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Underground Identity, Memory, and Political Spaces: Archaeological Investigations of the Classic Period Maya Ceremonial Karstscape in the Pacbitun Region, Cayo District, Belize

A Dissertation submitted in partial satisfaction
of the requirements for the degree of

Doctor of Philosophy

in

Anthropology

by

Jon Spenard

December 2014

Dissertation Committee:
Dr. Karl A. Taube, Chairperson
Dr. Wendy Ashmore
Dr. Scott Fedick
Dr. Terry Powis

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The Dissertation of Jon Spenard is approved:

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Committee Chairperson

University of California, Riverside

ACKNOWLEDGEMENTS

And thus ends my journey to the beginning. For as long as I can remember, I have always wanted to be an archaeologist. One of my earliest memories is digging in my mom's garden as a toddler and finding an "ancient artifact." She did not have the heart to tell me then that it was just a ham bone our dog had buried, but in that moment of discovery, I knew I was going to be an archaeologist! A few years later, in sixth grade, I became fascinated with the Maya after watching a movie on them, and my career path was clear, I was going to be a Maya archaeologist! This dissertation thus represents that dream come true for me, but as with all such journeys, I could have not have done it without the support, encouragement, and love of many along the way.

I could not have asked for a more inspiring, supportive, and overall world-class dissertation committee than Karl Taube, Wendy Ashmore, Scott Fedick, and Terry Powis. They have each provided helpful advice and words of encouragement as I navigated the trials and tribulations of graduate school and the research process. They gave me the freedom to explore my ideas, but kept me grounded, and each has profoundly impacted how I understand the Maya, the world that I live in, and my place in it as an archaeologist. Karl's depth of knowledge of Mesoamerican iconography, ethnohistory, and ethnography, is unmatched, and he has opened my eyes to the wealth of cultural data found in art, as well as the deep connections between the pre-Hispanic and contemporary cultures of North and Central America. Through many conversations and coursework with Wendy, I have developed the theoretical framework of this dissertation.

I am grateful for many reasons for having the opportunity to assist her with the Qulepa publication, most pertinent here is that opportunity showed me how to think about space diachronically, as well as helped me further develop my computer-aided drafting skills used to make many of the drawings in this dissertation. Scott has shown me the benefit of understanding the total environment and history of the landscapes that we study, from the deepest bedrock to the impact of meteors, and how these events, often in the deep geologic past, set the stage for pre-Hispanic Maya culture to flourish. Terry kindly welcomed me on the Pacbitun project, giving me free reign and full support to investigate whichever nook and cranny of the karstscape I encountered. Our conversations about cave use by the pre-Hispanic Maya have kept me on my toes, and often challenged me to rethink several of my long-held beliefs about them.

In addition to my committee, I would also like to extend my thanks and recognize T.S. Harvey, Travis Stanton, and Tom Patterson from UCR, and Stella Nair (formerly UCR, now at UCLA) for their contributions to this dissertation, their support and advice over the years, and for the knowledge and wisdom they have shared with me. I want to thank T.S. for sitting on my orals committee and the career and research advice he offered leading up to and during that event. I also want to acknowledge his Language and the Body in Healing class that remains one of the most thought provoking courses I have ever taken, and that remains a strong influence in my research. Travis has provided continual support and encouragement during the last stages of my graduate career, particularly as I prepared this dissertation. I also want to thank him for sitting in as a substitute committee member at my defense. His insights and comments there have

helped greatly, particularly with thinking how to move forward to the next stage of research. With a welcome email explaining his open door policy to my incoming cohort back in 2007, Tom has always been willing to have conversations about anthropological theory, teaching philosophy, and professionalism, or simply has been there offer a few words of advice and encouragement throughout my graduate career. I extend my thanks also to Stella Nair, now at UCLA for serving on my orals committee, and sharing her expertise on the Andes.

Several institutions provided financial support for this project. I received funding from the University of California Center for Ideas and Society, and The Waitt Institute-National Geographic Society. Petzl provided a corporate sponsorship, and donated caving gear. This project also benefitted from grants and other financial support awarded to Dr. Terry Powis from Dumbarton Oaks, the Alphawood Foundation, and the Department of Geography and Anthropology, and the Dean's Office, College of Humanities and Social Sciences, Kennesaw State University.

I want to express my gratitude to Drs. Jaime Awe, and John Morris, as well as the entire staff of the Institute of Archaeology in Belize for granting permission to Terry Powis and the Pacbitun Regional Archaeological project to work in and around Pacbitun, and for allowing us to export the ceramics and paleoethnobotanical materials for analysis. I also want to acknowledge Jaime for introducing me to cave archaeology as a field school student on the Western Belize Regional Cave Project, and for offering me the opportunity to return as a staff member. His continued support over the years, and

especially his encouragement to return to Belize for this dissertation project are greatly appreciated.

I want to say thank you to Jim Brady whose research and dogged determination made a space for cave archaeology in Maya studies. Without his pioneering efforts, this dissertation would not have been possible. On a more personal note, I want to thank him for always being willing to provide advice, offering feedback on my research, and support in general whenever I asked. I feel particularly lucky for his willingness to take time away from the BAS to come out to Pacbitun so that I could show him Actun Lak and the NTC. Our subsequent conversations from that visit helped shape my analysis and the conclusions made in this dissertation. I also want to say thank you for providing helpful feedback and insight on my history of Maya cave archaeology chapter.

Ronald Bishop and Erin Sears must be commended for their determination in battling the forces of nature, a government shutdown, and multiple computer glitches to ensure that the INAA analysis was completed. I also thank them for their friendship and support to "just get it finished" since I began my graduate career.

Joe Ball of San Diego State University, and Brent Woodfill of the University of Minnesota helped identify several problematic specimens, and conversations and informal ceramic workgroups that I participated in while in Belize with Jaime Awe, Reiko Ishihara-Brito, Shawn Morton, Carmen McCane, and Cameron Griffith reoriented me to Belize Valley ceramics at the start of my analysis. Lisa LeCount and Laura Kosakowski also provided advice and referred me to many sources unknown to me that helped greatly when finalizing my ceramics chapter. Maya Klingler is thanked for her

help with the ceramic analysis, and for helping to keep me grounded during the process. I hope someday you make it to Tulum!

On the PRAP, I want to again thank Terry Powis for inviting me on the project and offering his full support to complete the work. Co-director, Jennifer Weber and I have often had many stimulating debates about the role of caves in Maya society, what constitutes the built environment, and Maya perceptions of the landscape that have challenged me to think about my research in different ways. This dissertation is, in part, a reaction to those debates. I also want to thank her for her general support and friendship since I joined the project. Megan Dakota Parker is thanked especially for her willingness to include my ethnobotanical samples in her Master's research. The data from that project has offered a fine level of detail that would have otherwise been unavailable to me. Norbert Stanchly is thanked for his support and expertise along the way, especially on the scant (except for the sloth!) faunal material that I recovered, and for sharing his knowledge of architecture as I wrapped up this project. George Micheletti is thanked for his enthusiasm, sing-alongs, and willingness to help out when needed. R. Bryan Reece is thanked for his willingness to climb up to Sak Pol Pak every day to supervise the excavations up there. Getting there is certainly not a leisurely horseback ride! Thank you, Arianne Boileau for your willingness to help out wherever necessary, particularly when excavating Actun Lak. I extend my thanks to Kong Cheong, Linda Howie and Sherman Horn. I also want to say thank you to the PRAP field school students who assisted in most aspects of this research including the excavations and mapping of most of the karst features, and for their willingness to share their many keen ideas and observations

throughout the time they spent with me. Their feedback and commentary on the excavations profoundly impacted my interpretations. From the 2011 field school, I thank, Jessie Griggs Burnette, Lindy Crapps, Tammy Davis, Chancy Gatlin, Annie Goodman, Laura Holt, Brandie Wilkie, Mike Lawrence, George Micheletti, Craig Quertermous, Kathryn Ragan, Nikki Silva, Matt Wachstein, and Michael Weaver. From the 2012 field school, I thank Laura Chapman-Boardman, Mollie Gilstrap, Megan Hoogstad, Jamison Jewitt, Jonathan Parker, Amanda Schultz, Keener Smith, Carrie Tucker, and Jeffrey Turner.

In my experience, doing Maya archaeology involves working closely with local populations, and PRAP was no different. This research has benefitted greatly from many stimulating conversations I have had with our local collaborators from San Antonio, and I thank them for sharing their knowledge and stories with me, and for taking me under their wing to help me begin to learn to speak Mayan. To my San Antonio *sukunob* (brothers), Javiar Mai, Oscar Mai, John Mai, Lute Mai, Derek Bol, Selwin Bol, Rene Mai, Gary Canto, Joe Tzul, Adamar Mai, Antonio Mai, Minor Mai, Jimmy Mai, Habib Mai, Elmer Mesh, Ramero Mai, Javier Mai Jr., and Antonio Farias, I say thank you! I would also like to single out Fidencio Bol for a special thank you for allowing me access to his land, on which most of my research was conducted. I learned about his desire to protect the fragile archaeological record in the caves and rockshelters through many conversations, and I hope that he finds this dissertation useful as he continues that work.

This dissertation project would not have turned out nearly as well if not for the unmatched cave archaeology skills of Mike Mirro and C.L. Kieffer who were invaluable

for getting as much work done as we did. Together we entered the deepest pit that we found, explored the smallest hole, and everyone was able to make it out when doing so. We have also shared countless fruitful discussions about this project, and I thank them for keeping me honest throughout and for sharing their ideas about the Pacbitun karstscape with me. Their technical skills were invaluable and much needed, especially when exploring Actun Xux (we still don't talk about that!), and they must be credited for identifying many of the smaller components of the NTC. Mike dedicated long hours to producing the extraordinary maps that appear in this dissertation. With his attention to detail both in the field and on paper, they are truly works of art. In addition to mapping, Kieffer was always willing to help out wherever needed, whether it was supervising excavation units, taking field school students under her wing, or backfilling units.

As a field school student on Jaime Awe's BVAR/WBRCP project, I became great friends with a number of archaeologists, both staff and students, and they have remained a constant source of personal and professional support through the years. I thank Jim Aimers, Jaime Awe, Big Jim Conlon, Josalyn "peeper" Ferguson, Cameron "logistics ninja" Griffith, Sherry Gibbs, Raf Guerra, Christina Halperin, Christophe Helmke, Reiko Ishihara-Brito, Harri Kettunen, David Lee, Mike Mirro, Ness Mirro, Christopher "Omega Man" Morehart, Holley Moyes, Gonzo Pleitez, William Pleitez, Jeff "Jefe" Ransom, Rhan-ju Song, Brent Woodfill, and Peter Zubrzycki. Also in Belize, I thank William Hoffman for his friendship and a dependable ride, Dr. Francis Morey for a beautiful lab house to live in. To Guillermo from Erva's Restaurant, *bantiox* (thank you), for all the

logistical support while in Cayo, and your friendship, especially when I was wrapping up my lab work.

Brent Woodfill has been like a brother to me since we were on field school together back in 1998, and we have shared many memorable times together. Both being afflicted with wanderlust, we have spent many months exploring the Maya area together whenever work breaks would allow it, visiting countless sites along the way. Beyond the experiences gained from those trips, Brent has been a great support throughout this dissertation writing process, providing feedback about the content, offering words of support and encouragement along the way, and general survival tips. I also want to say thank you for the advice offered as I was preparing for my defense, and the valuable feedback given as I ran through the defense presentation "one more" time.

Many of the ideas developed in this dissertation have come from ongoing, years-long conversations with many of my fellow graduate students at UCR, several of which began in Core our first year. For us living next to campus, I was often amazed the walk home took several hours as Jay Dubois, Shyh-Wei Yang, and I continued the discussions from that class our first quarter. I also look back fondly at the countless hours spent discussing archaeological theory, school, and life in general with Michelle Butler and Nicoletta Maestri in their apartment, often over a nice home-made meal that I was regularly late for. These conversations have developed into life-long friendships, and I am happy to have shared in so many of your joyous life events, even if from afar.

Whether it be sharing a house, an office, or just running into one another in the hallway in Watkins, I also want to thank fellow UCR grads and alumni, Theresa Barkett,

Jennifer Chmilar, Lisa Delance, John Gust, Nick Hearth, Eric Heller, Priscilla Loforte, Dan Leonard, German Loffler, Kyle Lovell, Candy McGowan†, Ryan Mongelluzzo, Lauren Schwartz, Andrew Turner, and Matt Yacubic for their friendship and many stimulating conversations over the years. Thanks are also especially due to Jay Dubois, John Gust, German Loffler, and Catharina Santasilia for their helpful comments and suggestions as I made the final preparations to my defense presentation, and to Lisa Delance who took on some of my TA duties so that all would run smoothly throughout my last quarter. I also want to recognize again, John Gust and Ryan Mongelluzzo for coming out to the Pacbitun karstscape when they were in town and providing their feedback on what I was finding. Thank you, also to those UCR alumni who I came to know from the SAA while pursuing my Master's at Florida State, for introducing me to the UCR anthropology community, particularly, Chelsea Blackmore, Kata Faust, Christina Halperin, Reiko Ishihara-Brito, Ryan Mongelluzzo, and Shankari Patel.

