residential compound rather than some sort of ceremonial site. The presence of artisanal furnishings in the main plaza group along with the farming tools present in the more traditional residential groups corroborate these ideas. The long occupation period of Nohoch Ek, the potential social complexity, and the presence of chultun burials make this site a unique addition to this project.

La Milpa

La Milpa is a large Maya site located in the northwestern region of Belize near the borders of Mexico and Guatemala (Figure 1) (Trein 2012). Positioned approximately 190 meters above sea level, La Milpa sits on a limestone escarpment overlooking the Three Rivers Region. The Three Rivers Region is comprised of the Rio Azul, Rio Bravo, and Booth's Rivers which converge into the Rio Hondo (Hammond 2019). The site itself is broken down into two sectors, the northern sector and the southern sector. The northern sector houses Plaza A and many of the larger structures present at the site (Trein 2012). Also, in this area there is one chultun burial present containing one individual. Connected by a causeway (sacbe), the southern sector is composed of Plaza B, Plaza C, Courtyard D, and the Southern Acropolis. As seen in Figure 8, there are also a number of residential complexes and other structures located on the periphery of the site.

The site core of La Milpa was constructed during the Early Classic (A.D. 250-600) and was occupied through the Late/Terminal Classic (A.D. 750-900) (Hammond 1991). Due to the presence of elite architecture, such as pyramids and an acropolis, La Milpa is believed to be a "Classic Maya center of the highest size and rank" (Ford and Fedick 1988; Hammond 1991). This makes it likely to be one of the dominant Maya polities in the area during the Classic period. The discovery of La Milpa is recorded in 1938 based off of the testament of a Palace Hotel employee in Belize (Hammond 1991). Eric Thompson of the Carnegie Institution of Washington visited the site and quickly departed without further investigation due to having both issues with developing dysentery and problems with funding. No further research at La Milpa took place until 1978. Multiple groups came through the La Milpa area in the following decades

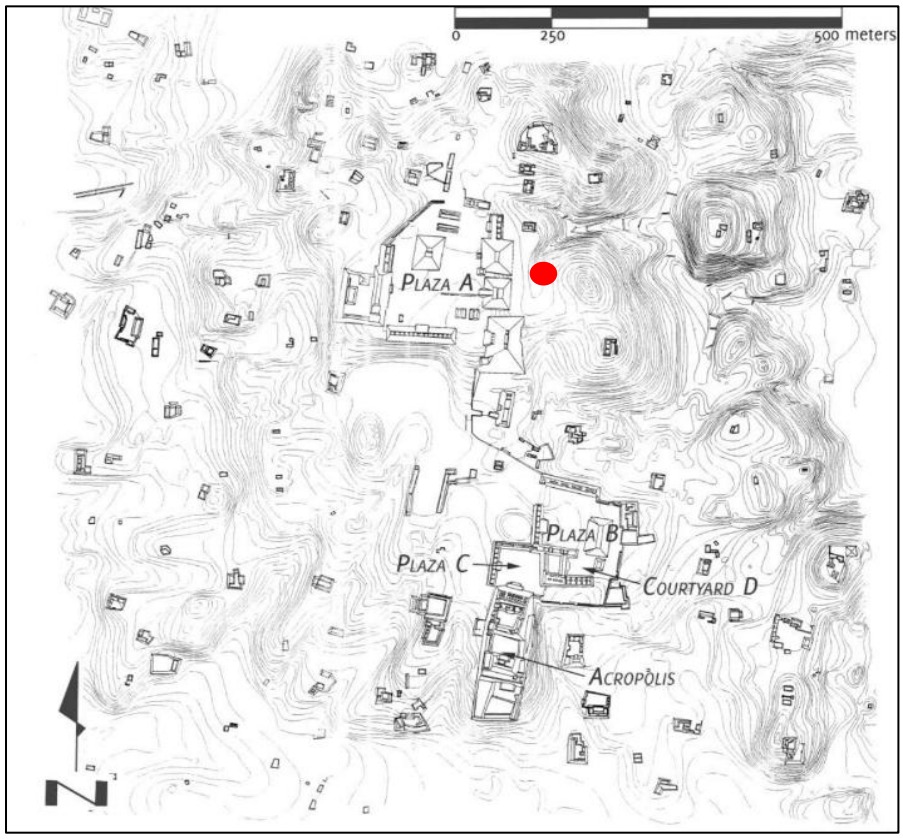

Figure 8. A site map of the La Milpa Site Core (Hammond and Tourtellot 1993; Trein 2012). The associated chultun is denoted using a red circle.

creating more and more detailed maps of the large, domineering site. This work has continued into modern day with the Tzaman Acropolis Research Project (TARP), directed by Western Colorado University.

Cerro Maya

Cerro Maya, formerly a small village complex, grew into a strategic trade city thanks to its geographical location (Vadala and Duffy 2021). It is positioned on the Corozal bay and near the outlet point of the New River as well as the Rio Hondo (Figure 1) (Freidel 1979; Vadala and Duffy 2021). The site core has more than 160 different structures including a dock, plazas, agricultural fields, and causeways (sacbes) connecting different areas (Walker 2016). All of these features are surrounded by a large canal. One chultun burial containing a singular individual is present in the waterfront village portion of the site as seen in Figure 9.

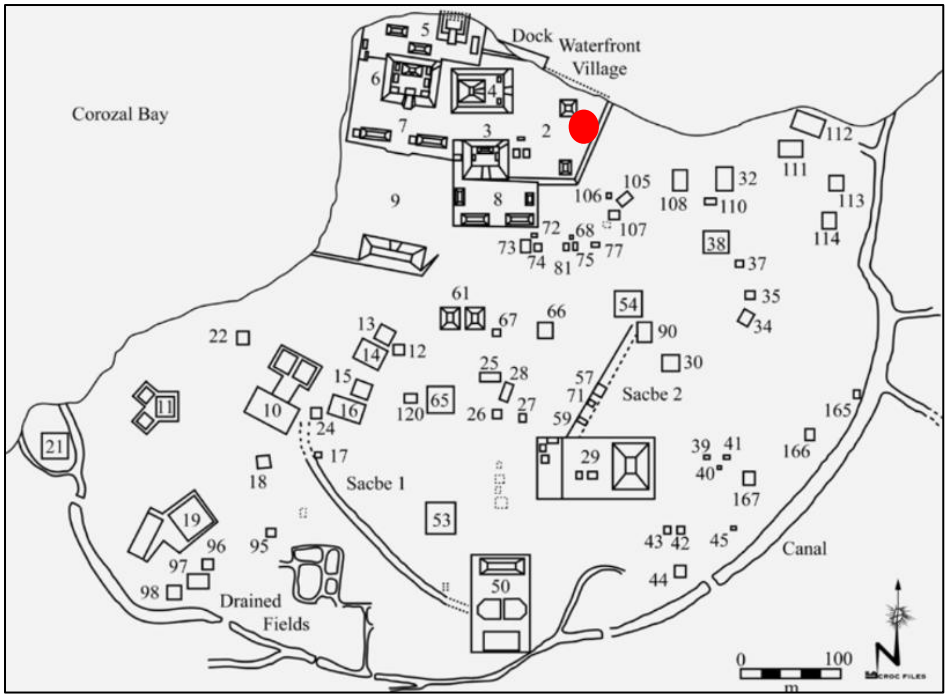

Figure 9. A site core map for the Cerro Maya trade settlement (Walker 2016). The chultun burial is demarcated using a red circle.

Originally established as a waterfront village in the Late Preclassic in 200-100 B.C., Cerro Maya grew into an important aspect of the Santa Rita Corozal polity (Walker 2016). The transition of Cerro Maya into a monumental site during the Terminal Preclassic (100 B.C.- A.D. 150) began fairly quickly after its original construction. It continued to grow and develop until a mass population influx in the Terminal Classic (A.D. 800-1000). Following the Terminal Classic Maya collapse, the influence of Cerro Maya was minimized to that of a coastal fishing village in the Early Post-Classic (A.D. 1000-1200). The site continued to endure into the Contact period (after A.D. 1450), but it no longer represented a powerful social center.

During the 1970s, excavations of the site began with the Cerros Project research team (Vadala and Walker 2020). From 1993 to 1995 the investigations of Cerro Maya were taken over by Debra Walker and a team of archaeologists. This research focused on the occupation of the area during the end of the Preclassic period. In later years, the Cerros Cooperative Archaeological Development Project (CCADP) took over the continuation of the excavation and mapping projects for Cerro Maya (Vadala and Walker 2020). There is minimal information regarding the investigations that have occurred in the area following the work of CCADP.

Minanha

Minanha is located in the North Vaca Plateau of west-central Belize (Snetsinger 2013) (Figure 10). The geographical environment is comprised of a hilly limestone terrain situated in a humid, tropical atmosphere. This archaeological site is positioned between two primary areas of importance to Maya culture, Naranjo and Caracol. Both of these archaeological sites are considered major centers within the Maya sphere of influence. This likely allowed for the inhabitants of Minanha to rise to power and gain alliances as an area of socio-political importance (Iannone 1999; Snetsinger 2013).

The first occupation of Minanha occurred during the late Middle Preclassic roughly from 600-400 B.C. (Iannone 2005). Amidst the Late Classic, the Maya established this site as a royal court complex and as a secondary center. This addition of another group of elites and royals in the region during the Late Classic led to the areas surrounding Minanha to increase in population size. Using customs derived from the example set by the formidable cultural center of Caracol, Minanha replicated a number of the structures and cultural practices observed there. Despite this, the court collapsed relatively quickly by the end of the Classic (A.D. 810-900) which coincided with the Terminal Classic collapse of the Maya (Iannone 2005; Snetsinger 2013).

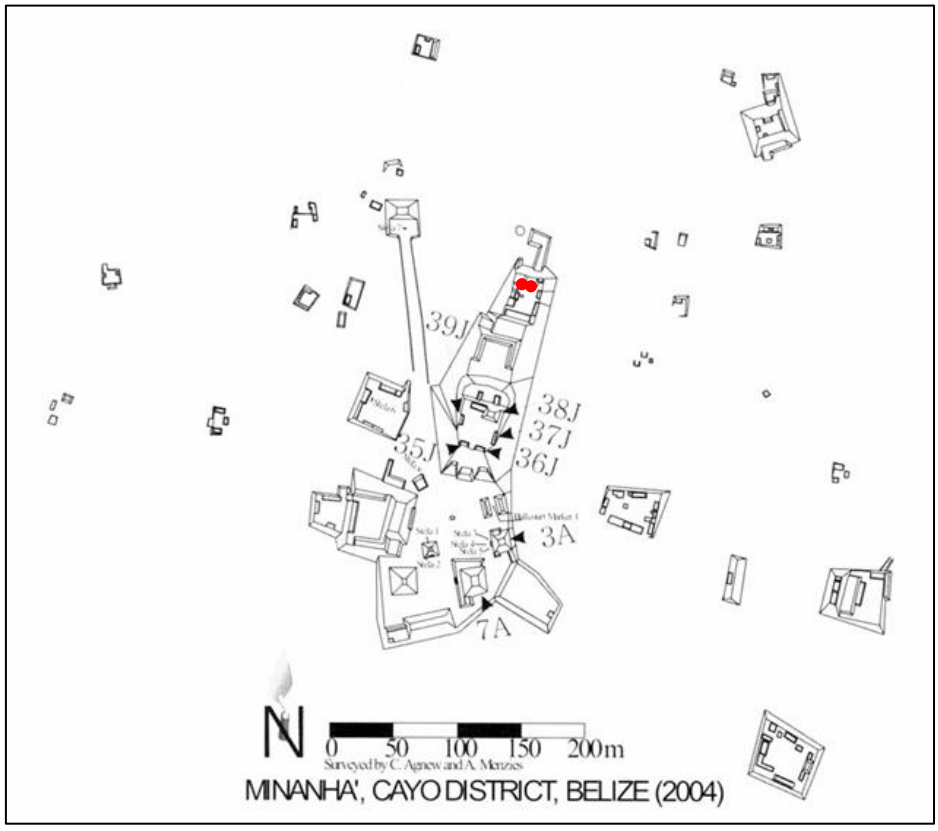

Figure 10. A map of the archaeological site of Minanha including the site core, epicenter, and greater Minanha community (Iannone 2005). The two red circles present in the elite aspect of the Minanha complex represent the two chultuns containing human remains present at the site.