The staff of the Anthropology Department has always gone out of their way to offer assistance throughout my graduate career, whether it be classroom issues, offering life advice, or simply a few words of needed encouragement. For that and more, I say, "Thank you!" to Lilia Liderbach-Vega, Becky Campbell, and Anna Wire. I extend that thanks to Teri Carter of the University Writing Program, for helping me navigate the intricacies of teaching for that program, and her enthusiasm for this project.

From my time at Florida State University, I appreciate Mary Pohl, Kathryn Josserand†, and Nick Hopkins for the time spent helping me improve my writing, and for providing me a wealth of research opportunities as I searched for a thesis project. They

also introduced me to Karen Bassie, who has been a consistent source of professional and personal support and encouragement throughout my graduate career whether it be an invitation to work in some of the more extraordinary archaeological caves in Chiapas, to travel to Calgary for the Chacmool, or simply listen and offer advice along the way.

Thanks are also in order to my anthropology mentors and friends from Franklin Pierce College, who got me on the right track after a bit of a stumble early on (I'm looking at you, Nan!), particularly, Kelli Malone, Nan Reckart, Howard Hecker†, Kimberly Parent, Rene Walker, Nathan Buzby, Heather McLeish, Judy McCashlund, Amy Spencer, Chris King, Paul Wagner, and Alice Stearns. To all of you, I say thank you! I am grateful that many of us have been able to stay in touch all these years, and your messages of cheer and encouragement have always been appreciated.

As I wrap up these acknowledgements, I must now turn to my families to recognize all that they have done for me, allowing me to accomplish this life-long goal. I want to start with the McKinney clan, my soon-to-be-family. They have welcomed me with open arms and hearts as a member of their family from day one, always providing a much-needed respite from my studies, and throwing their full support behind me as I pursued my degree. I cannot begin to thank them enough for all they have done.

From the day that I declared that I wanted to be an archaeologist, my family on the East Coast has stood by me, unwavering in their support as I pursued my dream, no matter what corner of the world it took me to. They have signed waivers against their better judgment, provided financial relief when funds ran low, and most importantly have

showered me with endless love and encouragement throughout this journey. Simply put, I would not have made it where I am today without all their help along the way.

I reserved the biggest thank you to my fiancée, Amy McKinney, who I know I have asked too much of as I wrapped up the last few years of my graduate studies. You have been my pillar, an unwavering source of love, support, and encouragement–and too many great meals to list! Even as I have had to lock myself away in the office to finish whatever writing project was due soon, or leave the country for several months, you have stood by me, cheering me on, and somewhere along the way decided you want to marry me! You have made this dissertation possible, and it belongs as much to you as it does me. As this part of my journey comes to and end, I could not ask for a more incredible and perfect person to start the next leg with. I love you, Boo!

In loving memory of Charles and Norman, two great men I miss dearly.

ABSTRACT OF THE DISSERTATION

Underground Identity, Memory, and Political Spaces: A Study of the Classic Period Maya Ceremonial Karstscape in the Pacbitun Region, Cayo District, Belize

by

Jon Spenard

Doctor of Philosophy, Graduate Program in Anthropology
University of California, Riverside, December 2014
Dr. Karl A. Taube, Chairperson

Regional archaeological investigations were conduced in the limestone karst landscape surrounding the pre-Hispanic Maya center of Pacbitun, Cayo District, Belize. The components of this "karstscape" range from large caverns to diminutive outcroppings, most containing evidence of pre-Hispanic Maya ritual use. Investigations focused specifically on Actun Lak cave, the Nohoch Tunich Bedrock Outcrop complex, and Actun Naj Che rockshelter, although others are discussed, all revealing an extensive, but subtle program of architectural modification connecting several of them, and indicating them as components of culturally significant places. The objectives of this study are illuminating the range of landmarks subsumed under the pre-Hispanic concept, *ch'een*, a term commonly glossed as cave, but referring to any hole in the ground, understanding who used the karstscape, and providing insight into the social significance of it for the surrounding communities. Data were gathered during three stages of

fieldwork, including regional reconnaissance; initial investigations, involving surface collecting, mapping, and photography; and lastly, extensive excavations, followed by laboratory analyses, with a subset of ceramics subjected to Instrumental Neutron Activation Analysis. Overall, the data reveal members of the Pacbitun polity began using the karstscape in the Late Formative (300 B.C.-100 B.C.) through the early Postclassic (A.D. 900-1200), with most activity occurring during the final two centuries of the Late Classic (A.D. 700-900). They also demonstrate a previously unsubstantiated connection between Pacbitun and the major center of Xunantunich during that later time. Interpretations employ the cartographic idea that shifting interpretive scales of resolution obtains a wealth of social information from a landscape. In particular, the unruly character of the modified spaces indicate a purposefully crude aesthetic mimicking nature employed in their construction, possibly used in transforming parts of the karstscape into a pleasure park. Alternatively, Actun Lak is rich in water symbolism, and its earliest use inscribed it as the primary rain shrine for the Pacbitun community. One of the last Pacbitun kings drew on that memory of place in the final century of the Late Classic period, transforming the cave into an elaborate royal performance stage in a last-ditch, yet ultimately unsuccessful, effort at restarting the failed weather system.

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CHAPTER 1

A SOCIAL APPROACH TO THE PRE-HISPANIC PACBITUN MAYA RITUAL KARST LANDSCAPE

As a cave archaeologist doing regional survey, I have spent countless hours traipsing through the Maya forest on my way to the next cavern, sometimes on trails, but often times through thorny brush following my guides as they try to remember how to get to this one they stumbled on once twenty years ago while hunting at night. I have never paid much attention to the land as I crossed it, except when pricked by the thorns, but rather, I spend most of that travel time in my head, imagining the grandeur and beauty, mostly the former, of the cave that I will soon be entering, if we find it. When we do, we put our packs down to regroup outside of the entrance, commonly in the small naturally clear areas and nooks against the exposed bedrock face into which the cave penetrates. Later, as I pick up my pack to enter and start my investigations, I invariably see a scattering of artifacts in the alcoves and cleared areas my team and I were just sitting in, but the real work begins inside and so we get moving, paying no heed to these small spaces and the artifacts they contain. Even the map I am about to make will begin at the dripline, and anything outside of it is never even considered for inclusion because I perceive it as not part of the cave, and therefore, it is unimportant.

Thus began my regional cave survey around Pacbitun, a pre-Hispanic Maya city inhabited between at least 900 B.C. and A.D. 900, and located immediately adjacent to

the cave-rich limestone foothills of the northern Maya Mountains in central western Belize, but my appreciation of these smaller spaces changed quickly (**Figure 1**; Healy et al. 2004). I started my investigations halfway down a steep but navigable hillside at Actun Lak (Pottery Sherd Cave), a 43 m-long cavern, whose name was given by the local landowner in reference to the thick blanket of ceramic sherds covering all of its surfaces. My travels here for work would ultimately be responsible for redefining how I understood the seemingly insignificant spaces outside of the caves, as well as those that sit in isolation from them. While scrambling up the steep hill on my second day, I slipped on wet patch of leaves and found myself looking up at a small overhang on the underside of a boulder beneath which were the architectural remnants of a small step or wall (**Figure 2**). A few days after that, I was directed to a shorter, less steep trail that led to the cave. This newly revealed path wove in, around, and over a structurally complex, isolated hilltop bedrock outcrop above Actun Lak, containing a massive boulder with an overhang, a crevasse that formed along a joint in the limestone, a partially collapsed karst window, multiple small caves, several diminutive and one large rockshelter, as well as other nondescript nooks and crannies.

The outcrop, which I later called the Nohoch Tunich Bedrock Outcrop Complex, (NTC), meaning "Big Rock," caught my attention because pottery and slate are ubiquitous in all of its features, the latter of which is not native to the immediate area, but rather found in a streambed that leads into Rocky Crab Cave, a massive cavern directly below Actun Lak. Because of the ubiquity of the artifacts, I began to explore the NTC, and as I did, I encountered extensive yet subtle architectural and other modifications, in

patterns reminiscent of those features commonly found in caves (**Figure 3**). These findings demonstrated that the pre-Hispanic Maya invested significant energies in transforming these features into cultural spaces, and therefore such places must also be included in my regional "cave" survey.

Pacbitun has undergone three primary phases of research, the current of which is the Pacbitun Regional Archaeological Project (PRAP), beginning in 2008 under the direction of Dr. Terry Powis of Kennesaw State University, Georgia. These three phases of studies have gleaned significant insights into the developmental and social history of the site, the lives of its inhabitants, and knowledge about its hinterlands; nevertheless, the surrounding caves and rockshelters have yet to be the subject of systematic archaeological investigations, even though several have been located in the area (Flavell et al. 1994; Francis et al. 1995; Healy et al. 1996; Hollings 1996; Powis 2010b; Valdez et al. 2011; Weber 2011b; Weber and Powis 2011). This dissertation aims at illuminating that relatively unknown aspect of pre-Hispanic Pacbitun, and as such represents the first long-term, systematic archaeological investigation of caves, rockshelters, and other karst features in the region.

I employed a multi-stage research strategy aimed at understanding general patterns of regional ritual landscape use with in-depth studies of select karst features. I began by performing regional reconnaissance, identifying sites for further study, and then implemented varying stages of documentation and investigations ranging from surface collections to excavations, and sketching to detailed tape and compass mapping. One pattern that became immediately apparent was that the types of ceremonially used

diminutive karst features I saw in the NTC are ubiquitous in the Pacbitun region. This observation seemed to verify that the recent recognition that the Maya considered nearly any hole in the ground to be a *ch'een*, a word discussed more fully in Chapter 4, but suffice it to say for now, indicated a portal to earth dwelling supernaturals and ancestors (Vogt and Stuart 2005). Related to this observation is that the Pacbitun Maya extensively, yet subtly modified most of the features, regardless of size by snapping speleothems, moving and importing into the features large quantities of stone, and building architectural constructions and rock alignments, most functioning as space delimiters. In total, I documented 75 karst features, 49 for the first time, although only those subject to more intensive investigations are discussed in this dissertation. However, my investigations focused largely on the first range of foothills of the Maya Mountains within a 2 km range south of Pacbitun, and as such this number of karst features undoubtedly represents only a small fraction of the total number in the region.

Thesis Statement, Theoretical Overview, and Definitions

This thesis argues that applying a multiscalar investigative and interpretive landscape approach to karst archaeology allows for consideration of caves and rockshelters in addition to other features traditionally overlooked by the discipline, while recognizing them all as similarly inscribed through ritual practice with socially

significant information about pre-Hispanic Maya cosmology, world-view, and sociopolitical organization (Bender 2001a:83-84; Bender et al. 1997:169; Crumley and Marquardt 1990:75; Fedick 1996a:335; Zedeño and Bowser 2009:7). I follow several others understanding landscapes as ever emergent social processes to be contended with rather than passive backdrops upon which culture is enacted (Ashmore 2004b; Basso 1996:107-108; Bender 1993, 1998:25-38, 2001b:3; David and Thomas 2008:30; Feinman 1999:685; Hirsch 1995; Inglis 1977:489; Ingold 1993:162; Morphy 1995). In other words, landscapes shape and are shaped by cultural practices, creating over time a material record encoding that history (Stewart and Strathern 2003:1). However, cultural preference determines which aspects of the world are significant, those that are not, and how to interact with them. Therefore, I submit that information about pre-Hispanic Pacbitun Maya society can be understood by identifying the types of karst features used and how they were (Ashmore 2002).

My discussion relies on differentiating between space and place. Certainly, both are social constructs as many archaeologists and social theorists have noted, but they differ significantly (Ashmore 2002; Carmichael et al. 1994; Casey 1996, 1998; Feld and Basso 1996; Lefebvre 1991; Low and Lawrence-Zúñiga 2003). I understand space as a delineated, physical location for which the range of possible uses is culturally constrained but otherwise undefined. On the other hand, places emerge by repeated actions inscribing areas as a socially significant component of the world, and as such their boundaries are blurry and loosely defined. Neither is necessarily limited in size; however, the places I discuss vary widely in magnitude including a cave, a political territory, and regions.

Alternatively, the spaces I investigate are components of the places and are thus smaller in scale, delineated by localized architectural constructions and other modifications.

Undoubtedly, the Pacbitun Maya extensively modified their surrounding environment for quotidian means. Most notably by flattening the hilltop on which the site epicenter sits, constructing a complex causeway system, and terracing hillsides, all leaving lasting impressions on the land remaining visible today, although in variable states of disrepair (Healy 1990a; Healy et al. 1980; Micheletti and Powis 2014; Spenard et al. 2012; Weber 2011a, 2011b). However, my investigations concentrate only on select landmarks used and modified for ceremonial purposes including caves, rockshelters, boulders, chasms, bedrock faces, and small, unique karst features for which satisfactory labels are nonexistent. As such, the moniker "cave archaeology" is too restricted for describing the scope of the present study, and "karst landscape archaeology" is too broad due to the quotidian modifications to it mentioned above (Healy et al. 1983; Healy et al. 1980; Weber 2011b). "Sacred landscape" (Knapp and Ashmore 1999:1) and "ceremonial landscape" (Ashmore 2008:167) are also too general because those terms connote a wider variety of components of the natural and built environments than considered here. Instead, I refer collectively to the geographic landmarks that I studied as Pacbitun's ceremonial karst landscape, henceforth shortened to karstscape for ease of discussion, and use the term "karst feature," rather than cave, as a general referent for individual components. Nevertheless, I maintain the primary tenants of the socialized landscape approach detailed above.

Outline of the Dissertation

Nine chapters comprise this dissertation, with this first one providing a brief introduction to the topic, the thesis of the dissertation, and definitions of important terms and ideas. Chapter 2 is a comprehensive overview of the environment and geologic past of the Maya area, including the study region. It reveals how plate tectonics, ocean floor sedimentation, geologic uplift, and a series of volcanic events, coupled with hydrological and other environmental factors led to the karstification of the study region and the creation of the geological formations that the raw materials for many stone artifacts came from. Chapter 3 discusses the previous archaeological work at Pacbitun, the developmental trajectory of that site and its territory, and simultaneously offers a general diachronic overview of the lowland Maya. This discussion situates my research within the previous and ongoing work at Pacbitun, demonstrating little was known about the karstscape prior to my investigations, while the developmental trajectory places its ritual use into the context of that site's past. The presentation of general patterns of Maya history identifies external factors, particularly warfare and alliances in the Late Classic period, influencing Pacbitun and the karstscape's material record. Chapter 4 discusses the origins of Maya cave archaeology and current interpretive paradigms, situating my dissertation within the subdiscipline. In particular, it reveals an investigative bias towards large cave and rockshelter use in the Classic period, to the near complete exclusion of other smaller types of ritually used karst features. The chapter also demonstrates that the Maya perceived almost any hole in the ground to be access points to subterranean

dwelling, supernatural beings, specifically the rain god, Chahk; furthermore, it shows the pre-Hispanic Maya considered mountains as living water receptacles that exhaled billowing rainclouds from their cave maws.

Chapter 5 details my field investigations, provides descriptions of the karst features I studied, and clarifies my data collection strategies, revealing how the karstscape modifications were constructed. Chapter 6 focuses on methods and general results of my type-variety and instrumental neutron activation pottery analyses, defining temporal and intersite distribution patterns, and how those data materialize broader socio-political and territorial relationships. Most significantly, the results define Pacbitun's late Late Classic period political territory, and indentify a heretofore unproven connection between that site and Xunantunich. Chapter 7 provides the methods and results of my non-ceramic artifacts analysis, revealing long-distance exchange relations with the Caribbean coast, highland Guatemala, and the Motagua River Valley, as well as Pacbitun's involvement in the Ahk'utu' molded-carved vessel production industry. Chapter 8 socializes the Pacbitun karstscape whereby I place Actun Lak and the modifications made to the karstscape in general into broad interpretive frameworks aimed at understanding the impact these places had on the Pacbitun community over time, as well as how they reflected cosmology and world-view. In particular, I discuss Actun Lak's changing role as a community rain shrine throughout the Classic period, and how external factors including drought and increased population pressure, changed the way that rituals were performed there. In interpreting the modifications made to the karstscape, I demonstrate how their construction techniques reflect Maya conceptions of

wilderness as a source of beauty and paradise, and propose that the NTC specifically may have been designed as a park-like place. Chapter 9 concludes the main body of the dissertation, providing a summary overview of my findings. Four appendices follow, with the first, Appendix A, containing all figures called out in the main body of the text, and numbered sequentially through the chapters. Appendix B provides plan and profile maps of excavation units; however, only certain ones are provided because many levels were simply soil, while several units lacked stratigraphy. Compiled in Appendix C are the results of the type:variety:mode ceramic analysis, as well as rim profiles and drawings of other diagnostic pieces. Appendix D is an ethnographic compilation of short stories, and vignettes about landscape-dwelling supernatural beings and forces as told to me by residents of San Antonio Village.

CHAPTER 2

ENVIRONMENTAL SETTING AND GEOLOGIC HISTORY OF PACITUN

Belize is located in Central America, bordered to the west and south by Guatemala, the Mexican states of Campeche and Quintana Roo to its north, and to its east is the Caribbean Sea (**Figure 4**). Pacbitun is on the southern rim of the Belize Valley in the Cayo District of western Belize (see **Figure 1**). It a completely landlocked settlement situated away from the rivers and tributary creeks defining the greater Belize River watershed, but it is just north of the Maya Mountains at the intersection of several environmental ecotones and geologic transitions. The karst features I investigated are all south of Pacbitun in the limestone foothills of the Maya Mountain, rising up from a tectonic fault called the Northern Boundary Fault. Although I interpret the karstscape investigated for this dissertation as a palimpsest-like record of ceremonial interactions between the Maya and their world, a series of major geologic processes were responsible for the karstification of the region, and therefore, the majority of this chapter focuses on that deep past. Nevertheless, my main goal in this chapter is understanding the broader environment that influenced the ritual lives of the pre-Hispanic Pacbitun Maya; therefore, I also consider the climate, soils and hydrology, and flora and fauna of the region. Because these environmental factors variably impacted the karstification of the region, I discuss them first and then proceed to the geology.

Environmental Overview

Climate

Belize has a subtropical climate with summer temperatures ranging from 24 to 33º C, and between 16 and 28º C in the winter (Hartshorne et al. 1984:11; Wright et al. 1959:15). The Maya Mountains share the same seasonal pattern, but the temperatures there are typically cooler by several degrees. Rainfall throughout the country fluctuates annually, but consist of distinct dry and wet seasons. The former occurs from January through April or May, while the latter reaches its peak between July and October, although continuing through December. Average rainfall and number of rainy days vary considerably locally with the northern half of the country receiving between 1524 and 2540 mm, and the south portion between 2032 and 4064 mm per year (Wright et al. 1959:18). Around the north and northwestern portion of the Maya Mountains is a rain shadow where average annual rainfall varies by up to 1000 mm over a few kilometers (Campbell et al. 1996:71). The effect of this rain shadow for Pacbitun is significant, but discussed in more detail below. San Ignacio town has the fewest average rainy days per year at 125, while Punta Gorda in the south of the country experiences over 200 (Wright et al. 1959:18). Data from San Antonio village, the closest contemporary settlement to Pacbitun, is currently unavailable.

Soils and Hydrology

The Pacbitun region is naturally divided into two distinct geographic zones, the gentle rolling hills and alluvial Belize Valley to the north and west, averaging between 200 and 300 m in elevation, and the Maya Mountains to the south and east, rising rapidly to between 700 and 800 m (Miller 1996:104). In the northwest corner of the Maya Mountains is the Mountain Pine Ridge, a complex series of granitic batholiths beginning two km south of Pacbitun, whose presence played a significant role in determining the pre-Hispanic settlement patterns in the region. Its soils are siliceous and prone to erosion making them low in nutrients and incapable of supporting agriculture, and thus habitation (Hartshorn et al. 1984:3; Wright et al. 1959:173). The remainder of the soils in the Pacbitun study region is calcareous and highly fertile. Reconnaissance trips to the east, west, and south of the site's epicenter have identified regular settlement and landscape modifications in all fertile areas, but evidence of habitation is noticeably absent where the siliceous Mountain Pine Ridge soils are encountered (Spenard 2011a:38-39; Spenard et al. 2012:139-141). Nevertheless, the presence of a shrine feature to the south and extensive ritual use of all known cave features there suggests the region held religious significance for the pre-Hispanic Maya, even if they lived elsewhere (Anderson 1962; Bullard 1963; Mason 1928; Pendergast 1970; Spenard 2011a:38-39). The Mountain Pine Ridge was also an economically significant source of pine, granite, and slate (Graham 1987a; Healy et al. 1995; Morehart et al. 2005; Ward 2013; Ward and Micheletti 2013).

As mentioned above, local perennial waterways are absent around Pacbitun, with the closest being Barton Creek and the Macal River, 7 km to the east and west of the site respectively. The Belize River is 12 km to the north, and the Rió On-Privación Creek is 6 km south. Although seasonal creeks do drain off the Mountain Pine Ridge towards Pacbitun, the two largest enter caves before reaching it (Francis et al. 1995:12, 15-17; Spenard 2011a:34, 36). Other sources of local water are multiple springs that dot the landscape, several showing evidence of pre-Hispanic modification (Healy et al. 2007; Spenard 2011a:42, 2012a; Spenard et al. 2012; Weber 2011a:13, 2011b:42). Settlement clusters are often found adjacent to these springs indicating that they were important and easily accessible sources of water for the pre-Hispanic population (Spenard et al. 2012).

Both creeks and springs are rain-fed, and thus susceptible to variations in precipitation, although the effects are less in the latter. As mentioned earlier, Pacbitun is located in a climatologically complex area due to the Maya Mountains rain shadow (Campbell et al. 1996:71). Rainfall averages can vary by up to 1000 mm per year over only a few kilometers in the area (Hartshorn et al. 1984:90). Pacbitun's epicenter, and the areas to the west and north are in a Subtropical moist zone, getting between 1300 and 2000 mm of average annual rainfall (Hartshorne et al. 1984:90). Elevated areas to the east and south consist of Subtropical Lower Montaine moist and Subtropical Lower Montaine wet ecological zones, the latter averaging over 2000 mm of rainfall annually (Hartshore et al. 1984:90, Figure II-3, Figure IV-16).

Creeks in the region remain stagnant and sometimes completely dry up unless persistent rains fall. For example, I observed the creek below Actun Lak stop flowing

three days after a week of intense rainstorms. On the other hand, the springs are likely connected to different karst drainage systems than the creeks because they retain some of their water throughout the dry season. In fact, they provided the only semi-dependable source of water in San Antonio until recently, but it is now piped into the village from Privación Creek. The switch was made because a severe drought impacted the area several years ago drying up all but one spring to the northwest of the village, approximately 5 km from Pacbitun. As discussed in Chapter 8, this vignette is particularly significant for understanding the demise of Pacbitun at the end of the Late Classic period because it demonstrates the impact of drought on the hydrology of the region, particularly considering the site is the only major settlement in the Belize Valley lacking direct access or territorial control to one of the perennial waterways.

Flora and Fauna

Differences in soils, elevation, and rainfall have produced three distinct ecological zones in the Pacbitun region today (Hartshorn et al. 1984). However, faunal bone recovered from the site core indicates that these zones were further delineated by the intensity of use and modifications made to the environment. Specifically, animals prefer particular habitats, and their remains indicate the presence of their favored environments in the region. Pacbitun and most of its surrounding settlement is located in the Subtropical moist ecological zone, consisting of broad-leaf tropical forest, home to the widest range of plant and animal life in Belize. The soils here are also the most fertile and

therefore, most likely to have been cleared for habitation and agriculture (Fedick 1994, 1995; Fedick and Ford 1990). Common wild tree species in this zone include: *Brosimum alicastrum* (breadnut, ramon), *Bursera simaruba* (gumbolimbo), *Ceiba pentadora* (ceiba), *Manilkara chicle* (chicle), *Manilkara zapota* (sapodilla), *Metopium browneii* (poison wood), *Orbignya cohulle* (cohune), *Pimenta dioica* (allspice), *Protium copal* (copal) and *Swietenia macrophyla* (mahogany; Arvigo 1992; Hartshorn et al. 1984:90; Schlesinger 2001:103-147).

Forest animals recovered from Pacbitun include deer, peccary, tapir, howler and spider monkeys, rabbits, paca, agouti, porcupine, rodents, armadillo, turkeys, curassow, turtles, crocodiles, frogs and toads, as well as the freshwater apple and *jute* snail shells (Healy et al. 1990; Healy et al. 2004:Table 13.2; Stanchley 1999). Of these animals, curassow, monkeys, and some peccary species prefer uncut, virgin forests. Other species of peccary, agouti, and armadillo prefer secondary growth forests. Deer, collard peccaries, turkeys, snakes, and rodents prefer cleared areas (Healy et al. 2004:221). The presence of riverine animals indicates that those locations were also used for subsistence. Aside from *jute* and a few other shells, the remains of a much older Pleistocene giant ground sloth, and a small quantity of bat and rodent bones, faunal remains were conspicuously absent from the entire karstscape assemblage (De Iuliis et al. 2014). On the other hand, large quantities of charcoal were recovered from most locations, the majority of which is pine (*Pinus* sp.; Parker 2014). Some hardwoods specimens were also recovered, although the only identified specimens are avocado, fig, and three types of legumes (Parker 2014:152, 168).

Subtropical Lower Montaine Moist and Subtropical Lower Montaine Wet zones share similar plant species, with their main differences being elevation and rainfall averages. Schlesinger (2001:75, 255) classifies these zones as a cross of pine-oak forest and savannah, primarily vegetated with two species of pine (*Pinus oocarpa*, *Pinus caribaea)*, oak (*Quercus)*, cypress (*Podocarpus guatemalensis)*, and nance (*Curatella americana)* trees. The higher elevations also have mountain cabbage palm (*Euterpe macrospadix)* and tree ferns (*Alsophila mysuroides*, *Hemitelia multiflora;* Hartshorn et al. 1984:90). The Maya are unlikely to have clear-cut these forests because these species thrive in soil that is of poor agricultural quality. Nevertheless, the recovery of large quantities of pine in Maya sites throughout Belize, coupled with the limited distribution of the trees in the country, indicates the Mountain Pine Ridge was likely a heavily utilized source for the wood, and thus susceptible to some cultural disturbance (Lentz 1999; Morehart 2002a, 2002b; Morehart et al. 2005).