There was initially little investigation into the area. Minanha was originally discovered in 1922 and investigated by British Museum archaeologists (Snetsinger 2013; Versaval 1922). In 1927 archaeologists attempted to further excavate the site, the lack of water and small work force caused investigations to halt (Snetsinger 2013). The site sat without incursion until the 1997 and 1998 expeditions, when Trent University continued the investigations started in 1927. The site itself is divided into three main sections: the Epicentral Court Complex, the Site Core, and the Greater Minanha Community as displayed in Figure 10. Two chultun burials were discovered in the Epicentral Court Complex during these excavations (Figure 10).

Ka'Kabish

Ka'Kabish is a moderately-sized archaeological site positioned in the northern region of Belize (Haines 2011) (Figure 1). The site is housed in the Orange Walk District and sits roughly 10 kilometers away from the prominent Pre-Classic era center of Lamanai. The site core of Ka'Kabish consists of six distinct groups of structures: Group A, Group B/Baker Group, Group C, Group D, Group E, and Group F (Figure 11). Due to more modern construction projects during the 20th century, the site was bisected by a road or early logging trail which increased structure

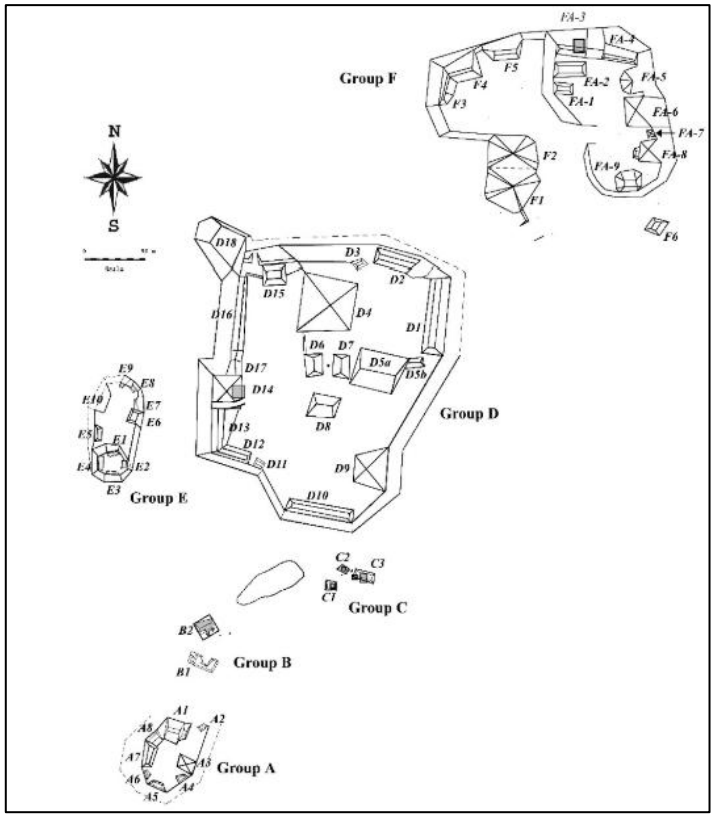

Figure 11. A map of the site core of Ka'Kabish (Smith 2020).

accessibility for looters (Haines 2011). Additionally, four chultun burials were uncovered in the area. These chultuns are unable to be demarcated in Figure 11 due to legal concerns with sharing location information derived from the Ka'Kabish Archaeological Research Project (KARP).

The center of Ka'Kabish was initially settled in the Middle Preclassic (800-600 B.C.) and occupied well into the Middle Post-Classic (A.D 1300-1400.) (Haines and Helmke 2016). The peak development of Ka'Kabish during this occupation period occurred from the end of the Late Preclassic to the Early Classic (A.D 400 B.C.- 600.). Amidst this period of growth, there is evidence that an elite population emerged and took control of the rulership of the site (Haines and Helmke 2016). Ka'Kabish likely still had to respond to the governance of the Lamanai polity. The site was discovered prior to the 1980s and investigated briefly, but no specific date of discovery is known (Haines 2011). In the mid-1990s, preliminary mapping and documentation of the site core by archaeologists from the Maya Research Program (MRP) began (Haines 2011). The maps created by MRP set the site up for the full-scale research project that began in 2007 under the name of Ka'Kabish Archaeological Research Project. This project classified Groups A-F and increased the number of mapped structures to 57. KARP's investigations of Ka'Kabish are ongoing.

Chaa Creek

Chaa Creek is a small, outlying settlement group near the prominent archaeological site of Xunantunich (Connell 1995) (Figure 12). Geographically, Chaa Creek is located at a midpoint on a route between the Macal and Mopan Rivers. There has been minimal archaeological investigation at this site. Research completed in the area includes the clearing of brush, excavation of the ramp feature, a plaza floor, a prominent staircase feature, and the excavation of an altar and a crypt. In addition to these finds, there were excavations of two chultuns found in

and around the Chaa Creek area (Connell 1995). One of which contained a set of human remains. Due to a lack of a map for the overall site or the site core it is not possible to share more specific locations of the chultun burial found at this site, but the burial location is within the property boundary of the Lodge at Chaa Creek.

The primary occupation of this settlement group is separated into two distinct periods, the Middle-Late Preclassic and the Late Classic (Connell 1994). Representing a middle-level settlement group, Chaa Creek is theorized to have been integrated into the state of Xunantunich during its secondary occupation period at the end of the Late Classic and continued following the collapse of the Late/Terminal Classic (Connell 1995, 1997).

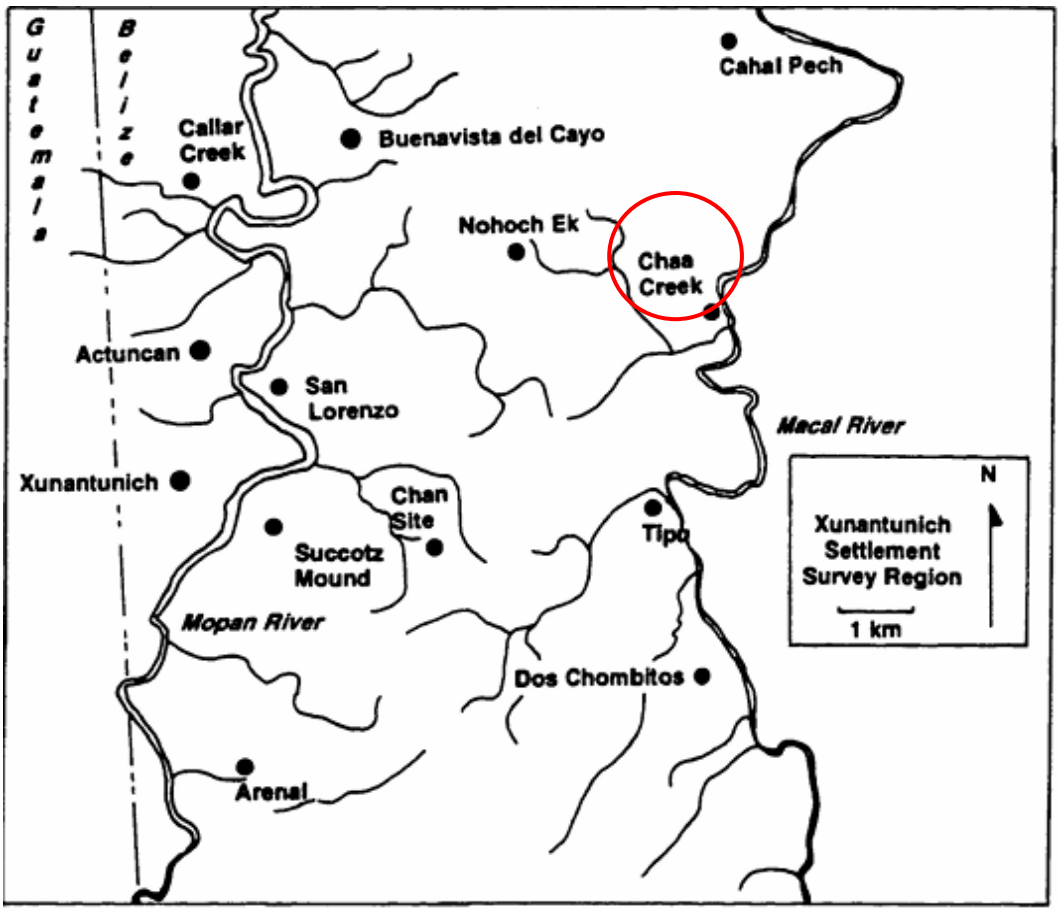

Figure 12. A map showing the Xunantunich settlement region with the location of Chaa Creek circled in red (Braswell 1998).

Blue Creek

Blue Creek is a moderately sized archaeological site positioned in the northern aspect of Belize (Lene 1996). It sits near a large limestone and dolomite escarpment located between two of the core rivers of the area, the Rio Hondo and the Rio Bravo. The Rio Hondo runs just northeast of the site and the Rio Bravo runs four to five kilometers east of the escarpment. In addition to this, a stream runs through the Blue Creek area (Guderjan 1996). The main area of