Geologic Overview

This section provides an overview of the geological setting of the study area. It begins with tectonic histories from a pan-regional perspective, and continues by narrowing the focus to specific features that define the survey area. This comprehensive discussion is presented because the region of investigation is located at a multifaceted

geologic juncture of the relatively flat limestone Belize Valley, elevated Maya Mountains, and a complex set of granitic intrusions, all impacting cave formation processes. The section ends with a model of speleogenesis for the Pacbitun region based on this geologic history and regional hydrology. Considering how the caves were formed and the geology of the region informs about how the pre-Hispanic Maya in the Pacbitun region interacted with and manipulated the karstscape. The overall goal of this section is understanding the geological processes responsible for creating the karst features investigated for this dissertation. A geologic time scale given in **Figure 5** provides chronological context for the nonarchaeological periods discussed.

Pan-Regional Geologic History

This subsection provides a broad geologic overview of southern Mesoamerica and northern Central America, understanding the large-scale forces that formed the continental landscapes subsequently modified by regional processes. Additionally, it locates some of the raw material sources that made up parts of the artifact assemblages recovered in Pacbitun's karst features. Three major, ancient geologic events are primarily responsible for shaping the geography of southern Mesoamerica and northern Central America (Graham 2003:31). The first was the subduction of the Cocos-Farallon plate beneath the North American plate beginning in the Middle Cretaceous period roughly 100 million years ago (Meschede and Frisch 2002:5). The second was the collision of the Maya and Chortis tectonic blocks in the beginning of the Tertiary period around 66.4

million years ago, the former of which is part of the Cocos-Farallon plate (Donnelly et al. 1990:37; Torres-de León 2012:307). The third major event was a meteor impact near Chicxulub in the northern Maya block that happened around the same time that the latter collided with the Chortis block (Hildebrand et al.1991; Rebolledo-Vieyra et al. 2000; Urrutia-Fucugauchi et al. 1996). The Chicxulub impact greatly affected karst formation in the northern Yucatan Peninsula, but its influence on those processes in the Pacbitun region was minimal (Perry et al. 2002). As a result, it is omitted from further discussion, except to note that these three events created the landscapes that the pre-Hispanic Maya interacted with, and that are still present in the area today, the relatively flat, karst limestone lowlands, the metamorphic volcanic highlands, and the uplifted areas between them.

Most of the Maya region is located on the Yucatan Peninsula, the southern portion of a large limestone platform measuring approximately 350,000 km^2 in area, and extending northward into the Gulf of Mexico (Weidie 1985:1). Approximately half of the larger platform to the north and northwest is currently submerged while the other half is the continental land (Weidie 1985:1). Geologists refer to these individual sections as the Campeche Bank and Yucatan Peninsula respectively, but together, make up the Maya block (Weidie 1985:1). In total, it encompasses Belize, northern Guatemala, and southern Mexico from the Yucatan Peninsula states to the Isthmus of Tehuantepec (Rebolledo-Vieyra et al. 2000:244).

Volcanic highlands define the southern continental region, formed when the Cocos plate was subducted beneath the North American plate along the Middle American

trench (Molnar and Sykes 1969:1648). This process began in the middle Cretaceous period, about 100 million years ago, and it continues today (Meschede and Frisch 2002:5). The subduction created a line of volcanoes running parallel to the Pacific coast from the Guatemala-Mexico border south to central Costa Rica (Weyl 1980:176). While such features held symbolic significance for many Mesoamerican cultures, they also provided obsidian, a volcanic glass (Bassie-Sweet 2008; Braswell 2002; Braswell and Glascock 1998; Broda 2000:411; Manzanilla 2000:94-95; Mejia and Suyuc 1998; Moholy-Nagy 1999; Santley 1983; Sapper 1897; Taube 1991; Tedlock 1996:111). This material had a variety of uses ranging from the profane to the sacred (MacLeod and Puleston 1978:75; Schele and Miller 2001; Sheets 1992:48-49).

The Maya block had spent much of its recent past as a shallow seabed (Graham 2003:32). It became a separate tectonic feature when the North and South American plates split sometime during the Jurassic to Early Cretaceous periods, between 187-97.5 million years ago (Graham 2003:32; Pindell and Barrett 1990:426; Ross and Scotese 1988:149). Mangrove covered shorelines and coral reefs grew on the submerged platform in the Late Cretaceous and Quaternary periods. As these organisms and the animals inhabiting them died, they sunk and were cemented together, forming the carbonate bedrock making up much of the continental landscape today (Graham 2003:33; Palmer 2007:62; Weidie 1985:2; Weyl 1980:11). Later, plummeting sea levels and tectonic activity caused the southern Maya block to emerge, although recent archaeological and paleoclimatological studies indicate that the continental margins are unstable due to the continual sea level fluctuation (Barclay 2008; Coke et al. 1991; Fairbanks 1989; Jones

and Dill 2002). Nevertheless, the majority of the block has remained exposed since emerging (Graham 2003:34).

Comprised of current day southeastern Guatemala, most of Nicaragua, and all of El Salvador and Honduras, the Chortis block split from the Pacific coast of west Mexico approximately 84 million years ago in the Upper Cretaceous (Donnelly et al. 1990:37, 56; Ross and Scotese 1988). Afterwards, it migrated to the southeast where it began converging with the southern boundary of the Maya block at the start of the Tertiary period, approximately 66.4 million years ago, and arriving in its current position by the Early Miocene epoch (20.5 million years ago; Ross and Scotese 1988:157; Torres-de León 2012:307). Nevertheless, geologic events such as the February 4, 1976, 7.5 M_w earthquake resulting in significant horizontal movements of the land–over three meters in some areas–suggests that migration episode is still underway (Weyl 1980:269).

The boundary of the Maya and Chortis blocks is located along the Motagua-Polochic fault system running through central Guatemala from the Bay of Honduras, between the Verapazes, and on through southern Quiche, Huehuetenango, and coastal Chiapas, where it intersects the Cocos plate in the Pacific Ocean (Donnelly et al. 1990:39; Estrada-Carmona et al. 2009:243). Volcanic activity in the Tertiary period buried the western portion of the Motagua fault, but the other sections of both remain exposed (Donnelly et al. 1990:37). The collision of the Maya and Chortis blocks resulted in the creation of the non-volcanic highlands between and around the Motagua valley and Polochich fault (Dengo 1985:136). This inter-fault, non-volcanic highland region was highly significant for many pre-Hispanic Mesoamerican cultures, including the Maya

because it is the only known source of their jadeite (Taube et al. 2006). Regarded as a symbol of wealth, centrality, corn, agricultural fertility, this stone type had strong connections to ancestors and other supernatural beings (Taube 1998, 2005a, 2007).

Overall, these major geologic events resulted in the creation of the limestone karst lowlands and volcanic highlands upon which prehispanic Maya civilization developed. Local geologic events further refined these landscapes, giving them their unique characters. Specifically, the area around Pacbitun was exposed to localized tectonic uplifting, volcanic eruptions, submersion, sedimentation, and karstification.

Local Geologic History

This subsection describes the local geologic history and formations making up the greater Pacbitun region. It begins with a broad scope that incorporates southern Belize and eastern Guatemala, and ends with a discussion of the history of the landscapes directly adjacent to the study area. Briefly, Pacbitun is at the northern most foothills of the Maya Mountains, a range making up the eastern extent of a limestone formation called the La Libertad Arch. Three granitic batholiths are present in these mountains, one beginning two kilometers south of Pacbitun, collectively creating a favorable environment for speleogenesis around the site.

La Libertad Arch. The La Libertad Arch is an east-west trending anticlinal fold structure formed by tectonic compression as early as the Paleozoic Era and continually impacted by fault activity through the later Mesozoic (Dillon and Vedder 1973:2715;

Miller 1996:102; Vinson 1962; Weyl 1980:55). The formation was submerged during the Late Jurassic and Cretaceous periods, resulting in the deposition of deep limestone and dolomite karst deposits (Martens et al. 2010:Figure 2). The Maya Mountains dominating southern Belize are an eastern extension of the arch, and they experienced greater uplift than other parts if it stretching into Guatemala (Reeder et al. 1998:38). This resulted in little sedimentation in those Belizean portions when much of the rest of the Maya block was submerged during those periods. The only exception is the western side of the Maya Mountains, near where Pacbitun is located, which as also submerged and subject to the same sedimentation processes as those regions of Guatemala (Miller 1996:102). Three major divisions are present in these karst deposits, including the Coban Limestone north of the Maya Mountains, the Lacandon-Sepur Formation, and the Campur Limestone, containing the cave-rich regions of southern Belize including the dissertation study area (Hartshorn et al. 1984:62-63; Miller 1996:102). While little tectonic activity occurred in the remainder of the Libertad Arch, the Maya Mountains continued to be uplifted periodically throughout the Cenozoic Era (Dillon and Vedder 1973:2715; Miller 1996:102).

Geologic History of the Maya Mountains and their Granitic Intrusions with a Focus on the Mountain Pine Ridge Batholith Cluster. The Maya Mountains measure approximately 90 km east to west by 50 km north to south (Donnelly et al. 1990:39). They represent a west-southwest trending example of what geologists call a synclinorima, a basin-like fold in the bedrock (Steiner and Walker 1996:17,727). Understanding their makeup and formation is necessary for the present discussion because they are largely

responsible for the karstification and speleogenesis of southern Belize (Miller 1996). The Maya Mountains synclinorium slopes gently downward to the west, while its peaks reach an average height of 800 m, but its tallest point is Victoria Peak at 1095 m (Bateson and Hall 1977:1; Weyl 1980:55). The Northern and Southern Boundary Faults circumscribe the mountains, and another unnamed, likely major fault is at the eastern extent of the mountains (Bateson and Hall 1977:22-23; Miller 1996:102). A sequence of volcanic rocks called the Bladen Volcanic Member runs for 50 km along the Southern Boundary Fault in the southwest corner of the mountains (Bateson and Hall 1977:9). The western boundary is more poorly understood because of its gradual slope that was heavy sedimentation when submerged during the Cretaceous and Tertiary periods. Marine red beds, siltstone, and shale were also deposited when these areas of Belize, Guatemala, and Mexico were submerged, in addition to the limestone and dolomite carbonates (Dillon and Vedder 1973:2715).

Three granitic intrusions emerge from the surface of the Maya Mountains, including the Cockscomb-Sapote pluton, and the Hummingbird-Mullins, and Mountain Pine Ridge batholiths (Weyl 1980:87). Several small surface streams and rivers drain from these features, dissecting the range often along joints and fault lines (Bateson and Hall 1977:1). Due to this geologic makeup, the Maya Mountains were the source of many of the metamorphic and igneous rocks used by the prehispanic Maya of Belize, and surrounding regions, including red and gray archaeological “slate” (shale), and granite for making grinding stones (Graham 1987a; Hammond 1981:177; Healy et al. 1995; Spenard 2012a:178-179, 2013c; Spenard et al. 2012; Ward 2013).

The pre-Cretaceous stratigraphy of the Maya Mountains has been regularly debated since they first came to the attention of scientists (Martens et al. 2010:815). It was originally described by Henry Fowler in 1879, and then by Karl Sapper in the late 1800s who included a description of them in the first detailed scientific study of southern Mesoamerica (Bateson and Hall 1977:1; Sapper 1889). Sapper recorded the geological diversity of the Maya Mountains, but believed that they all belonged to the same temporal group (Bateson and Hall 1977:1). C. G. Dixon (1956) directed in the 1950s their next major study, dividing the lower stratigraphy into three separate units, two of which he belived were contemporaneous. The earliest was the Lower Pennsylvanian-aged Maya series, including the granitic intrusions, and the later was the Upper Pennsylvanian to Middle Permian-aged Macal Series (Dixon 1956).

No further major geological studies were performed until the Maya Mountains were remapped in the 1960s, resulting in a revision of the stratigraphy and chronology (Bateson and Hall 1971, 1977). These findings also suggested that that the previously defined Macal and Maya Series were parts of the same formation, all belonging to the Pennsylvanian to Permian age (325-245 million years ago) Santa Rosa Group, previously identified in Guatemala (Bateson and Hall 1977:3-9). Composed of low-grade siltstones, mudstones, and shale that are interlayered by sandstone, conglomerate, and limestone beds, the Santa Rosa Group material is likely the source of the red and gray slates found throughout the Belize Valley (Awe et al. 2005; Bateson and Hall 1977:3; Dixon 1956; Healy et al. 1995; Spenard 2013c). The study also indicated that nearly 80 percent of the Maya Mountains are composed of sediments belonging to this group, with the remaining

20 percent consisting of the three granitic intrusions and the Bladen Volcanic Member (Weyl 1980:88). The geologists conducting the resurvey collected potassium/argon rubidium/strontium assays from these four features, suggesting the intrusions originated in the pre-Pennsylvanian period, with development continuing through the Triassic (325-208 million years ago; Bateson 1972; Bateson and Hall 1971, 1977:14-17; Cole and Andrews-Jones 1979). These data suggested to them that the formations intruded the Santa Ana Group during the later period (Bateson and Hall 1971:529, 1977:14-17).