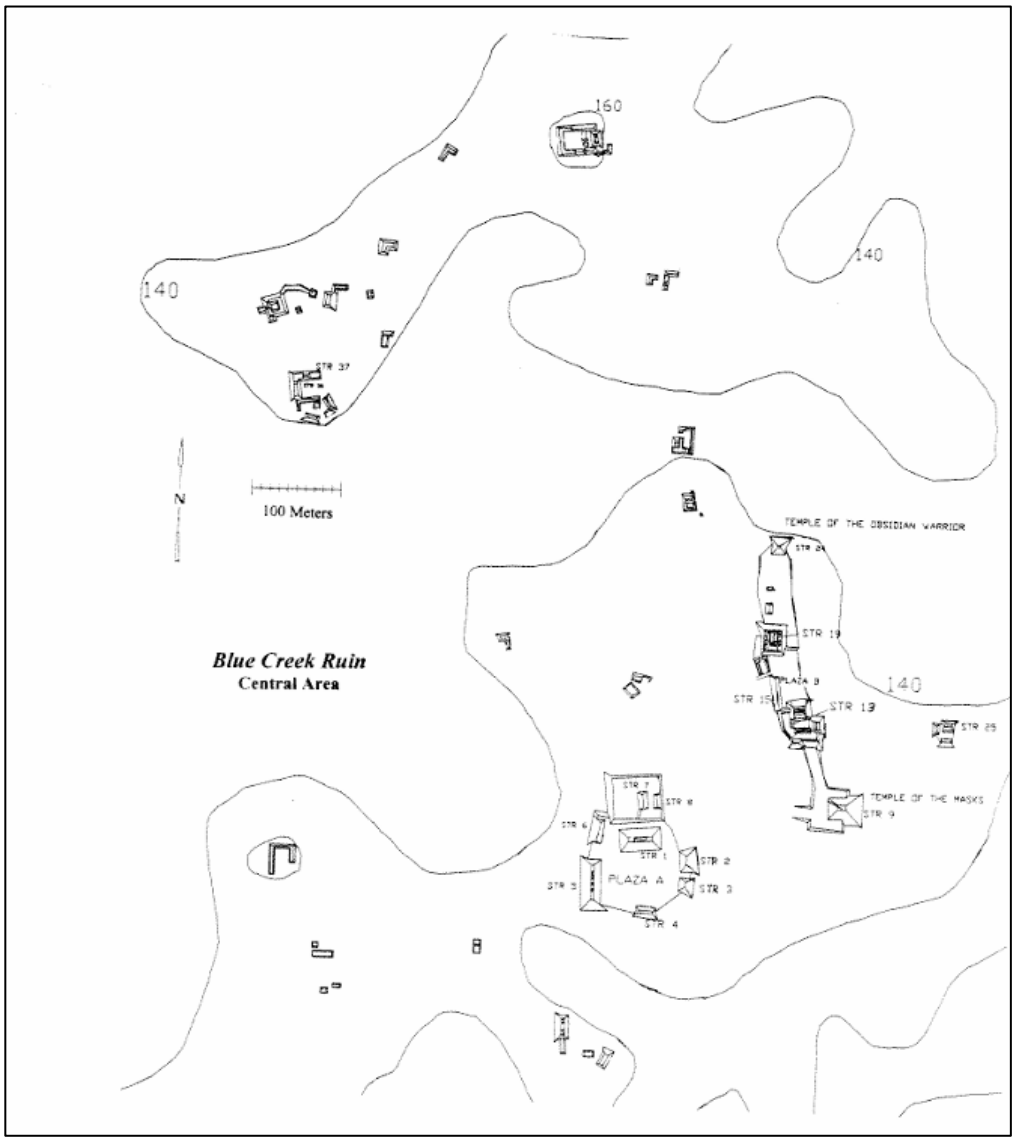

Figure 13. A site map for Blue Creek archaeological site (Guderjan 1996).

Blue Creek contains a number of structures (Figure 13). These structures include residential complexes and various other structures to the north along with a number of temples and plazas. The temples in the area are the Temple of the Obsidian Warrior and the Temples of the Masks which are interconnected with Plaza B. Plaza A is separated from the main temple group, but is positioned nearby (Guderjan 1996). A single chultun containing one set of human remains was discovered and excavated in the settlement area surrounding Blue Creek. Unfortunately, the specific location of this site is unable to be denoted in Figure 13 due to problems with location reporting in the site report that the chultun burial data originates from.

The first signs of occupation in the Blue Creek area occurred during the Middle Preclassic (900 B.C.) and lasted until the site's abandonment in the Terminal Classic (A.D. 850-950) (Barrett and Guderjan 2006). Based on evidence of expensive goods and imported products, Blue Creek represented a wealthy merchant community. This is also supported by the evidence of working-class communities and agricultural system remnants positioned in the area below the escarpment. It is uncertain which overarching polity had control over this area of this communal group and their high-quality agricultural productions (Barrett and Guderjan 2006).

Investigations at Blue Creek were first documented in 1976 in conjunction with the El Pozito Project (Barrett 2004). A rudimentary map of the site core was constructed along with notations regarding looting related disturbances at the site. Mary Neivens, one of the lead researchers on the El Pozito Project, led salvage operations in the looted areas to discern chronological information regarding the site. The site was later investigated further by Thomas Guderjan during a reconnaissance survey on the settlement areas in northwestern Belize (Barrett 2004). Under the oversight of the Maya Research Program, Guderjan worked to further map and excavate the site core along with the surrounding dispersed settlement communities.

Caracol

Caracol, the largest Maya archaeological site in Belize, covers more than a 10-kilometer diameter (centered around the site epicenter) of landscape (Chase and Chase 2018). The main site core contains massive numbers of structures including several acropolises, multiple plazas, a reservoir and many additional causeways to interconnect the massive city. In the site periphery there are innumerable amounts of residential units and complexes. This is likely due to the population of more than 100,000 individuals at the height of its power as an urban center (Chase and Chase 2018). Near some of the residential structures, three chultun burials were uncovered.

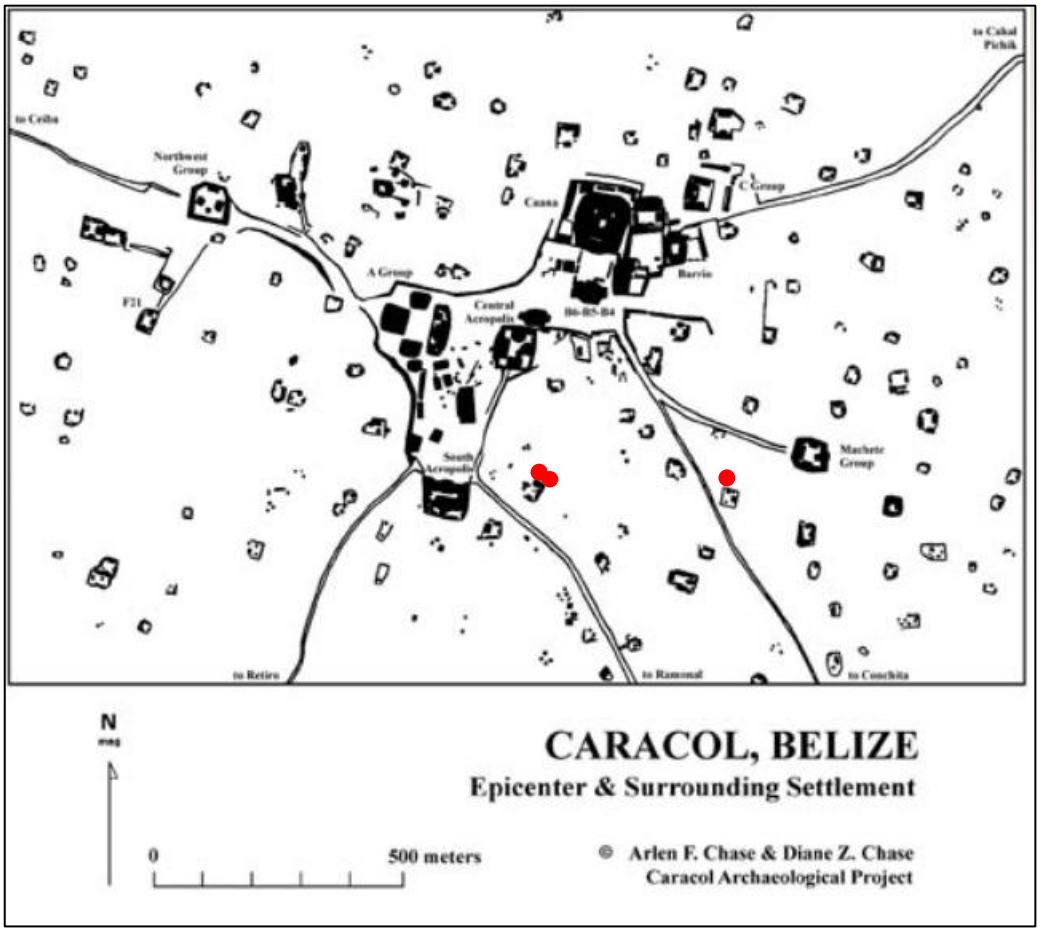

Figure 14. A map representing the site core and periphery of Caracol. Additionally, the red circles on the map represent the chultuns containing human remains in the site core area.

The earliest occupation of Caracol began in the Middle Preclassic (600-900 B.C.) with small villages in the area existing prior to the construction of monumental complexes (Chase and Chase 1996, 2017). In its early development, Caracol was governed by one of the largest urban centers of the Maya lowlands, Tikal (Chase and Chase 1994). In approximately A.D. 331, during the Early Classic, the royal family of Caracol was officially established (Chase and Chase 1996, 2017). This and other political/economic tensions likely catalyzed the war-like period of the inhabitants of Caracol. In the Late-Early Classic, Caracol began expanding and competing with Tikal ending in Tikal's eventual defeat. Caracol continued to expand across the Maya lowlands until the total abandonment of the site in the Early Post-Classic (A.D. 950).

Caracol was found in 1937 by a lumberman searching for mahogany trees to utilize (Chase and Chase 2018). For the next decade an archaeological commissioner for Belize tried to find an archaeology team to begin work at Caracol. In the 1950s archaeologists begin to excavate and map the site, but only at a very minor level. This involved the excavation of two tombs and many caches along with the mapping of the more prominent monument structures (Chase and Chase 2018). It was not until the 1980s that researchers realized the unusual occurrences of high population density that surrounded the site epicenter. In 1985 the Caracol Archaeological Project began and has continued investigations into the modern era.

Analysis Methods

Database Creation

The database created for this study looked for occurrences of Maya chultun burials across the country of Belize. The creation of the Chultun Burial Database was accomplished using a pre-existing table sourced from the Belize Valley Archaeological Reconnaissance (BVAR)

Project. That table contained 16 chultun burials that had been categorized and recorded by the BVAR Project (this data is still present in rows 2-17 of Table 3). This table was built upon using data collected from surveys, excavation reports, field notes, and other published literature. Each potential source was analyzed and reviewed to extract the data required for each of the 62 interred individuals included in the final version of the database.

The final table was designed using Excel and derived data from the original master table in Google Sheets. This table includes the following fields for the categorization of each burial entry (Table 2):

Table 2: A table listing the fields used in the original chultun burial database.

Polity/District	Articulated
Burial Database Number/Name	Looted
Political Status	Position
Tentative Time Period	Prone/Supine
Maximal Social Unit	Head Direction
Group/Plaza	Head Facing
Structure/Area	Body Orientation
MNI	Trauma
Sex	Dental Modifications
Age Category	Grave Goods
Burial Type	Notes
Re-Entry	

The compiled data then was used to facilitate the frequency analysis and spatial analysis. There are additional fields that were included in the original table from the BVAR Project that have been excluded from the list above due to a lack of data.

Frequencies

Frequency data is a visualization, in percentage form, of how often a particular value occurs within a dataset. Using the Chultun Burial Database, frequency data was generated for

the 62 interred individuals. This data collection period occurred over the span of approximately two months.

Spatial Analysis

Manual Input of a Point Feature Class

Following the development of the database discussed above, the site map for each major site location was georeferenced in ArcGIS Pro using the site epicenter as the control points for each raster dataset unless specified otherwise. Each burial location was then added manually with fields to match the ones present in the original database. The manual and generalized placement of each burial data point was due to legal constraints and data confidentiality.

Digital Elevation Modeling (DEM) & Slope Analysis

A Digital Elevation Map (DEM) is a raster layer containing elevation information for a specific geographic area. The DEM layer is sourced from the Belize National Spatial Data Infrastructure. It was then used as a component in a slope evaluation for Belize in ArcGIS Pro. These two pieces of data were then used in conjunction with the chultun burial point class. This information was then compared with the different elevation and slope values to find similarities.

Soil Analysis Comparison

As previously mentioned, the soil of Belize creates innumerable issues with burial preservation. For an analysis of correlation between soil composition and chultun burial location, a soil composition data vector layer was sourced from the Conservation Biology Institute. The core soil types housed within the soil composition layer are Arenosol/Regosol, Cambisol/Leptosol/Vertisol, Fluvisol/Cambisol/Vertisol, Gleysoles, Leptosols, and

Litosol/Cambisol (Baillie 1993). The two data layers were then compared to look for the possibility of soil composition correlation.

Waterway Location Comparison

A comparison between the burial point class and waterways was also completed to look for burial proximity to culturally relevant river systems. The stream data vector layer was sourced from the Belize National Spatial Data Infrastructure database and then applied to ArcGIS Pro in comparison with the burial layer.

Major Cave Proximity Comparison

A proximity analysis was conducted between the burial point feature class and a major cave point feature class. The cave feature class was developed through the georeferencing of five two dimensional maps in ArcGIS Pro that were pulled from the Belize Valley Archaeological Reconnaissance Project field reports from 1997 to 2000. These maps cover a series of small areas within the Cayo District of Belize. This region of the country was selected due to the high number of chultun burials within the district's borders. Further expansion of this feature class into a greater portion of the Cayo District was limited by the privatization of data (a response to looting issues) along with the innumerable occurrences of caves in the area. An additional three-mile buffer was added to the major cave points to look at the cave proximity to the burials in detail.

Table 3: Chultun burial database with the irrelevant fields removed due to missing data.

Polity/District	Burial Database Number	Political Status	Tentative Time Period	Area	Age Category	Burial Type	Re-entry	Articulated
Cahal Pech Settlement	Choj: Chultun 1, Burial 1, Individual 1	6	No data	Residential	Adult	No data	No data	No data
Cahal Pech Settlement	Choj: Chultun 1, Burial 1, Individual 2	6	No data	Residential	Adult	No data	No data	No data
Cahal Pech Settlement	Choj: Chultun 1, Burial 1, Individual 3	6	No data	Residential	Adult	No data	No data	No data
Cahal Pech Settlement	Choj: Chultun 1, Burial 1, Individual 4	6	No data	Residential	Adult	No data	No data	No data
Cahal Pech Settlement	Choj: Chultun 1, Burial 2	6	No data	Residential	Adult	No data	No data	No data
Cahal Pech Settlement	Choj: Chultun 1, Burial 3, Individual 1	6	No data	Residential	No data	No data	No data	No data
Xual-Canil Settlement	Choj: Chultun 1, Burial 3, Individual 2	6	No data	Residential	No data	No data	No data	No data
Xual-Canil Settlement	Gran Maestro: Chultun 4, Burial 1	6	No data	Residential	Adult	Primary	No data	No
Cahal Pech Settlement	Zotz: Chultun, Burial 1	4	No Data	Residential	No Data	No Data	No Data	No Data
Nohoch Ek	NHE Chultun 1- Burial 1	3	No Data	Monumental	Old Adult	Primary	No Data	Yes
Nohoch Ek	NHE Chultun 1- Burial 2	3	No Data	Monumental	Child	No Data	No Data	No Data
Cahal Pech Settlement	Cas Pek: Chultun 1, Burial 1	4	Early- Late Classic	Residential	No data	No data	No data	No data
Cahal Pech Settlement	Zinic: Chultun 1, Burial 1	6	No Data	Residential	No data	Indeterminate	No data	No
Cahal Pech Settlement	San Ignacio Resort Salvage Burial 1 Individual 1	6	Unknown	Residential	No Data	No Data	No Data	No Data
Cahal Pech Settlement	San Ignacio Resort Salvage Burial 1 Individual 2	6	Unknown	Residential	No Data	No Data	No Data	No Data
Cahal Pech Settlement	Tolok: Chultun B, Burial 1	4	Late Classic	Residential	Adult	Secondary	No	No
La Milpa	LM-4-U-9: Chultun 1, Burial 1	no data	Early Classic	Residential	Young Adult	Primary	Possibly	No
Cerro Maya	Cerro Maya: Chultun 1, Burial 1	no data	Possible Terminal Preclassic I/Late Preclassic	Residential	Young Adult	no data	no data	no data

Looted	Position	Prone/ Supine	Head Direction	Head Facing	Body Orientation	Dental Mod	Grave Goods
No Data	No data	No data	No data	No Data	Positioned on N wall	No data	No data
No Data	No data	No data	No data	No Data	Positioned on N wall	No data	No data
No Data	No data	No data	No data	No Data	Positioned on N wall	No data	No data
No Data	No data	No data	No data	No Data	Positioned on N wall	No data	No data
No Data	No data	No data	No data	No Data	Positioned on N wall	No data	No data
No Data	No data	No data	No data	No Data	Positioned on N wall	No data	No data
No Data	No data	No data	No data	No Data	Positioned on N wall	No data	No data
No Data	Flexed	No data	North	No Data	Positioned on N wall	No data	No data
No Data	no data	No Data	No Data	No Data	Positioned on N wall	no data	No data
No Data	Extended	No Data	No Data	No Data	Positioned on N wall	no data	None
No Data	No Data	No Data	No Data	No Data	Positioned on N wall	no data	None
No	No data	No data	No data	No data	Positioned on N wall	no data	No data
Heavily	No data	No data	No data	No data	Positioned on N wall	no data	No Data
No Data	No data	No data	No data	No data	Positioned on N wall	no data	shell discs
No Data	No data	No data	No data	No data	Positioned on N wall	Pyrite Inlay	No data
No	Secondary	N/A	North	No data	Positioned on N wall	no data	1 Platon Punctated-Incised vessel with hallow over feet and enclosed rattles, 1 small projectile point. In the southern chamber: 1 Platon Punctated-Incised Vessel and 1 broken Silk Grass Fluted vessel containing 2 obsidian blades.
No	Flexed	no data		East	Positioned on N wall	no data	Large ceramic pottery sherds and large cobbles
no data	Seated, cross legged	N/A	no data	no data	Positioned on N wall	no data	Grave goods included a ceramic whistle and an oval biface. The deceased cradled a Savannah Bank Usulutan: Composite bowl. Tipped over sideways nearby was a Tuk Red-on-red Trickle collared jar

Polity/District	Burial Database Number	Political Status	Tentative Time Period	Area	Age Category	Burial Type	Re-entry	Articulated
Minanha	Minanha Epicenter: Group M, Chultun 1, Burial 1	Likely upper lower status	Late Preclassic	Monumental	Adult	Primary	Yes	no data
Minanha	Minanha Epicenter: Group M, Chultun 2, Burial 1	Likely upper lower status	Early Postclassic	Monumental	no Data	Multiple	Yes	Yes
Minanha	Minanha Epicenter: Group M, Chultun 2, Burial 2	Likely upper lower status	Early Postclassic	Monumental	no Data	Multiple	Yes	Yes
Minanha	Minanha Epicenter: Group M, Chultun 2, Burial 3	Likely upper lower status	Early Postclassic	Monumental	no Data	Multiple	Yes	Yes, but poorly
Minanha	Minanha Epicenter: Group M, Chultun 2, Burial 4	Likely upper lower status	Early Postclassic	Monumental	no Data	Multiple	Yes	No
Minanha	Minanha Epicenter: Group M, Chultun 2, Burial 5	Likely upper lower status	Early Postclassic	Monumental	no Data	Multiple	Yes	No
Minanha	Minanha Epicenter: Group M, Chultun 2, Burial 6	Likely upper lower status	Early Postclassic	Monumental	no Data	Multiple	Yes	No
Minanha	Minanha Epicenter: Group M, Chultun 2, Burial 7	Likely upper lower status	Early Postclassic	Monumental	no Data	Multiple	Yes	No
Ka'Kabish	Ka'Kabish: Group B, Chultun 2, Burial 1	Unknown	Postclassic	Residential	young adult	Multiple	Yes	no data
Ka'Kabish	Ka'Kabish: Group B, Chultun 2, Burial 2	Unknown	Postclassic	Residential	young adult	Multiple	Yes	no data
Ka'Kabish	Ka'Kabish: Group B, Chultun 2, Burial 3	Unknown	Postclassic	Residential	sub-adult (5+)	Multiple	Yes	no data
Ka'Kabish	Ka'Kabish: Group B, Chultun 2, Burial 4	Unknown	Postclassic	Residential	sub-adult (5+)	Multiple	Yes	no data

Looted	Position	Prone/ Supine	Head Direction	Head Facing	Body Orientation	Dental Mod	Grave Goods
no data	Extended		positioned to the W	No data	Positioned on N wall	no data	Dolphin Head Red: Variety bowl and dates to the early Late Classic, Orange-Walk Incised: Variety Jar dates to the Middle Classic, Orange-Walk Incised: Variety florero, once contained 40 jadeite beads, Dolphin Head Read: Variety dish dates to the Late Classic, Mangrove Brown-Black: Variety bowl dates to Mid-Classic, Dolphin Head Red: Variety vase dates to the early Late Classic, hematite groundstone-mosaic piece and a groundstone-raw slate fragment.
no data	Extended	Supine	positioned to the W	No data	Positioned on N wall	4 Filed Teeth, 1 Inlaid Tooth	An artifact found in direct association with this individual was a small “poison pot” or pigment vessel
no data	Extended	Supine	positioned to the W	No data	Positioned on N wall	4 Filed Teeth, 1 Inlaid Tooth	Two spindle whorls, a shell adomo, and a thin biface, Intermixing with faunal remains
no data	No Data	No data	No data	No data	Positioned on N wall	4 Filed Teeth, 1 Inlaid Tooth	Early Postclassic Daylight Orange: Variety unspecified bowl, a fragment of a bone flute, a jadeite groundstone-ear ornament, a hematite groundstone mosaic piece, two groundstone-spindle whorls, a groundstone-awl, a chipped stone- 112 thin biface, a bone pin, a shell adomo, one fragment of worked bone and worked shell
no data	No Data	No data	No data	No data	Positioned on N wall	4 Filed Teeth, 1 Inlaid Tooth	Early Postclassic Daylight Orange: Variety unspecified bowl, a fragment of a bone flute, a jadeite groundstone-ear ornament, a hematite groundstone mosaic piece, two groundstone-spindle whorls, a groundstone-awl, a chipped stone- 112 thin biface, a bone pin, a shell adomo, one fragment of worked bone and worked shell, Intermixing with faunal remains
no data	No Data	No data	No data	No data	Positioned on N wall	4 Filed Teeth, 1 Inlaid Tooth	Early Postclassic Daylight Orange: Variety unspecified bowl, a fragment of a bone flute, a jadeite groundstone-ear ornament, a hematite groundstone mosaic piece, two groundstone-spindle whorls, a groundstone-awl, a chipped stone- 112 thin biface, a bone pin, a shell adomo, one fragment of worked bone and worked shell, Intermixing with faunal remains
no data	No Data	No data	No data	No data	Positioned on N wall	4 Filed Teeth, 1 Inlaid Tooth	Early Postclassic Daylight Orange: Variety unspecified bowl, a fragment of a bone flute, a jadeite groundstone-ear ornament, a hematite groundstone mosaic piece, two groundstone-spindle whorls, a groundstone-awl, a chipped stone- 112 thin biface, a bone pin, a shell adomo, one fragment of worked bone and worked shell
no data	No Data	No data	No data	No data	Positioned on N wall	4 Filed Teeth, 1 Inlaid Tooth	Early Postclassic Daylight Orange: Variety unspecified bowl, a fragment of a bone flute, a jadeite groundstone-ear ornament, a hematite groundstone mosaic piece, two groundstone-spindle whorls, a groundstone-awl, a chipped stone- 112 thin biface, a bone pin, a shell adomo, one fragment of worked bone and worked shell
no data	No Data	No data	No data	No data	Positioned on N wall	C4 (1), C6 (5)	charcoal, one bead, and lithic fragments, and loose teeth (n = 24).
no data	No Data	No data	No data	No data	Positioned on N wall	C4 (1), C6 (5)	charcoal, one bead, and lithic fragments, and loose teeth (n = 24).
no data	No Data	No data	No data	No data	Positioned on N wall	C4 (1), C6 (5)	charcoal, one bead, and lithic fragments, and loose teeth (n = 24).
no data	No Data	No data	No data	No data	Positioned on N wall	C4 (1), C6 (5)	charcoal, one bead, and lithic fragments, and loose teeth (n = 24).