Archaeologists working in southern Belize have traditionally adopted this 1960s survey as the primary source for understanding the geology of the region. Nevertheless, recent research has called that geologic work into question (Martens et al. 2010; Steiner and Walker 1996). A summary of these new studies is presented below, providing a revised update of this complex geologic area. The issue with 1960s work stems from chronological inconsistencies between the dates of the granitic intrusions and the Bladen Volcanic Member (Bateson 1972; Bateson and Hall 1977; Cole and Andrews-Jones 1979).

These inconsistencies prompted a new study of the region using refined uranium/lead techniques, suggesting the Mountain Pine Ridge, and thus the overall history of the Maya Mountains are much older and more complex than previously recognized (Martens et al. 2010; Steiner and Walker 1996). These recent studies indicate that the uniformity of Late Triassic potassium/argon dates, and contact metamorphism at the intersection of the intrusions and limestone, provided faulty dates. The Mountain Pine Ridge batholith is the most complex of the three granitic intrusions and the most likely to

be revised by future geologic studies. It is currently understood to consist of five compositional phases, while the Humming Bird-Mullins is made up of three separate bodies, and the Cockscomb-Sapote only one (Bateson and Hall 1977:14-16; Steiner and Walker 1996:17,727). Each of the eruptions has distinct textural and mineralogical compositions suggesting a potential avenue for source identification once the components of the features are better understood (Bateson and Hall 1977:14-16, Plate 7, and Table 2; Martens et al. 2010:818).

The most recent reevaluations of the Maya Mountains chronology occurred in 1996 and 2010. The former was concerned with an age discrepancy of 100 million years in the previous recorded dates from the Mountain Pine Ridge (Steiner and Walker 1996). The latter was a follow-up to the previous study, resulting in a revised stratigraphic sequence for the mountains. It also identified an early Cambrian period (505-570 million years ago) strata, and hints of Late Precambrian age (older than 570 million years ago.) deposit (Martens et al. 2010:817). The newly proposed stratigraphic column addresses the discrepancies between the earlier studies (Martens et al. 2010: Figure 2). The Cretaceous period limestone and dolomite strata identified in the 1950s has been extended into the Jurassic period, and the Santa Rosa group was renamed the Macal group. One of the idiosyncrasies in the published data that the 2010 study attempted to address is the ages of the granitic intrusions, which remain poorly understood (Martens et al. 2010). The 1996 study recorded secure dates from the Late Silurian to early Devonian (420-403 million years ago) for the Mountain Pine Ridge and Hummingbird-Mullins batholiths, also applicable to the Cockscomb-Sapote pluton (Steiner and Walker 1996).

The potassium/argon results collected in the 1950s suggested a younger Permian-Triassic (230 million year ago) date for these features (Bateson and Hall 1971, 1977). However, the new techniques suggest the younger dates were actually the result of rifting in the area due to the creation of the Gulf of Mexico during the breakup of Pangaea (Steiner and Walker 1996:17,732). Rather than the 230-million-year-ago event being the original crystallization of the granite, it represents their reheating during the Pangaean rifting and subsequently cooling and resettling. The most recent study challenges this interpretation suggesting that too few reliable data currently exist to rule out a Permian-Triassic granite stratum, but its findings do support the Late Silurian to early Devonian emergence of the three main intrusions (Martens et al. 2010:824).

Bateson and Hall (1977) considered the Bladen Formation located in the southwest corner of the Maya Mountains coterminous with the Santa Rosa Group (later renamed the Macal Formation). The most recent geochronological study challenges this interpretation because the sandstones and conglomerates of the securely dated Macal Formation are composed of weathered materials from granitic intrusions and volcanic material dating to approximately 415 million years ago (Martens et al. 2010:822). The Bladen Formation is the only known volcanic source in the Maya Mountains with a similar mineralogical composition; therefore, it must predate the origins of the Macal Formation. A stratum of white sandstones lithified, eroded, and then transported locally during the development of the Bladen Formation was identified as a separate feature named the Baldy Unit, located on the eastern edge of the Mountain Pine Ridge (Martens et al. 2010:822). This unit lacks interbedded volcanic rocks seen in other strata, and was

intruded by the Silurian-Devonian granites, suggesting an older date of formation. This newly defined formation includes a Cambrian to Early Devonian date (613-517 million years ago), making it the oldest known stratum yet recorded in the mountains (Martens et al. 2010:822).

Ultimately, the results of these geologic processes were the emergence of an uplifted, slightly western sloping landform, providing the materials and favorable conditions for the creation of the heavily karstified central and southern Belize (Miller 1996). The formation also became a major source of mineral and vegetal materials used by the pre-Hispanic Maya throughout Belize and likely beyond (Graham 1987a). The materials included granite for manos and metates, slate, pyrite, hematite, welded tuff, and pinewood (Graham 1987a; Healy et al. 1995; Lentz 1999; Morehart 2002b; Morehart and Butler 2010; Morehart et al. 2005; Parker 2013, 2014; Ward 2013). The geologic make up of the Maya Mountains facilitated karstification because the rocks contained within are poorly soluble and crystalline, and channel high volumes of water runoff to the lower elevation karst (Miller 1996:103).

Regional Karsts of Belize

Five major continental karst regions formed in the calcite areas immediately adjacent to the Maya Mountains as the water drained off of them, while other distant areas are less karstified (Miller 1996:103). The five continental Belize karst regions formed after the Maya block reemerged cover approximately 3,000 km^2 and are all

located around the Maya Mountains (**Figure 6**; Miller 1996:103-104). Although they tend to be treated as separate units by geologists, their origins are shared in the submersion of the region in the Late Cretaceous period discussed above (Miller 1996). The only exception is a possible Tertiary dolomite region in the east. Making up the Campur formation in Belize, the Boundary Fault, Sibun-Manatee, and Vaca Plateau, are located to the north and west of the Maya Mountains and are delineated to the south by the Northern Boundary Fault (Viniegra 1971). The other two, Little Quartz Ridge, and K-T Fault Ridges are part of the Lacandon-Sepur formation in the southern part of the country. The former three are of the most concern for the current project because the PRAP study area is located at the western end of the Boundary Fault karst, at the juncture with the Vaca Plateau formation. Additionally, the Boundary Fault and Sibun-Manatee karsts are closely related, and only distinguishable by visual criteria (Miller 1996:104, 113). The Boundary Fault karst has a higher elevation, and the Sibun-Manatee karst contains the possible Tertiary period dolomite mentioned above. The Vaca Plateau is separated from the other two by the Macal River.

The Campur Formation is made up of a sequence of porous gray, brown, and tan limestones mixed with thin beds of dolomite, shale, and siltstone (Hartshorn et al. 1984:63; Vinson 1962). Their porous character, coupled with heavy drainage from the nearby Maya Mountains has resulted in the development of cockpit or cone karst throughout the Boundary Fault and Vaca Plateau regions, a type of landscape resembling the bottom of an egg carton (**Figure 7**; Palmer 2007:26). Such landscapes are riddled with caves and other types of karst features because soils rich in carbonic acid erode

rapidly from the steep slopes and hills, accumulating in the low-lying areas (Palmer 2007:26). Rain runoff carries the acid in solution through fissures and cracks into the carbonate rock, dissolving the limestone and creating caves (Palmer 2007:4). The Sibun-Manatee is mostly tower karst, defined by steep, isolated peaks surrounded by nearly flat erosional surfaces (Miller 1996:113; Palmer 2007:26).

Cave formations between the northern Vaca Plateau and Boundary Fault and Sibun-Manatee karsts are significantly different in character. Deep, vertical pits with few side passages characterize the northern Vaca Plateau, while those in the Boundary Fault and Sibun-Manatee formations tend to have horizontal passages, sometimes with large chambers (Awe et al. 2005; Awe et al. 1998; Colas et al. 2000; MacLeod and Puleston 1978; Miller 1989; Mirro 2007; Pendergast 1964, 1969, 1970, 1971, 1974; Peterson 2006; Reeder et al. 1998; Reeder et al. 1996; Reents-Budet and MacLeod 1986). Nevertheless, these differences are general trends rather than defining characteristics of the three formations. For example, some large horizontal caves have been reported on the northern Vaca Plateau, although they tend to be close to the Macal River (Ferguson 2000, 2001; Griffith et al. 2002, 2003; Mirro et al. 1999; Moyes 2006a, 2006b; Moyes et al. 2009). Additionally, the southern half of that formation is also the home of the extensive Chiquibul system, measuring at least 55 km long (McNatt 1986; Miller 1986b, 1996). Lastly, I have encountered multiple vertical shafts in the Pacbitun region, although they make up only a small portion of the total number of features (Francis et al. 1995:13; Spenard 2012a).

Speleogenesis and Belizean cave types

Palmer (2007:4-7) provides a typology of caves found worldwide, and Miller (1996:106-110) has described the types and passages commonly found in Belize using morphological and hydrological criteria. Summaries of the descriptions are given below and summarized in **Table 2.1**. They are included here because part of this dissertation research included regional reconnaissance, resulting in locating several different types of caves and a variety of other karst features, and these typologies provide a starting point for classifying many of the karst features studied in the Pacbitun region. While they are archaeologically useful to this end, Palmer's (2007:407) scope is global, and therefore only provides general information. Miller's (1996) research focus is karst hydrogeology and speleogenesis in Belize, and is therefore limited to proper caves, defined as karst features with a dark zone large enough for a person to enter (Miller 1981, 1983, 1986a, 1996; Palmer 2007:36). With the few exceptions listed below, the smaller karst features rich with archaeological materials discussed in Chapter 5, are typically unique, making them difficult to categorize. In such cases, thorough descriptions of them are provided.

Palmer's (2007:4-7) descriptions include eight caves types, five occurring in the study area, including solution, erosion, shelter, crevice, and talus caverns. Solution caves form as underground water percolates through the bedrock, carrying it off and depositing it elsewhere (Palmer 2007:4). As the local water table level lowers, or the region above it is uplifted by tectonic activities, solution features dry out, becoming fossil caves that may

Table 2.1. Summary of common cave types found in the Pacbitun study area compiled from Miller (1996), Palmer (2007), Reeder et al. (1998), and Reeder et al. (1996).

Cave/Passage type	Sub-type	Description
Phreatic caves/Passages (Solution caves)		formed by percolating water dissolving all sides of feature
	Isolated	high elevation, three-dimensionally complex, room rather than passages, formation development common but variable
	Chamber Stratum	massive collapse areas aligned with trunk conduits, rubble-floored chambers with extensive formations, large, high ceiling chambers, bedrock typically buried beneath collapse
	Zuhuyha	similar to trunk conduits but are chemically diffuse. Formation and calcite depostion rare. Likely collectors of long residence karst water subject to seasonal pulse transmission
	Margin Swallet	found at base levels, and function as intake conduits for runoff
Vadose channels (Erosion caves)		formed by flowing allogenic water. Typically only areas in contact with flowing water subject to erosion
	Trunk Conduit	transporters of allogenic water and sediment from highlands through karst
	Swallet	vertical fluted walls with minor clastic deposits, located at or near cockpit bottoms at end of periodic gullies
	Piratic Conduit	similar to trunk conduits but smaller, funnel river water into nearby trunk conduits
Shelter cave (Rockshelter)		created by selective weathering of weak rocks beneath more resistant ones
Talus shelter		voids between boulders in talus piles, tend to occur at bases of cliffs, steep slopes, or in Pacbitun region where bedrock outcrops collapse onto each other

Crevice cave		cracks produced by stresses in Earth's crust. Stress rather than dissoluion is major formation process
Sinkhole		refers specifically in this dissertation to a collapsed subterranean cavern that creates a large open hole on the ground surface
Blind vertical shaft		Conical shaped vertical feature lacking side passages
Vertical shaft(s) connected to horizontal passage(s)		Feature with a vertical shaft for an entrance that drops onto a horizontal passage. Multiple drops and passages are possible, which resemble a staircase in profile
Fossil cave		Solution cave that is no longer subjected to erosion, but is instead being shaped by deposition and formation growth. These are the most common in the Pacbitun region.

continue being modified secondarily by formation growth. Such karst features are referred to colloquially as "dry caves," even if they have active dripstone formations in them. Alternatively, solution caves that either become located partially above the water table, or those that are conduits for allogenic (non-local) water are subject to mechanical scouring by the liquid. These features are called erosion caves, or "wet caves" colloquially, even if a feature is only subjected to seasonal flow (Miller 1996:109; Palmer 2007:5). These two cave types are the primary criteria for Miller's (1996) typology discussed in further detail below.

Shelter caves are those that are formed when weak rock beds are below stronger ones. The lower, weaker rock is weathered away quicker than the upper, resilient rock,

resulting in an undercut area. They tend to be at the foot of cliff faces and are typically little more than long, shallow alcoves (Palmer 2007:6). Shelter caves, referred to in this study as rockshelters, are differentiated from caves by the lack of a dark zone, an accessible place devoid of direct or ambient daylight. Crevice caves are principally formed by tectonic activity rather than erosion, but the latter can impact the feature by widening it (Palmer 2007:6). They tend towards vertical, have long narrow passages, and may lack a ceiling. Sinkholes are sunken features formed in low-lying areas, resulting from a combination of solution and collapse (Reeder et al. 1996). Sauro (2012) distinguishes between surface and subsurface sinkholes. Surface sinkholes are the most common in the world, typically occurring when near-surface rock dissolves, causing a depression on the surface (Sauro 2012:140-150). Subsurface sinkholes originate due to conditions in materials in deeper strata, such as collapsed caves (Sauro 2012:150-151). This specific type of sinkhole occurs regularly throughout the Pacbitun region and most of those investigated contained archaeological material. These features form when a cavern undermines the land above causing it to sink or collapse (Sauro 2012:150). I use the term "sinkhole" in this dissertation to refer specifically to this type of depression feature.

The primary criterion for Miller's cave typology is whether the feature is phreatic (solution) or vadose (erosion). Phreatic features are the same as solution caves, while adose features are the same as erosion caves. Miller (1996:109) observes that most known passages in Belize are trunk conduits, a specific type of vadose formation discussed in more detail below. While his observation may hold true for the total length

of passages, fossil phreatic caves and other smaller karst features far outnumbered such caves in the current study area. In fact, only two of the karst features investigated in this study are classifiable as vadose, including proper caves.

Miller (1996:106-109) identifies four phreatic features, including isolated phreatic caves, chamber stratum caves, zuhuyhas, and karst margin swallets. Isolated phreatic caves are complex, three-dimensional fossil chambers, rather than passages, now located well above the base ground level. Dripstone formations are common, although their extent in any one cave varies. Chamber stratum caves are massive collapsed areas generally aligned with trunk conduits, the latter of which are described below. The contemporary floors of these types of caves are typically composed of ceiling collapse rubble rather than bedrock, while their roofs are covered in thick dripstone formation clusters. Zuhuyhas, (a Yucatec Mayan term meaning "virgin water") are chemically diffuse passages similar to trunk conduits, and often connect to them. They are similar to basins, holding water until filled, then discharging into the trunk conduits, and depositing travertine as they do. Other calcite precipitation is uncommon in them, such as flowstone creation. Karst margin swallets are the final phreatic feature identified by Miller (1996:109). They can be likened to landscape drains because they tend to be located near the base ground level, receiving aggressive runoff. Additionally, they connect to other similar features, but quickly becoming impassable to people. Isolated phreatic, and chamber stratum formations account for most of the proper archaeological caves investigated in the Pacbitun region; although, this result is partially due to an

investigative bias. Any evidence of pre-Hispanic Maya use would be swept away by the regular flooding, and as a result, they were often given little research attention.

Miller (1996:109-110) identifies three types of vadose channels including trunk conduits, swallets, and piratic conduits. These types of passages make up the majority of known caves in Belize primarily because they are large and easy to explore (Miller 1996:109). Funneling water and sediment from the highlands through the karst, trunk conduits are the main transporters of allogenic water. Swallets are vertical, cone-shaped shafts typically located in the bottoms of cockpit karst, and found at the end of gullies that flood during prolonged or intense rain. Akin to trunk conduits but smaller, piratic conduits are rare outside of the Caves Branch area, tending to occur where a major cave conduit parallels the Caves Branch River, siphoning water from river into the passage.

Preliminary Model of Speleogenesis in the Pacbitun Region

The cave types discussed in the previous section form under specific environmental conditions, which this section presents from a local perspective, while also considering the broader geologic history of the Maya area. A formal study of speleogenic processes in the Pacbitun area has yet to be undertaken, although one has been made for the adjacent northern Vaca Plateau (Reeder et al. 1998; Reeder et al. 1996). The two formations inhabit proximate spaces and have similar geologic histories, and many of the cave types overlap. Even though they have unique characteristics, the similarities between the two regions are sufficient enough for the northern Vaca Plateau study to

provide an effective working model for speleogenesis around Pacbitun (Reeder et al. 1998; Reeder et al. 1996).

Five general types of caves have been identified on the Vaca Plateau, some determined by their position on the landscape or their hydrologic histories, while others are found throughout the plateau (Reeder et al. 1996:128-129). The types include: 1) blind vertical shafts, 2) vertical shafts connected to horizontal passages, 3) multiple drop vertical caves, 4) shelter caves, and 5) horizontal caves (Reeder et al. 1996:128-129). Several examples of each of these types of caves are present in the PRAP study area, but the main difference between the two regions is that most caves (80 percent) on the northern Vaca Plateau have vertical entrances greater than 10 m deep, while most in the Pacbitun region are horizontal.

Typically on residual hill slopes, in the bottoms of sinkholes, or on hilltops, blind vertical shafts penetrate straight down, terminating without any side passages (Reeder et al. 1996:128). Vertical shafts connected to horizontal passages, and multiple drop vertical shafts join series of horizontal passages, resulting in step-like profiles (Reeder et al. 1996:128). Their entrances are typically on residual hillside slopes or sinkhole bottoms. Both horizontal and vertical sections likely formed along weaknesses in the bedrock, and the former was assisted by dissolution (Reeder et al. 1996:128). The stepped nature of the more complex of these caves, those with multiple drops and horizontal passages, is likely due to changes in the water table over time (Reeder et al. 1996:128-129). The archaeologists who studied them posited that the horizontal components formed when the water table was stable, while the vertical components formed when the levels dropped

(Reeder et al. 1996:128-129). Shelter caves are pockets in the bedrock formed by dissolution or weathering (Reeder et al. 1996:128). They occur in all topographic areas in the northern Vaca Plateau, and the Pacbitun region, although rarely on hilltops in either areas (Reeder et al. 1996:129).

Horizontal caves contain the most diversity in their formation. They may be fossil phreatic tubes from the movement of groundwater, formed from vadose flow, or a combination of the two (Reeder et al. 1996:128-129). Information about their formation is most pertinent for the current study because they make up most of the archaeological caves in the current study area. The archaeologists studying the Vaca Plateau caverns posit that the horizontal caves began as dissolution tubes in a shallow phreatic system (Reeder et al. 1996:129). Over time, the valleys between the hills deepened, dropping the water table and draining the caves, but speleogenic processes persisted within the lower bedrock. Vadose flow continued modifying the previously submerged tubes, resulting in "keyhole" shaped passages. Eventually, the water table dropped enough that the upper passages no longer transported any water, becoming fossil features. Next, soil and sediments began accumulating and speleothem formations started growing. This description of the horizontal formations in the northern Vaca Plateau is apt for those archaeological caves in the Pacbitun region. While some in the current study area are vadose, most are fossil features subjected to extensive deposition and formation growth.

CHAPTER 3

PREVIOUS STUDIES AND CULTURE HISTORY OF THE PACBITUN REGION

This chapter presents an archaeological and cultural historic overview of Pacbitun, beginning with an introduction to the Pacbitun Regional Archaeology Project (PRAP), and how my dissertation research articulates with its main goals. Next, I weave together a history of archaeological research at the site for understanding the settlement history of the region, beginning with the earliest human occupation, and continuing with an overview of San Antonio village today. Short summaries of broader Maya history accompany this discussion, contextualizing Pacbitun's development within it, and I propose a new model of Late Classic period territorial organization for the primary centers located along the Northern Boundary Fault in central Belize. This chapter forms the second half of a larger analytical unit with Chapter 2, understanding the pre-Hispanic Maya and the world that they inhabited were in a mutually constitutive relationship whereby each was strongly influenced by the other through regular interactions (Ashmore 2002; Fedick 1996b, 1996c, 2003; Hendon 2010; Knapp and Ashmore 1999; Taube 2003a). Overall, this chapter situates my research into a broader socio-political landscape framework.

The Pacbitun Regional Archaeology Project

The Pacbitun Regional Archaeology Project (PRAP) directed by Terry Powis of Kennesaw State University, Georgia, is an ongoing anthropological archaeology investigation initiated during 2008 in a roughly 100-km^2 concession centered on the village of San Antonio in the Cayo District of western Belize **(Figure 8)**. The concession area's eastern, western, and southern boundaries are the Georgeville road, Macal River, and Privacción Creek respectively, while the northern boundary is more ambiguous, terminating just south of the village of Cristo Rey. The Northern Boundary Fault, a large northeast-southwest trending tectonic rift discussed in the previous chapter, divides the concession into two distinct geographic regions of similar size. The land to the north of the fault consists of low, rolling limestone hills, gently grading into the flat Belize River Valley (**Figure 9**). The area to the south consists of the uplifted, heavily karstified limestone terrain of the Maya Mountains, and the northwest corner of the granitic Mountain Pine Ridge.

Previous Research in the Pacbitun Region

PRAP is the third major archaeology project investigating Pacbitun, although a few other targeted studies have also taken place there. Paul Healy of Trent University, Ontario, directed the first major project there, and co-directed the second with Jaime

Awe, now of Northern Arizona University. Much of the known socio-political history of Pacbitun comes from these two studies, therefore a summary of that work is presented below, situating PRAP's current research agenda. An outline of the cultural history of Pacbitun and the surrounding region is presented in a separate section that follows.

The first scientific accounts of a pre-Hispanic Maya presence in the Pacbitun region are restricted to five short references in publications occurring over a 90-year span beginning in the late 1890s. Gann (1896-1897:315) reports on his excavations and the contents of a mound measuring 120 feet in diameter and 10 feet high in San Antonio village in the Cayo District. Although he never mentions its exact location in relation to the village, no single structure at Pacbitun fits those measurements. Additionally, the density of construction and presence of three large pyramidal structures at that site together suggest that Gann would have described more than a single mound if Pacbitun were the focus of his investigations. A more likely candidate for this work is San Antonio Viejo, a small, multi-component secondary center that is currently sitting in the middle of a banana and cahoon palm orchard one km west of San Antonio Village center. I documented this site during regional reconnaissance in 2010, and as discussed more fully below, it was likely a border settlement between Pacbitun and Guacamayo, a large, uninvestigated primary center located on the eastern bank of the Macal River (Neff et al. 1995; Spenard 2011a:41). Although PRAP has yet to undertake formal archaeological investigations at San Antonio Viejo, part of it is discussed here, assisting in locating Gann's work in the region. A complete description appears in Spenard (2011a), although

new, more accurate measurements obtained using the Google Earth computer program are given here. The previous dimensions were collected by a quick visual estimation.

San Antonio Viejo is composed of three separate architectural groups forming four plazas. My focus here is on Plaza A, the most open of the four, and the one that contains the largest structures, making it the likely focus of Gann's excavations. Located on a small, artificially flattened hilltop, four structures aligned approximately 15 degrees west of north define the plaza. Structure 1 is an eastern pyramidal shrine and the tallest of the group, measuring between five to six meters high and approximately ten meters at its base. Large trenches penetrate the structure from both the eastern and western sides, possibly the remnants of Gann's excavations, although this observation needs to be verified by future research. The other three buildings are range structures measuring approximately three meters tall and between 30 and 50 meters long. Collectively these measurements resemble Gann's (1896-1897:315) description of the San Antonio mound. Five to seven meter gaps separate the corners of each structure, creating a well-open plaza space.

Gann's (1896-1897) report is the only mention of settlement in the Pacbitun region until the site's "discovery" in the 1970s, although mentions of cave sites appear in three other sources, the first is an index of known Maya sites in Belize compiled by Thompson (1939). He makes note of multiple private pottery collections obtained from caves around San Antonio village, Cayo, grouping them with Mason's (1928) Rio Frio Caves (Thompson 1939:282). Nevertheless, the owners of the collections are never mentioned, the names or locations of the caves where the artifacts were obtained are not

discussed, nor were descriptions of them were offered, and the list is the only place they are mentioned in the text.

The second and third mentions of "caves with signs of Maya use" in the Pacbitun region appear on a map produced for a British land use survey, and an environmental profile of Belize compiled by the USAID agency, although the caves are never mentioned in the text of either of the reports (Hartshorn et al. 1984; Wright et al. 1959). The British land use survey map is an overview of known pre-Hispanic Maya sites in Belize, with the authors indicating two "caves with archaeological remains" in them as the only pre-Hispanic sites in the Pacbitun region (see Wright et al. 1959: Figure X). The first is located near the juncture of the Macal River and Privación Creek, and is likely Offering Cave, a massive subterranean site currently being investigated by the Belize Regional Cave Project co-directed by Holley Moyes of University of California, Merced, and Jaime Awe.

Located between the Macal River and Barton Creek, abutting the northwest corner of the Mountain Pine Ridge, and approximately 9.5 km north of the 89º N 17º W latitude-longitude intersection, the second cave marked on the British land use survey map is more pertinent for the present discussion (see Wright et al. 1959:Figure X). These coordinates and measurements were replotted and compared with PRAP cave locational data on the Google Earth computer program, placing it somewhere between Actun Lak and Crystal Palace, both prominent features in that spot, and therefore the most likely visited by Wright's team (see Parker 2013, 2014; Weber 2011b; Weber and Powis 2011

for discussion of the latter cave). Circumstantial evidence points to the cave being Actun Lak (Pottery Sherd Cave), one of the major foci of this dissertation.

Originally discovered by one of PRAP's local foremen in the late 1950s, Actun Lak is well known in San Antonio. Our foreman reports that several vessels have been removed from just outside of cave's entrance since he found it, one of which is on display at a small museum in the village. The current landowner has been constructing a gate over its entrance due to extensive looting, which has been ongoing for several years. Actun Lak's local fame and history of being looted suggests that it may also be one of the sources for the personal collections mentioned by Thompson (1939:282). Lastly, Actun Lak is directly down hill from the old foot trail out of the Mountain Pine Ridge, and less than a half of a kilometer from the then recently cut road out of it. On the other hand, Crystal Palace is over one km from any modern or historic road. These indicators strongly suggest that the second cave noted on the British land use survey maps is Actun Lak (Wright et al. 1959:Figure X).