Polity/District	Burial Database Number	Political Status	Tentative Time Period	Area	Age Category	Burial Type	Re-entry	Articulated
Ka'Kabish	Ka'Kabish: Group B, Chultun 2, Burial 5	Unknown	Postclassic	Residential	sub-adult (5+)	Multiple	Yes	no data
Ka'Kabish	Ka'Kabish: Group B, Chultun 2, Burial 6	Unknown	Postclassic	Residential	Infant (<1)	Multiple	Yes	no data
Ka'Kabish	Ka'Kabish: Group B, Chultun 2, Burial 7	Unknown	Postclassic	Residential	no data	Multiple	Yes	no
Chaa Creek	Lodge at Chaa Creek: Chultun 2, Chamber 3, Burial 1	Unknown	Preclassic	Unknown	Adult	primary	no data	yes
Blue Creek	4.25 km of Blue Creek: Chultun 1, Burial 5	Unknown	Terminal Preclassic	Unknown	no data	no data	no data	
Caracol	Caracol: Gateway Group, Chultun 1, Burial 1	Unknown	Late Preclassic	Residential	Adult	Multiple	no data	no data
Caracol	Caracol: Gateway Group, Chultun 1, Burial 2	Unknown	Late Preclassic	Residential	Young Adult	Multiple	no data	no data
Caracol	Caracol: Midget Group, Structure 4C11, Chultun 1, Burial 1	Unknown	no data	residential	no data	no data	no data	no
Caracol	Caracol: Chon Group, Structure 4C26, Chultun 1, Burial 1	Unknown	Early Classic	residential	no data	no data	no data	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 1, Burial 1	Unknown	Terminal Classic/Early Postclassic	residential	adult	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 1, Burial 2	Unknown	Terminal Classic/Early Postclassic	residential	adult	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 1, Burial 3	Unknown	Terminal Classic/Early Postclassic	residential	adult	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 1, Burial 4	Unknown	Terminal Classic/Early Postclassic	residential	adult	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 1, Burial 5	Unknown	Terminal Classic/Early Postclassic	residential	older subadults (15-18)	Multiple	yes	no

Looted	Position	Prone/ Supine	Head Direction	Head Facing	Body Orientation	Dental Mod	Grave Goods
no data	No Data	No data	No data	No data	Positioned on N wall	C4 (1), C6 (5)	charcoal, one bead, and lithic fragments, and loose teeth (n = 24).
no data	No Data	No data	No data	No data	Positioned on N wall	C4 (1), C6 (5)	charcoal, one bead, and lithic fragments, and loose teeth (n = 24).
no	No Data	No data	No data	No data	Positioned on the W wall of chamber, slightly N from center	no data	Snail Shells, small pebbles, ceramic sherds dating from the Late/Terminal Classic to the Postclassic periods, loose human teeth (n = 41), charcoal pieces, one bone needle, and a bone spindle whorl/ear spool.
no data	Seated	No data	No data	No data	No data	No data	no data
no data		No data	No data	No data	No data	No data	28 ceramic vessels from the Linda Vista Ceramic Complex & Chicanel Ceramic Sphere
no data	no data	No data	No data	No data	Positioned to the N	No data	faunal remains, a stalactite, a partial chert point, a partial ceramic labrette, a partial sandstone palette, a worked shell, a large obsidian blade, an obsidian core, chert drills, worked shell fragments; a shaped drilled sherd, drilled spondylus shell, a partial slate palette, a stingray spine, an unexpected amount of chert (281 “chunks", 602 flakes, 3 blade fragments, 8 tools, and 4 drills)
no data	no data	No data	No data	No data	Positioned to the S	No data	faunal remains, a stalactite, a partial chert point, a partial ceramic labrette, a partial sandstone palette, a worked shell, a large obsidian blade, an obsidian core, chert drills, worked shell fragments; a shaped drilled sherd, drilled spondylus shell, a partial slate palette, a stingray spine, an unexpected amount of chert (281 “chunks", 602 flakes, 3 blade fragments, 8 tools, and 4 drills)
no data	no data	No data	No data	No data	No Data	No data	no data
no data	no data	No data	No data	No data	No Data	No data	a largely complete incensario missing its flanges and partial vessels representing ollas, jars, bowls, and flanged dishes
no data	no data	No data	No data	No data	No Data	B2 (1), C4 (9), C5 (2), C6 (13), F4 (7)	No data
no data	no data	No data	No data	No data	No Data	B2 (1), C4 (9), C5 (2), C6 (13), F4 (7)	No data
no data	no data	No data	No data	No data	No Data	B2 (1), C4 (9), C5 (2), C6 (13), F4 (7)	No data
no data	no data	No data	No data	No data	No Data	B2 (1), C4 (9), C5 (2), C6 (13), F4 (7)	No data
no data	no data	No data	No data	No data	No Data	B2 (1), C4 (9), C5 (2), C6 (13), F4 (7)	No data

Polity/District	Burial Database Number	Political Status	Tentative Time Period	Area	Age Category	Burial Type	Re-entry	Articulated
Ka'Kabish	Ka'Kabish: Group C, Chultun 1, Burial 6	Unknown	Terminal Classic/Early Postclassic	residential	older subadults (15-18)	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 1, Burial 7	Unknown	Terminal Classic/Early Postclassic	residential	young subadult (2+)	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 1, Burial 8	Unknown	Terminal Classic/Early Postclassic	residential	infant (9 months +/-3)	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 1, Burial 9	Unknown	Terminal Classic/Early Postclassic	residential	Late Fetal (712 months gestational)	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 1, Burial 10	Unknown	Terminal Classic/Early Postclassic	residential	Late Fetal (712 months gestational)	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 1, Burial 11	Unknown	Terminal Classic/Early Postclassic	residential	Early Fetal (46 months gestational)	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 2, Burial 1	Unknown	Postclassic	residential	Young Adult (20-35)	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 2, Burial 2	Unknown	Postclassic	residential	Young Adult (20-35)	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 2, Burial 3	Unknown	Postclassic	residential	Young Adult (20-35)	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 2, Burial 4	Unknown	Postclassic	residential	Young Adult (20-35)	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 2, Burial 5	Unknown	Postclassic	residential	Young Adult (20-35)	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 2, Burial 6	Unknown	Postclassic	residential	Young Adult (20-35)	Multiple	yes	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 3, Burial 1	Unknown	no data	residential	Young Adult (20-35)	Multiple	no data	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 3, Burial 2	Unknown	no data	residential	Adult	Multiple	no data	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 3, Burial 3	Unknown	no data	residential	Adult	Multiple	no data	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 3, Burial 4	Unknown	no data	residential	Adult	Multiple	no data	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 3, Burial 5	Unknown	no data	residential	Adult	Multiple	no data	no
Ka'Kabish	Ka'Kabish: Group C, Chultun 3, Burial 6	Unknown	no data	residential	Sub-Adult (15-18)	Multiple	no data	no

Looted	Position	Prone/ Supine	Head Direction	Head Facing	Body Orientation	Dental Mod	Grave Goods
no data	no data	No data	No data	No data	No Data	B2 (1), C4 (9), C5 (2), C6 (13), F4 (7)	No data
no data	no data	No data	No data	No data	No Data	B2 (1), C4 (9), C5 (2), C6 (13), F4 (7)	No data
no data	no data	No data	No data	No data	No Data	B2 (1), C4 (9), C5 (2), C6 (13), F4 (7)	No data
no data	no data	No data	No data	No data	No Data	B2 (1), C4 (9), C5 (2), C6 (13), F4 (7)	No data
no data	no data	No data	No data	No data	No Data	B2 (1), C4 (9), C5 (2), C6 (13), F4 (7)	No data
no data	no data	No data	No data	No data	No Data	B2 (1), C4 (9), C5 (2), C6 (13), F4 (7)	No data
no data	no data	No data	No data	No data	No Data	no data	3 Postclassic/Late or Terminal Formative Vessels
no data	no data	No data	No data	No data	No Data	no data	3 Postclassic/Late or Terminal Formative Vessels
no data	no data	No data	No data	No data	No Data	no data	3 Postclassic/Late or Terminal Formative Vessels
no data	no data	No data	No data	No data	No Data	no data	3 Postclassic/Late or Terminal Formative Vessels
no data	no data	No data	No data	No data	No Data	no data	3 Postclassic/Late or Terminal Formative Vessels
no data	no data	No data	No data	No data	No Data	no data	3 Postclassic/Late or Terminal Formative Vessels
no data	no data	No data	No data	No data	No Data	A2 (3), C6 (2)	No Data
no data	no data	No data	No data	No data	No Data	A2 (3), C6 (2)	No Data
no data	no data	No data	No data	No data	No Data	A2 (3), C6 (2)	No Data
no data	no data	No data	No data	No data	No Data	A2 (3), C6 (2)	No Data
no data	no data	No data	No data	No data	No Data	A2 (3), C6 (2)	No Data
no data	no data	No data	No data	No data	No Data	A2 (3), C6 (2)	No Data

Results

Database Frequencies

Cultural Data

The time periods of each individual in the database included burials from the Preclassic (n=6, 9.68%), the Classic (n=15, 24.19%), and the Post-Classic (n=21, 33.87%). Some of the burials from these broader time periods were able to be broken down into more specific temporal categories: Late/Terminal Preclassic (n=5, 8.06%), Early Classic (n=1, 1.61%), Late/Terminal Classic (n=13, 20.97%), and Early Post-Classic (n=7, 11.29%). The remaining individuals in the database without an associated time period were organized into the unknown (n=21, 33.87%) category. The presumed political status of the individuals interred within the burials were classified into two categories: low status (n=11, 17.74%) and unspecified middle-upper status (n=13, 20.97%). This was determined based on burial location and/or associated grave goods with each individual or burial. The remaining individuals who were unable to be sorted into either category were placed into the unknown (n=38, 61.29%) categorization.

The evidence for the re-entry of living individuals into the chultuns had two core categories: presence (n=33, 53.23%) and absence (n=1, 1.61%). The additional burials that did not fit into either of these groupings were placed into the unknown (n=28, 45.16%) classification. Evidence of looting within the chultun burials was separated into the presence (n=1, 1.61%) or absence (n=4, 6.45%) categories. The remaining burials in which the evidence was unclear were demarcated as unknown (n=57, 91.94%). The site area types for the sampled burials were split between two categories: residential (n=50, 80.65%) and monumental (n=10,

16.13%). The remaining burials that could not be categorized into either grouping were placed into the unknown (n=2, 3.23%) category.

In the sampled burials there were some with grave goods present, but several lacked any items in association with the deceased. The presence of grave goods was divided into two distinct categories: present (n=28, 45.16%) and absent (n=34, 54.84%). There were a large variety of grave goods (n=1,215) found between the chultun burials sampled. For ceramics, vessels (n=48, 3.95%), figurines (n=3, 0.25%), and sherds (n=2, 0.16%) were included. For stones or stone derived items, projectile points/debitage (n=742, 61.07%), obsidian blades (n=3, 0.25%), jadeite (n=42, 3.46%), spindle whorls (n=4, 0.33%), and whole stones (n=286, 23.54%) were found. Another prevalent grave good category was bone items (n=70, 5.76%). This encompasses items such as bone pins, bone flutes, and loose human teeth that were distinctly separated from the other sets of interred human remains. Other related categories of grave good types are shell items (n=8, 0.66%) and faunal remains (n=3, 0.25%). Similarly to the bone items category, the shell items category contains a diverse array of goods including worked shell, shell adomos, and shell discs. The final two categories of grave goods are charcoal (n=3, 0.25%) and rattles (n=1, 0.08%).

Bioarchaeological Data

Based on the field reports and other sources utilized, presumed osteological sexes were determined (if possible). The burials included individuals that were male (n=4, 6.45%), female (n=4, 6.45%), or indeterminate (n=8, 12.9%). The remaining individuals that had no information regarding their sex were classified as unknown (n=46, 74.19%). Also addressed in the source documents were the presumed age categories of the deceased based on osteological information. The age categories were broken down into childhood and adulthood groupings. The childhood

classifications include fetal (n=3, 4.84%), infant (n=2, 3.23%), child (n=5, 8.06%), and sub-adult (n=3, 4.84%). The categories included in the adulthood groupings are young adult (n=12, 19.35%), adult (n=18, 29.03%), and old adult (n=1, 1.61%). The remains that could not be classified into one of the previously aforementioned categories were organized into the unknown (n=18, 29.03%) grouping. The burial types present include primary (n=5, 8.06%), secondary (n=1, 1.61%), multiple (n=39, 62.9%), and indeterminate (n=1, 1.61%). The remaining burials that did not fit into any of these categories were included in the unknown (n=16, 25.81%) category.

Evidence of articulation in the remains is broken down into two categories: presence (n=5, 8.06%) and absence (n=35, 56.45%). The remaining individuals where this information was not known were placed into the unknown (n=22, 35.48%) category. The bodily positioning of the remains found in each chultun was broken down into five groups: flexed (n=2, 3.23%), seated (n=2, 2.23%), extended (n=4, 6.45%), prone (n=0, 0%), and supine (n=2, 3.23%). In addition to this, the cranial positioning was broken down into three additional categories: north head direction (n=2, 3.23%), west head direction (n=3, 4.84%), and east head facing (n=1, 1.61%). Similar to the body & cranial positioning of the remains, the body orientation is based on the position of the individual(s) within the chultuns rather than independent positioning of the remains. The categories for body orientation include positioned on north wall of chultun (n=33, 53.23%), positioned on south wall of chultun (n=1), and positioned on west wall of chultun (n=1, 1.61%). The remaining burials in which this information was undetermined were placed into the unknown (n=27, 43.55%) category. Evidence of dental modifications were present within some sets of remains. The dental modifications found included pyrite inlay (n=1, 1.61%), inlaid (n=1,

1.61%), filed (n=4, 6.45%), A2 (n=3, 4.84%), B2 (n=1, 1.61%), C4 (n=10, 16.13%), C5 (n=2, 3.23%), C6 (n=20, 32.26%), and F4 (n=7, 11.29%).

Spatial Analysis & Map Products

The base GPS locations for the 62 chultun burials are distributed along the outskirts of the border of Belize (Figure 15). Each site is denoted with a small black/white headstone icon in the map layout. The icons are visualized over an Imagery Hybrid base map. These burial sites range across 10 maximal site locations and 18 individual structures. Approximately half of the chultun locations are clustered in the Cayo District while the others are more sparsely spread across the northernmost region of the country. After creating the map with the sample chultun burial points, the additional elevation, slope, waterway, and soil composition maps were added to the geodatabase. The Digital Elevation Map (DEM) showed a clustering of the burials at three different elevation ranges (Figure 16). There are 14 burials at mid-range elevation areas and 12 burials at high-range elevation areas. The remaining 36 burials are at low-range elevation areas and exist in less mountainous regions of the country. The slope map, created by using the raster data from the DEM, shows the same spread of burials across the various levels of slope as seen in the Digital Elevation Map (Figure 17). The 36 low-range elevation burial

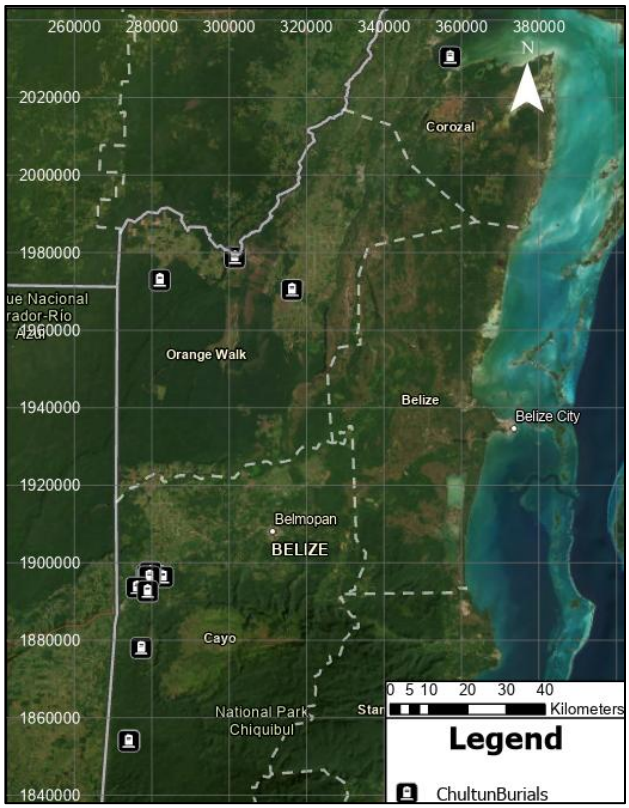

Figure 15. A map of the distribution of chultun burials scattered across Belize.

locations are in the bottom 18%, the 14 burials located at a mid-range elevation are at the bottom 40% and the 12 burials found at a high-range elevation are in the top 65% of slope levels.

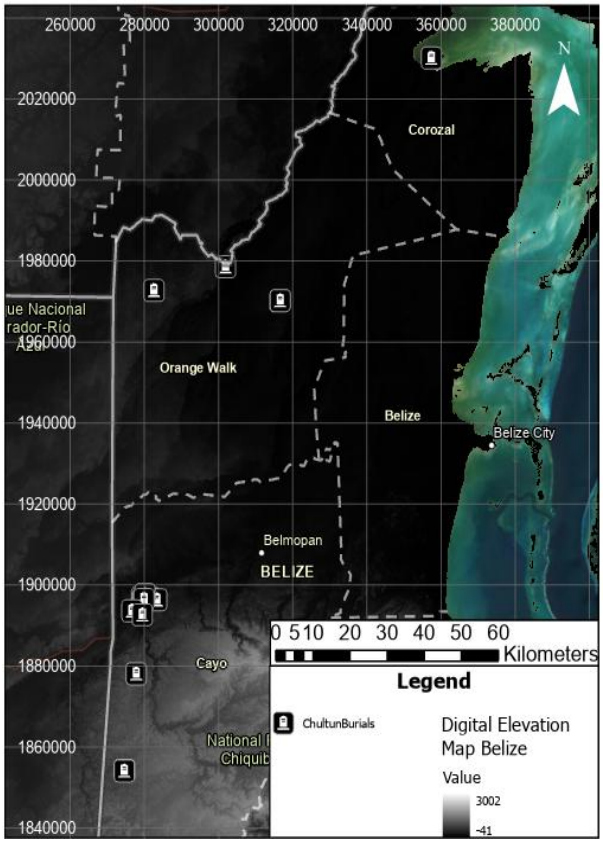

Figure 16. A map of Belize layered with a Digital Elevation Model (DEM) and chultun burial database locations.

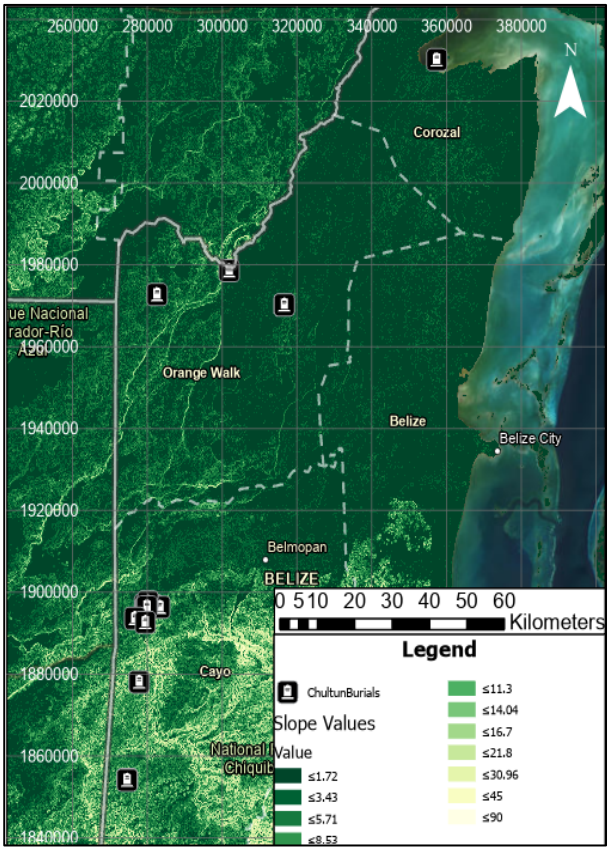

Figure 17. A slope map of Belize layered with the locations of chultun burials.

The following step involved the inclusion of the soil composition map in comparison to the burial data points (Figure 18). This data layer demonstrates that 98.38% of the burials are located in soil areas comprised of the Leptosol soil type. Leptosol represents a very shallow soil cover over continuous rock or a deeper soil that is extremely rich in coarse fragments such as gravel or stone (Mantel). Some Leptosol soil compositions are also acidic (Ebelhar et al. 2008). The final 1.62% of the burials are located in soil areas comprised of a Gleysol soil composition. Gleysol is a wetland soil that has been extremely saturated with water for an extended period of

time that it changes color ranging from brownish to yellowish (Mantel). This type of soil is often present in lowland river basin areas (Mantel).

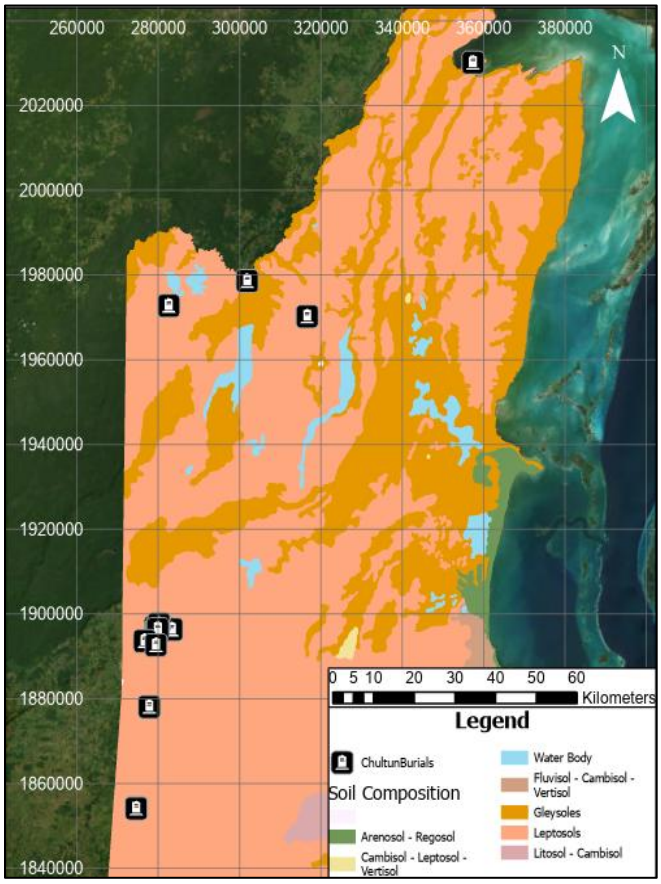

Figure 18. A map of Belize that demonstrates the differing soil compositions of the country. Data points associated with Maya chultun burials are included.