Ethnographer David Snow made the first know reference to Pacbitun after spending four weeks in the late 1960s performing an informal archaeological survey of the San Antonio area in conjunction with an ethnographic study (Healy 1990a:248; Snow 1969). Snow recorded fourteen "sites" including nine house mounds, a large rubble-faced temple-pyramid, a "plazuela mound," and two "contiguous" caves that contained pottery (Snow 1969:47). He also made some surface collections of ceramics, sent to Jeremy Sabloff who confirmed they belong to the Spanish Lookout phase of the Late Classic period (Snow 1969:47). Healy (1990a:248) notes that the dimensions Snow gives for the

temple-pyramid are similar to those of Structure 1 at Pacbitun. Nevertheless, locations of all of the sites are missing from his report with the exception of a large mound at Macaw Bank on the east side of the Macal River (Snow 1969:48). The stated position of that mound suggests that it is likely one of the two uninvestigated sites of Guacamayo or Macaw Bank (Healy 1990a:251; Neff et al. 1995). Additionally, Snow (1969:48) states that former commissioner of archaeology, A.H. Anderson, had visited several caves in the region, a likely reference to his study of the Rio Frio caves 10 km south of Pacbitun (Pendergast 1968b). Snow (1969:47) also noted two "contiguous caves containing pottery" at Pacbitun, which may be two adjacent sinkholes located 500 m to the northeast of Structure 10 (Healy et al. 2007:Figures 3 and 7).

Pacbitun was brought to the attention of the Belize government officially in 1971 with the Department of Archaeology receiving a report of a structure there being mined for road fill, an illegal practice that sadly continues throughout the country today (Healy1990a:248; e.g. Jones and Stevenson 2013). Peter Schmidt, then Archaeological Commissioner of Belize, recorded the site, retaining the Yucatec Mayan name commonly used for it by the San Antonio villagers, which translates to "set stone," a likely reference to the center's multiple standing stelae (Foster 1992:53; Healy 1990a:249).

The first systematic archaeological investigations at Pacbitun began in 1980 when Healy reconnoitered the region, revealing terrace architecture heavily modifying the landscape (Healy 1983, 1990a; Healy et al. 1980; Healy et al. 1983). A short season in 1984 followed, suggesting the site was settled by the Late Preclassic period (300 B.C.-A.D. 250) and continuing uninterrupted through the end of the Late Classic (A.D. 600-

900). These findings sparked the establishment of the Trent University-Pacbitun Archaeological Project (TUPAP), the first full-scale archaeological project at Pacbitun.

TUPAP ran for two seasons in 1986 and 1987 with the explicit goals of outlining the site's history, and illuminating the function of the terraces (Healy 1990a:249). Investigations into the history of the site considered both the epicenter and sustaining area, and resulted in four Master's thesis–two in the site core, and two in the periphery– and multiple journal publications (Awe and Healy 1994; Bill 1987; Campbell-Trithart 1990; Healy 1988; Healy 1990a, 1990b; 1992; Healy et al. 1995; Healy et al. 1990; Healy et al. 2009; Richie 1990; Sunahara 1995; White et al. 1993). The epicenter research was a full-coverage survey of a 1-km^2 block defined as the Core Zone (Campbell-Trithart 1990). Additional excavations concentrated on specific locations including a palace-like structure, the only known ballcourt at the site, the two largest temple pyramids and flanking structures, and a small structure off of the northwest corner of the main plaza (Bill 1987; Healy 1992; Healy 1990a:251-254). Plaza excavations were also made, recovering several caches and stone monuments, of which three of the latter were carved, but only two have been published (Healy 1990a:254-256; Healy 1990b; Helmke and Awe 2008, 2012; Helmke et al. 2006). A series of C^{14} dates recovered from construction and burial fill was compared to the site's ceramic sequence, establishing the regional chronology (**Table 3.1**; Healy 1990a:254-259).

Table 3.1. Developmental sequence of Pacbitun (adapted from Healy et al. 2004:208).

Date range	Period name	Phase name
A.D. 700–900	Late Late Classic period	Tzib phase
A.D. 550–700	Early Late Classic period	Coc phase
A.D. 300–550	Early Classic period	Tzul phase
100 B.C.–A.D. 300	Protoclassic period	Ku phase
300–100 B.C.	Late Preclassic period	Puc phase
900-300 B.C.	Middle Preclassic period	Mai phase

The Master's theses focused on Pacbitun's periphery reported on the results of linear transects extending from the corners of the 1 km Core Zone survey aligned to the intercardinal directions. Areas extending beyond the Core Zone were called the Periphery Zone. Clarence Richie (1990) investigated the eastern transects, and Kay Sunahara (1995) surveyed those on the west. Collectively, these investigations documented the extent of Pacbitun's settlement history including the Core and Periphery Zones, and its rural sustaining population (Healy et al. 2007). These projects also resulted in more focused studies of particular artifact and material classes. For example, they produced a summary of ancient and modern exploitation in the region of *jute* snails, a species of riverine animal whose shells were recovered in abundance from a variety of contexts at the site. Another detailed the use of slate in constructions and as a raw material for artifact production (Healy et al. 1995). Musical instruments recovered were studied for their acoustical qualities, playing techniques, and social roles (Healy 1988; Healy et al. 2009). Isotope data were collected from human remains, determining diet and health of the population (White et al. 1993). Lastly, iconographic and epigraphic studies of two of the carved monuments from the main plaza informed about Pacbitun's royal dynasty,

socio-political affiliations, and possible warfare history, although these data are primarily restricted to the Classic period (Healy 1990b; Helmke and Awe 2008, 2012; Helmke et al. 2006).

Initiated by Healy and Awe (1995:1-2), the Belize Valley Preclassic Maya Project (BVPMP) ran for four field seasons beginning in 1994 and ending in 1997, investigation the origins and development of the Classic period traits from a regional perspective (Healy and Awe 1995:1). With a dual focus on Cahal Pech and Pacbitun because of known extensive Preclassic period deposits there, BVPMP research addressed seven questions: 1) When did the earliest agricultural communities develop in the greater Belize Valley? 2) Were the cultural adaptations between the two sites different? 3) What types of architecture were constructed, and how did they change over time? 4) What kinds of crafts and technologies originated in the Middle and Late Preclassic periods? 5) What kinds of trade and other economic relationships existed? 6) What was the diet and health of the populations? 7) What evidence of increased social and political complexity was there (Healy and Awe 1995:4-8)?

Addressing the questions related to site chronology and evolution, the Cahal Pech research focused some energies on the site core, but most investigations tested outlying plaza groups (Brisbin 1995; Cheetham 1995, 1996; Ferguson et al. 1996; Lee 1996; Lee and Awe 1995; Powis and Hohmann 1995; Powis et al. 1996). With two exceptions, Pacbitun investigations were restricted to the plazas in the site core (Arendt et al. 1996; Hohmann 2002; Hohmann and Powis 1996; 1999; Hohmann et al. 1999). The exceptions were a reconnaissance trip to the minor hilltop center of Sak Pol Pak, and a report on a

brief cave visit in the area (Conlon 1999; Healy et al. 1996; but see Reece 2012 and Spenard et al. 2012 for updated interpretations of this site). The Pacbitun excavations resulted in Bobbi Hohmann's (2002) dissertation on shell bead production in the Preclassic period, while ceramic material from both sites appeared in Kay Sunahara's (2003) dissertation on petrographic analyses of pottery from the Belize Valley. The 1997 investigations marked the final year of study at Pacbitun until 2003 when archaeologists made limited excavations in a corner of Plaza A in hopes of recovering additional material from Stela 6, the best preserved carved monument from the site (Helmke et al. 2006). Nevertheless, analyses of Pacbitun artifacts recovered by the TUPAP and BVPMP projects continue to be produced largely in the form of Master's theses from Trent University, and under Healy's direction (Boileau 2013; Robertson 2011; Wagner 2009).

The Pacbitun Regional Archaeology Project (PRAP), formerly the Pacbitun Preclassic Project, grew out of the 1990's fieldwork at Pacbitun, and has been ongoing since 2008. Research is conducted over the summer, typically beginning in late May, concluding in early July, with a short lab season is held in mid December. PRAP's initial focus was on the Preclassic period settlement, which is limited to the plazas, and the contemporaneous shell-bead production areas uncovered in the mid 1990s (Powis 2009:4-5). The second season of research continued with site core investigations, but expanded into the periphery (Powis 2010a). These latter investigations mark the beginning of sustained archaeological interest in caves in the Pacbitun area, although they were limited in scope to short visits to three caverns (Powis 2010a, 2010b). PRAP initiated these studies for three reasons, with the first being that Pacbitun has many caves

never studied on a regional scale. The second reason was the researchers desired to understand the role that the caverns played in the settlement of the region, while the third was documenting the sites before being destroyed by looters (Powis 2010a:23; Powis 2010b:153). The result of the investigations included the production of basic maps and preliminary ceramic type identifications for the three caves (Powis 2010a, 2010b).

The scope of investigations during PRAP's third season continued its dual-focus on the site core and surrounding landscape. Site core investigations continued to probe the Preclassic period occupation, and excavations in a subroyal elite complex demonstrated a renewed interest in the Classic period component of the Epicenter (Cheong 2011, 2013; Powis 2011b). Studies in the periphery focused on the correlations between surface features, particularly the causeway system and cave entrances, and limited test excavations were made in a newly recorded rockshelter, Chaan Hol (Valdez et al. 2011; Weber 2011a, 2011b). The investigations of the sub-royal elite complex, and the explorations of the connections between the causeways and caves resulted in Master's theses by Kong Cheong (2013) and Jennifer Weber (2011a, 2011b) at Trent University and Georgia State University respectively.

Overall, Healy's research at Pacbitun can be summarized as settlement pattern archaeology, a method of investigation commonly attributed to having been introduced to the Maya area by Gordon Willey (Healy et al. 2007:19; Willey et al. 1965). Willey (1953:1) states that settlement archaeology, "refers to dwellings, to their arrangement, and the nature and disposition of other buildings pertaining to community life." Under such a paradigm, the landforms upon which settlements sit are treated as little more than

passive backdrops upon which culture is enacted, and which are exploited for political and economic gain (Knapp and Ashmore 1999:1-2).

A theoretical shift away from a settlement pattern approach and a move towards landscape archaeology at Pacbitun began to emerge during PRAP's second season with the onset of subterranean investigations, understanding the relationship between the caves and causeway system (Powis 2010a, 2010b; Weber's 2011a, 2011b; Weber and Powis 2011). Stoddart (2000:1-3) defines landscape archaeology as those studies focused on non-traditional sites, such as roads, waterways, monuments, and natural features as places (see also Knapp and Ashmore 1999:2). My investigations continue this trend, and I follow several others understanding landscapes are ever-emergent social processes to be contended with rather than passive backdrops upon which culture is enacted (Ashmore 2004b; Basso 1996:107-108; Bender 1993, 1998:25-38, 2001:3; David and Thomas 2008:30; Feinman 1999:685; Hirsch 1995; Inglis 1977:489; Ingold 1993:162; Knapp and Ashmore 1999; Morphy 1995). In other words, landscapes shape and are shaped by cultural practices that create over time a material record encoding that history (Stewart and Strathern 2003:1). However, cultural preference plays a determining role about which aspects of the world are significant, those that are not, and how to interact with them. Therefore, information about pre-Hispanic Pacbitun Maya society can be understood by identifying the types of karst features used and how they were (Ashmore 2002). Such an approach posits that the landscape is an active agent in cultural processes rather than a passive one, allowing for understanding the interrelationships between people and places (Knapp and Ashmore 1999:2).

PRAP had identified thirteen karst features by the end of the 2010 summer season, although others were suspected to exist in the area (Powis 2010a, 2010b:153). I was invited to join the project during the winter lab season in 2010 in light of these numbers to determine whether a regional cave survey would be fruitful. I visited nineteen karst features during that period in addition to the thirteen already known to the project, indicating that a regional cave survey would in fact be beneficial (Spenard 2011a).

Dissertation Project Overview

Five major questions guided my research in the Pacbitun region. They are:

1) What types of karst features did the pre-Hispanic Maya in the Pacbitun region use for ritual purposes? How can these data inform emic understandings of the world?
2) Who used the karst features and why? How can these data assist in understanding the political landscape (Smith 2003) and identity formation for the people of Pacbitun?
3) What other types of socio-political information can be obtained from studying karstscape ritual?
4) How were spaces and places created in the karst features? What function did they have in karstscape ritual practices and why were they made?

5) Do these patterns of karstscape use reflect those found elsewhere in Belize, including temporal and behavioral? In what ways are they different?

I initiated a regional research project employing a range of investigative techniques from reconnaissance to intensive excavations. The methods, techniques, and descriptions of this work are presented in detail in Chapter 4, while the following chapter outlines my theoretical framework.