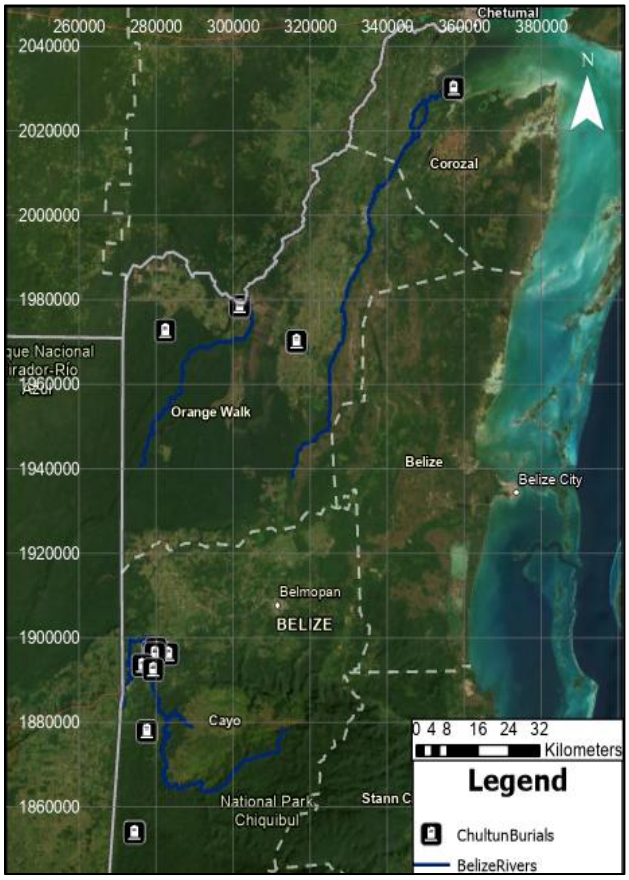

Figure 19. A map of the waterways of Belize with the rivers that have the closest proximity to the chultun burials isolated from the data set (i.e. the Macal River, Mopan River, Rio Bravo, and Rio Nuevo).

The subsequent data layer that was utilized as a part of this study was the waterways layer. The chultun burial locations and their direct proximity to the rivers and waterways of Belize were analyzed for significance. The waterway proximity maps show that the majority of the chultun burial locations have a proximity to the river locations on the map (Figure 19). The northernmost site of Cerro Maya seems to be fairly disconnected, due to distance and preexisting nearness to the Corozal Bay, to the nearby outlet of the Rio Nuevo. The sites of Ka'kabish, Blue

Creek, and La Milpa are in minor proximity to the Rio Nuevo. The sites in the Cayo District are distinctly positioned between the Macal and the Mopan Rivers. The site locations to the south, Caracol and Minanha, sit near the continuation of the Macal river with Caracol sitting significantly further to the south than Minanha.

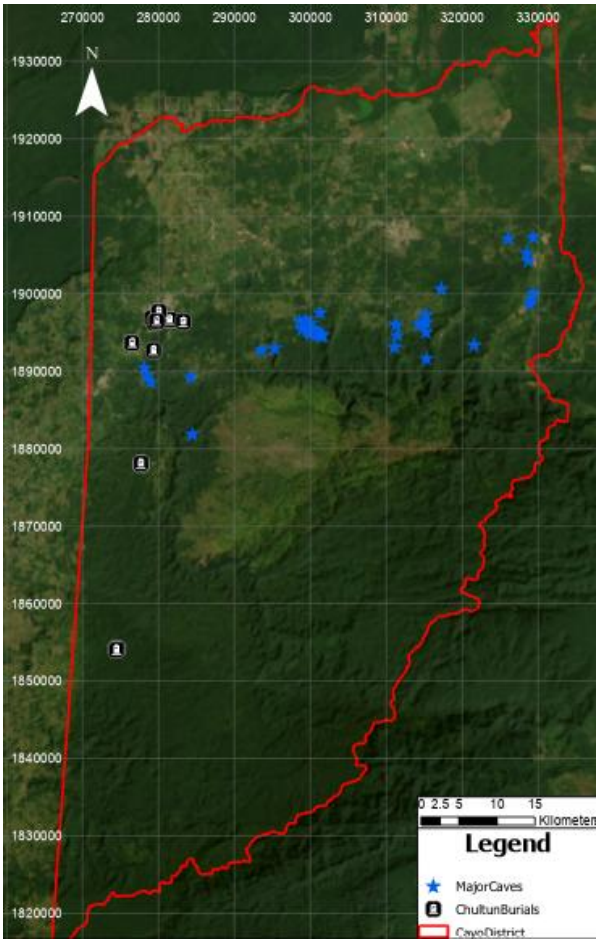

Figure 20. A map of Belize's Cayo District with chultun burials (tombstones) and major caves (blue stars) highlighted.

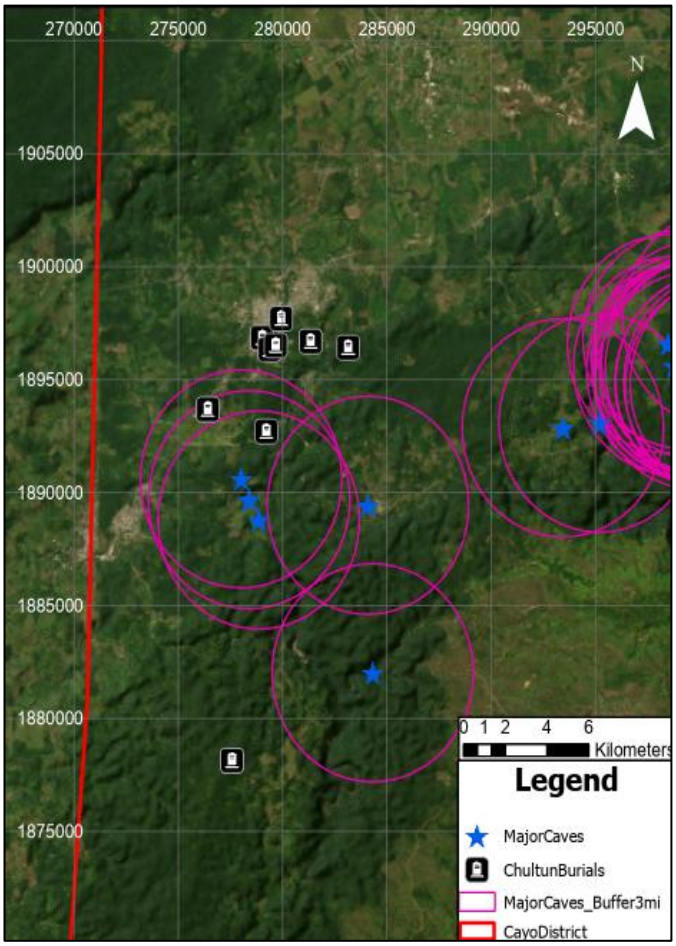

Figure 21. A map of the major caves (blue stars) in the Cayo District of Belize with three-mile buffers (pink circles).

The final aspect of the spatial analysis involved the addition of major cave sites in the Cayo District of Belize. In Figures 20 and 21, the caves are denoted using blue stars and a surrounding pink circle for the corresponding three-mile buffer. An additional red border was used to outline the boundaries of the district. Only the burials at Nohoch Ek and Chaa Creek are

within the range of the cave buffers. The other chultun burials nearby are still close to the buffer boundaries, but do not actually fall within them.

Discussion

Database Analysis

Cultural Analysis

The data categories for political status and the evidence of looting did not produce any relevant data. Despite this, there are still some interesting cultural trends present in the data for the remaining fields. The biggest trend is the time periods of the burials. Based on Figure 22 below, there are spikes in mortuary usage of chultuns in the Late/Terminal Preclassic, Late/Terminal Classic, the Early Post-Classic, and the Broad Post-Classic. Excluded from this figure are the additional 22 individuals, ~35 percent of the data, where a time period was undeterminable. There was a significant spike in the practice of using chultuns as a part of mortuary practices during the end of the Classic period and into, at the very least, the Early Post-Classic. This likely correlates with

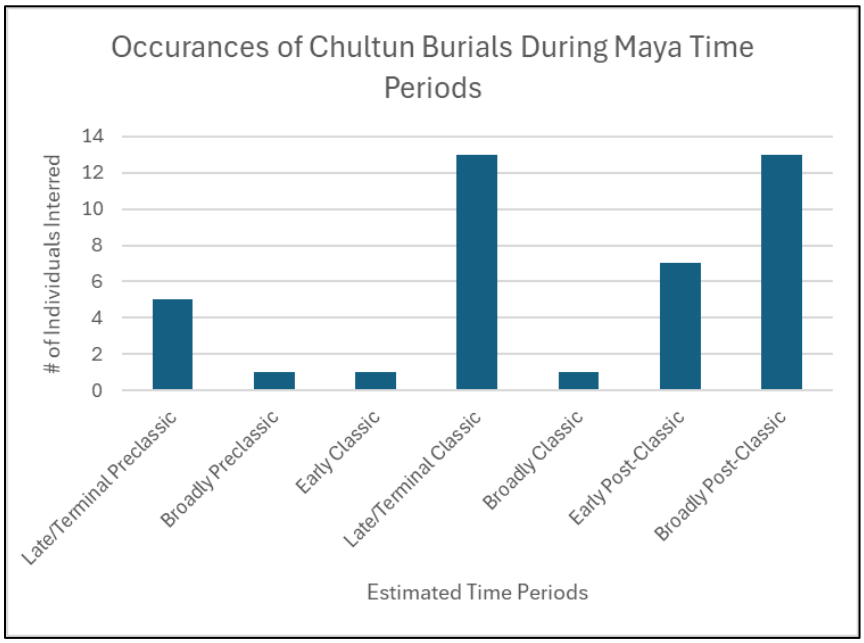

Figure 22. A graph denoting the distribution of chultun burials across the time periods of the Maya. It demonstrates peaks in this burial practice during the Late/Terminal Classic and Post-Classic periods.

the collapse of their political systems in the Late/Terminal Classic Collapse. According to a climatological study from 2012 that assessed the correlation between a sub annual climate record and the expansion/diminishing of political centers of the Maya, an extreme drought may have been a contributing factor to this collapse (Kennett et al. 2012). As seen in Figure 23, one of the driest periods began at the mid-point of the Terminal Classic and continued well into the Post-Classic. This would have been a severe, multidecadal drought that minimized much of the Maya's agriculture and trade sources.

The Post-Classic occurred after this massive collapse where the prominent cities were abandoned, and millions of citizens died (Coe and Houston 2022). This could correlate with the occurrences of chultun burials during these time periods. The peak from Figure 22 begins towards the tail-end of the Classic and peaks again towards the Early Post-Classic. It may represent an attempt to continue burial practices from prior to the Classic collapse with the "trend" dropping off in the later aspects of the Post-Classic. This is all subject to speculation as there is not a large enough sample to determine if this idea can be fully corroborated by the data.

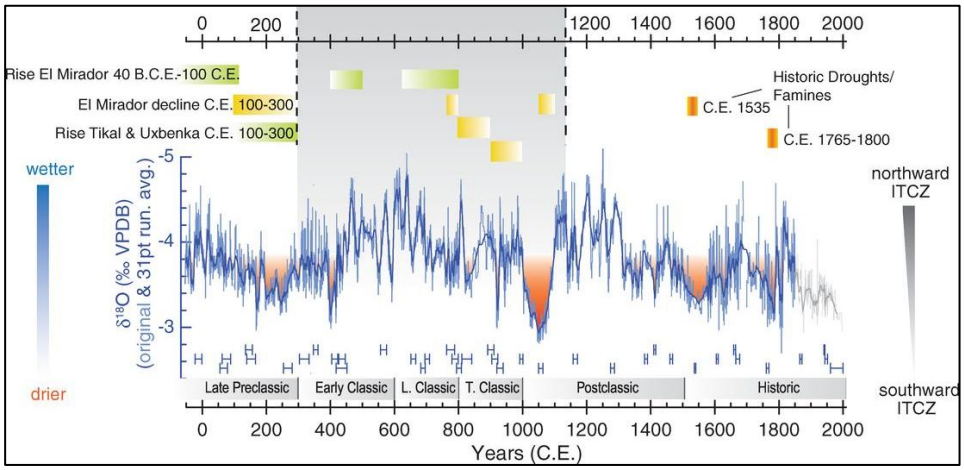

Figure 23. YOK-I $\delta^{18}O$ climate record spanning the past 2000 years (40 B.C. to A.D. 2006) shown relative to Maya chronology and major historical events. The blue peaks represent wetter periods and the dips in red represent drier periods (Kennett et al. 2012).

Approximately 80 percent of the area types for these burials are residential with minimal representation of monumental areas within the data. This would make sense if all of the deceased were of low status, but little information was able to be determined for the social status category. There was also frequent re-entry into the chultuns throughout different time periods. This is seen through evidence of living individuals in the spaces as well as the addition of grave goods from later time periods. This may have a relationship with the concept with ancestor veneration discussed in previous sections. Less than half of the chultun burials had grave goods present (possibly due to preservation issues), but those that did have them contained an interesting array of items. These include many stone items (whole cobbles, projectile points, debitage, etc.) and ceramic vessels in particular. There were also additional artifacts, such as jadeite objects and obsidian blades. These items in particular are often correlated with individuals of a higher social status despite that overall lack of political status information presented by the data.

Bioarchaeological Analysis

Much of the known biological information of the deceased individuals in the chultuns is fairly limited. Only 8 sets of remains out of the 62 individuals sampled were positively identified as being either male or female with the occurrence of each sex being evenly split. This same limitation is present in the results for presence of articulation, body positioning, cranial positioning, and bodily orientation. For these categories, the majority of the burials are either classified as unknown or are not able to be included in the table at all due to missing data from the original field reports.

This lack of information within the field reports is due to two main reasons: poor preservation of remains/archaeological materials and the limitation of using archaeological reports with minimal skeletal data. Poor skeletal preservation is a common issue across the areas

of Maya occupation. This is a result of the "harsh taphonomic processes" in the region (Seidemann 1999). This includes extrinsic factors such as degrative soil types and the hot, humid climate of the area. There are also a number of discrepancies between archaeological reports when it comes to the condition and cataloging of the skeletal remains.

The main burial type present in the skeletal remains were multiple burials. This kind of burial makes up about 63 percent of the individuals in the database. Another 26 percent of the remains were categorized as unknown, eight percent are stated as primary, and two percent are listed as secondary. This information was heavily argued between reports as many of the multiple burials (which were multiple or chronological) were so intermixed that information regarding burial type was possibly lost (Jurasek 2023).Regardless, this idea potentially leans away from the often-held belief that all chultun burials are inherently secondary burial types.

Age categories and the presence of dental modifications were helpful in gathering more specific information regarding the individuals in the database. For the age category group, there were eight age classifications: fetal, infant, child, sub-adult, young adult, adult, old adult, and unknown. These categories were derived from the archaeological field reports, which did not frequently possess any age-range specific

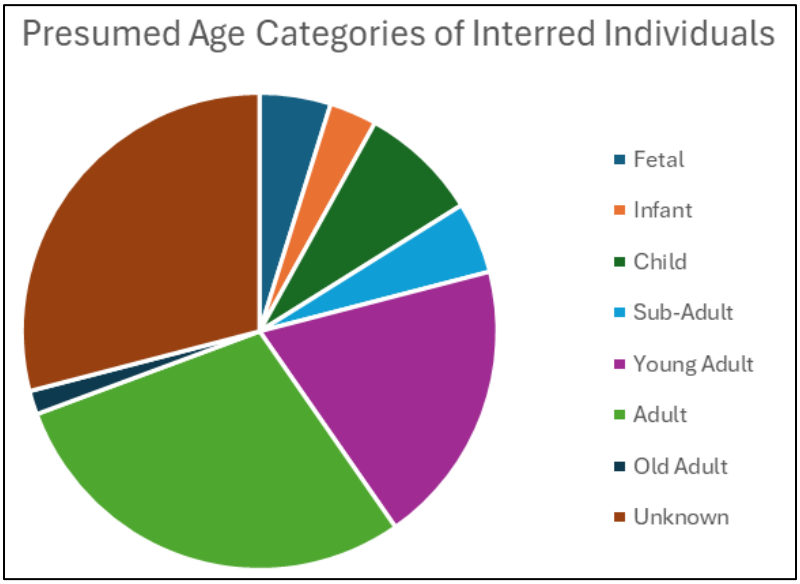

Figure 24. A pie chart representing the distribution of age categories within the chultun burials.

information for the corresponding remains. Out of the 62 individuals sampled, approximately 48 percent of the remains fall in either the young adult (19 percent) or the adult (29 percent) classification (Figure 24). The remaining identified skeletal materials represent the mainly younger end of the age spectrum with approximately five percent being fetal remains (of varying developmental stages), three percent representing infant remains, eight percent being child remains, and five percent representing sub-adults.

Little is known about the average life expectancy of members of the Maya cultural group. The only demographics that can be drawn upon are from Classic period and Post-Classic period settlements. According to a study conducted in 2015, the life expectancy at birth during the Classic period was roughly 20 to 42 years for the average individual (Olga Hernández Espinoza and Márquez Morfín 2015). This same study suggests the evidence of mobility and poor living conditions demonstrated by Post-Classic settlement groups likely a demonstrate a decrease in live expectancy and an increase in infant mortality rates (Olga Hernández Espinoza and Márquez Morfín 2015). These ideas fit well with the data for the chultun burials as the majority of the ages present in the sample group are within the 20-to-42-year life expectancy range. This also corresponds with the presence of remains from younger individuals such as infants and children.

The presence of dental modifications also provided more helpful biological data. There are 49 occurrences of dental modifications in the burials. Roughly 40 percent of the teeth with dental modifications are the C6 type (Figure 25, denoted in red on the chart). This number of modified teeth across 62 individuals represents a small number of people who had these types of oral procedures performed. This is likely due to one main reason: social status.

The process of creating dental modifications typically required copious amounts scratching, filing, and drilling into the surface of the teeth (Tiesler et al. 2017). Modifications that required deeper indentations utilized drilling past the enamel of the tooth (Tiesler et al. 2017). This often led to pain and increased sensitivity in the teeth following the procedures. An individual's diet would need to fluctuate and change to accommodate this. These procedures would also take time to accomplish without disrupting important aspects of the teeth. The time, effort, and potential dietary fluctuation it took to create these "looks" suggest an abundance of time and/or money that may be associated with social status.

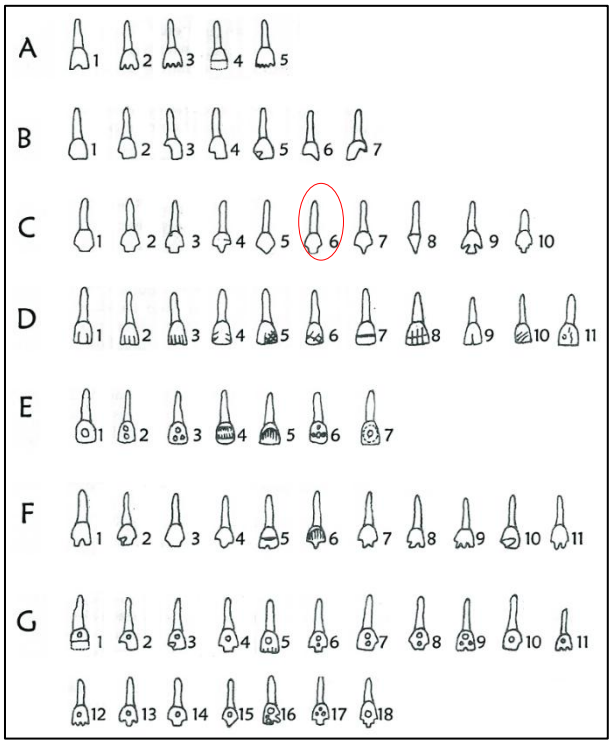

Figure 25. A chart demonstrating the different dental modifications of the Maya (Quintanilla 2015).

Spatial Analysis

It is unlikely that the geographical components of the spatial analysis are directly related to the placement of the chultun burials. The elevation and slope values of the burial locations being frequently low is due to the widespread flatness of the non-mountainous regions of Belize. These levels only increase towards the Cayo District where the Maya Mountain Range begins. As for the shared soil type, Leptosol-based soils cover approximately 70% of Belize. This makes it the most prominent soil type in the country, so it is unsurprising that the burial locations happened to be in areas with this soil type. The placement of the burials near the prominent

rivers is likely due to the pre-existence of the archaeological sites to the chultun burials. This information is a point of significance in and of itself. It further utilizes the concept of ancestor veneration through the idea that the Maya wanted these individuals to be in and around centers of importance along with being a part of everyday life. The overall proximity to major cave sites, or lack thereof, can likely be attributed to the privatization of information for other cave locations.

Conclusion

This investigation into Maya mortuary practices in the case of chultun burials in Belize has demonstrated evidence of patterns that signify that this practice is a connected trend rather than being a series of singular endeavors without influence on one another. As research into the topic continues, the complexity of this funerary practice continues to grow. The cultural and bioarchaeological data demonstrated that there were visible peaks in the "trendiness" of chultun burials and relevant age categories that may correlate with the Late/Terminal Classic collapse and its aftermath. The burial type skewed towards multiple or chronological burials sheds doubt on previously held beliefs regarding the inherent nature of chultun burials. The presence of dental modifications and high-quality grave goods may represent a connection to heightened political status that is not represented in other data categories. The spatial component of this research does not show much, if any, connection between the burials based on geography. The connection between locations is likely due to the desire to have the deceased be in close proximity to everyday life (i.e. ancestor veneration).

Limitations

The main limitation of this research is that there is much argument without any helpful data generation regarding the broad purpose of chultuns or how they are relevant to Maya burial

contexts. This leaves a substantial gap in the literature in which there is nothing to compare my findings and analysis to. Additionally, the field reports that were used for this research were extremely limited in information regarding the chultun(s) that had been discovered and investigated. This is particularly true for the skeletal data but is present in the data collection for chultun burials overall. These issues may be a result of limited time and funding given to archaeological groups to excavate/catalog the site areas as well as the consistent poor preservation in the area.

Future Research Opportunities

The interpretations of this project can be greatly expanded upon for future research opportunities. One option for future research would be adding additional burial samples. The samples for this research were limited as was the detail that was able to be derived from the archaeological field reports. A larger sampling of burials would increase the ability of future research to either corroborate or negate the assertions made in this project. Another avenue of investigation would involve focusing on more specific aspects of either the cultural or bioarchaeological information generated by the chultun database. There was a vast quantity of information between all 62 samples, some of which did not get as much focus as what could be achieved by a narrower study. On a spatial level, it could be helpful to incorporate more data layers that analyze other features such as archaeological site locations or additional geographic details. This would allow for a more in-depth analysis of how the geography of the chultun burial locations factor into their overall significance. Another avenue would involve the inclusion of chultun burial locations/data for other areas within the Maya region to see cross-regional variances.

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