Culture History of the Pacbitun Region

Description of Pacbitun

Pacbitun is a medium-sized pre-Hispanic Maya site in the limestone foothills of the Maya Mountains approximately three kilometers to the east of San Antonio village in the Cayo District, Belize, with its settlement is divided into the Epicenter, and Core and Periphery Zones (Healy et al. 2007:17). The Epicenter is the main "downtown" area, containing the main religious and administrative structures (**Figure 10**; Healy et al. 2007:17). It is on an artificially leveled hill trending east-west, and consisting of 41 known masonry buildings, comprising three main plazas, and an additional two adjacent to the north side, all of which are similarly aligned. The main plazas, labeled A, B, and C run east to west, while the two northern ones were named D and E, from west to east

(Healy 1990a:250). An additional architectural group located to the northeast of Plaza A was called the Eastern Court, and an isolated platform-pyramid-temple complex is located at the terminus of a causeway extending east from the epicenter (Cheong 2011, 2013; Healy 1990a:251; Weber 2013). Two other causeways extend several kilometers away from the Core Area, one to the southwest, and another to the north, and a large reservoir or possible spring, is just north of the Eastern Court (Chase et al. 2014:8683; Healy 1990a:251; Weber 2011b).

The Core Zone includes the Epicenter and a one-km^2 buffer around it surveyed by Melissa J. Campbell-Trithart (1990) for her Master's thesis. The area beyond the Epicenter is dotted with house mounds, although a few larger structures, courtyard groups, agricultural terraces, three additional springs or reservoirs, and four known sinkholes are present (Healy et al. 2007:18, Figure 3; Richie 1990; Spenard et al. 2012; Sunahara 1995; Ward 2013). The Periphery Zone is the sustaining area for the site and contains of several hundred-house mounds spread out over the entire landscape (**Figure 11**). It was conservatively estimated to extend to eight-km^2 beyond the Core Zone, estimated because settlement extends unbroken, although less dense, in all directions from the site into the vicinity of other nearby major centers, making hinterland socio-political affiliations difficult to identify (Conlon 1999; Healy 1990a:251; Reece 2012; Spenard 2011a; Spenard et al. 2012; Spenard et al. 2012; Weber 2011a, 2011b). Lastly, caves, and other karst features, springs, and agricultural terraces abound in the southern and eastern areas of the Periphery Zone.

Paleoindian [11,500-8,000 B.C.] and Archaic Periods [8,000-2000 B.C.]

The Paleoindian (11,500-8,000 B.C.) and Archaic (8,000-1000 B.C.) periods constitute the largest time block of human occupation in Belize, but they are also the most poorly understood (Lohse et al. 2006). Archaeological remains in the Pacbitun area from these times have yet to be recovered, thus, a general discussion, rather than site-specific histories are given here for the periods, and they are lumped together for ease. I include them here because investigations in Actun Lak (Pottery Sherd Cave) uncovered *Nothrotheriops shastensis (*giant ground sloth) remains, a species of megafauna that went extinct at the end of the Pleistocene (De Iuliis et al. 2014; Spenard 2012a; Stanchly et al. 2013). Although these bones do not appear to be altered by humans, their presence indicates favorable conditions in the area for preservation of artifacts dating to the Paleoindian and Archaic periods. Research at Actun Halal on the west side of the Macal River, approximately 10 km southwest of Pacbitun further demonstrates the region's potential for deep human history in Belize. There, in the only other contemporaneous land deposits known for the Upper Belize Valley, archaeologists recovered the remains of horse, bear, and peccary in association with non-diagnostic lithic tools (Griffith et al. 2002; Griffith and Morehart 2001; Lohse et al. 2006). Although limited in number, the Actun Lak findings in conjunction with the Actun Halal data comprise a small dataset of Pleistocene fauna recovered from caves in Western Belize, suggesting it may be a prime area for paleoarchaeological and paleontological research.

Lithic tool technologies and subsistence strategies largely defined both the Paleoindian and Archaic periods (Lohse 2010; Lohse et al. 2006:215-220). Paleoindian lithic assemblages from throughout Belize show influence from both North (Clovis and Folsom) and South America (Fell's Cave/fishtail), demonstrating the country was at the focal point of two major cultural influences (Lohse et al. 2006:221). The presence of these projectile points suggests that the earliest inhabitants of Belize were nomadic hunters; nevertheless, many occur in inland settings, indicating a familiarity with the terrain (Lohse et al. 2006).

The Archaic period represents one of the most dynamic in regards to cultural change throughout Belize, and greater Mesoamerica in general (Clark and Cheetham 2002; Flannery 1972a 1972b, 1976; 1985, 2002; Iceland 2005; Lohse 2005, 2010; Lohse et al. 2006; MacNeish 1992; Pohl et al. 1996; Pope et al. 2001; Rosenswig 2004; Rosenswig and Masson 2001; Smith 1994, 1995; West 1964). Overall, it is the longest of Belize prehistory, spanning nearly 6,000 years, and represents a transition from nomadic gatherer-hunter groups to increased dependence on cleared field agricultural cultigens, especially maize and manioc, and the appearance of semi-sedentary habitation (Pohl et al. 1996). The end of the period is marked by permanent habitation and the appearance of ceramics, although this transition varied by up to several hundred years in different areas (Garber et al. 2004; Healy et al. 2004; Lohse 2010:343).

Early Preclassic Period (2000-1000 B.C.)

The Early Preclassic period in Belize is best known from research at the sites of Cuello, Colha, Santa Rita Corozol in the northern part of the country, which at that time were small villages (Chase and Chase 1986; Coe 2005:80; Pendergast 1981). Research at these sites revealed the inhabitants were likely ethnically Maya, although the cultural complex lacked some of the developments found in subsequent periods (Healy 2006:16; Pedergast 1993a:15; although see Ball and Taschek 2003 who propose Mixe-Zoque ethnicity for these earliest settlers). A particular issue that arose from the work at Cuello is that the techniques for house construction were well established before the village was settled, indicating that even earlier settlements are present somewhere in the region although there are as of yet not clues as to where (Pendergast 1993a:15). In the Belize Valley, a series of radiocarbon and accelerator mass spectrometry assays demonstrate the founding of Blackman Eddy and Cahal Pech villages by Cal B.C. 1295, and Cal B.C. 1200 respectively. Similar to their counterparts in the north of the country, they were also modest settlements of pole and thatch architecture, but built on hilltops overlooking rich alluvial valleys (Awe 2006:84; Healy 2006:14, 17). Many of these villages contained round structures with wattle and daub superstructures, some of which were plastered and painted with red and white bands (Aimers et al. 2000; Awe 2006:85; Powis 1996). Importing jadeite, obsidian, and iron pyrite from the Guatemalan highlands, conch shells and reef fish from the Caribbean, and even employing some Olmec-like symbols on

pottery, the people living in these small Early Preclassic period villages in Belize had far reaching economic connections (Awe 2006:85).

Middle Preclassic Period (1000-300 B.C.)

The Middle Preclassic period marks the emergence of social and political complexity, and the rise of the first major Maya cities as early as 600 B.C. These new urban centers, including Calakmul, El Mirador, Nakbe, Tikal, and Uaxactun, developed in the Mirador Basin in northern Guatemala, southern Campeche, Mexico, and surrounding areas (Martin and Grube 2008:8; Pendergast 1981; Sharer 1994:71). The Mirador Basin sites were the most grandiose and include the largest structures ever made by the pre-Hispanic Maya, although Lamanai in Belize contains one of the more substantial constructions at 33 m tall (Martin and Grube 2008:8; Pendergast 1981:41). Overall, the centers from this time are defined by triadic architecture, including a principal pyramid flanked by two others facing each other, all of which rest on top of a larger platform mound rising up from a central plaza (Coe 2005:82). Each of these features is reached via a central staircase that also leads from the plaza. Those buildings were covered in plaster, painted red, and massive deity masks flanked the staircases leading to their summits (Martin and Grube 2008:8).

Current evidence suggests Pacbitun was settled during this period in 900 B.C., and would remain inhabited for at least the next 1800 years. Its position in the greater Belize Valley region was likely chosen because two ecozones intersect there, and a wide

variety of resources are locally available, including granite, slate, pine, springs, and fertile land, all discussed below (Healy 1990a:248; see also Graham 1987a; Hammond 1981). The initial settlement began as a small farming village of at least 14 houses and had a population of less than 50 (Healy et al. 2007:32). Narrow alleyways, in some cases measuring only one meter wide, separated houses suggesting that parts of the village were closely settled (Hohmann et al. 1999:Figure 3). To date, excavations have revealed habitation during this phase was restricted only to the areas later transformed into the Epicenter plazas (Cheong 2013:89;Healy 1990a; Healy et al. 2007; Healy et al. 2004; Hohmann 2002; Hohmann and Powis 1996, 1997, 1999; Hohmann et al. 1999; Powis 2009, 2010a, 2011a; Powis and Healy 2012; Powis et al. 2009). Houses constructed during the first half of the phase were modest, with foundations consisting of one to two courses of roughly shaped limestone blocks supporting pole and thatch superstructures (Hohmann and Powis 1999:13). Those dating to the second half of the period indicate a greater construction investment; in particular, all of the foundations had a minimum of three courses of cut limestone blocks (Hohmann and Powis 1999:14).

The inhabitants of Pacbitun were well connected to other areas in and beyond the Belize Valley, in spite of their small population size. For example, artifacts made from the highland Guatemala El Chayal, Ixtepeque, and San Martin Jilotepeque obsidian sources appear in deposits from this time (Awe and Healy 1994:198; Awe et al. 1996; Healy 1990a:259-260; Hohmann and Powis 1996:118). Additionally, evidence for an extensive village-level shell bead-production economy has been recovered from all structures dating to this early phase, even though agricultural pursuits were surely a

primary concern for the entire population (Arendt et al. 1996; Hohmann 2002; Hohmann and Powis 1996, 1997, 1999; Hohmann et al. 1999; Spenard et al. 2013; Wagner 2009). The material used includes freshwater and Caribbean marine shells, with a strong preference for the latter (Hohmann 2002:116). Pacbitun's location 110 km from the Caribbean Sea indicates its early inhabitants developed a regional inland-coastal trade network. The finished items appear to have been destined for external markets, such as northern Belize, and perhaps further inland to the Peten (Hohmann and Powis 1999:14; Spenard et al. 2013:149). The quantity of beads produced far outweighed local demand, while only finished specimens are found at sites such as Colha and Cuello in northern Belize, and Tikal in Guatemala, indicating they were imported to those sites from elsewhere (Buttles 1992; McSwain et al. 1991; Moholy-Nagy and Coe 2008). Nevertheless, Pacbitun was one of several settlements in central Belize where shell beads were being produced at this early time. They were also being made at Barton Ramie, Blackman Eddy, Cahal Pech, Caracol, Chan, Dos Chombitos, and Zubin, suggesting that central Belize may have been considered a shell bead manufacturing region for the southern Maya Lowlands (Awe 1992; Cobos 1994; Cochran 2009; Ferguson 1995; Keller 2008; Robin 2000; Spenard et al. 2013:149; Willey et al. 1965).

Late Preclassic Period (300 B.C- A.D. 250)

The Late Preclassic period was a dynamic time for the Maya. In fact, most of the traits commonly recognized as indicative of the Classic period developed then, the only

exceptions are vaulted stone architecture, and monuments with Long Count dates and hieroglyphic writing, which were present but exceedingly rare (Coe 2005:85). Monuments from sites along Pacific coastal Chiapas and Guatemala, particularly Izapa and Takalik Abaj, show that Olmec high culture was adopted into the Maya area (Coe 2005:67). Stelae from Kaminaljuyu in the Guatemalan highlands display kings and supernatural beings dressed in elaborate regalia performing rituals, and seated on thrones receiving bound prisoners (Coe 2005:70-76). In the lowlands, the murals from the site of San Bartolo provide a wealth of social and political information about the Maya from this time. More specifically, they reveal that divine kingship, hieroglyphic writing, and the core components of the Maya mythological account of creation story were fully developed by at least 100 B.C., some directly influenced by the Olmec (Saturno 2005; Saturno et al. 2006; Saturno et al. 2004; Saturno et al. 2005; Taube et al. 2004; Taube et al. 2010).

The Late Preclassic period also represents one of the most dynamic in Pacbitun's history. It included the construction of the first monumental architecture, origins and establishment of institutionalized social inequality, and a population boom and geographic expansion. Construction in the Epicenter buried the earlier village settlement beneath newly elevated plazas, an E-group and palace complex were built in Plazas A and B respectively, modifications were made to the Eastern Court, the ballcourt was established, one of the earliest in the Maya area, and several uncarved stone monuments were erected (Bill 1987; Cheong 2013:89; Healy 1990a:254-255, 1992; Healy et al. 2004:209-214; Micheletti and Stanchly 2014; Powis 2011b; Skaggs and Powis 2014).

Briefly, E-groups, of which nine are known in the Belize Valley, are specific architectural configurations, commonly thought to be solar observation points, set around plazas, including a western pyramid and a series of three north-south aligned buildings on top of a low platform to the east (Aimers and Rice 2006:76; Awe 2013b; Guderjan 2006). The Late Preclassic period construction projects in Pacbitun's Epicenter suggest a move towards social inequality, and divine charter for rulers (Hammond 1982; Healy 1990a:254-244; Healy et al. 2004:213; Hill and Clark 2001).

The population also expanded at this time both in terms of the number of inhabitants and in the areas where they lived (Healy et al. 2007). Population estimates for this phase incorporate the one proceeding it, but they suggest that the number of inhabitants ranged between 550 and 700 (Healy et al. 2007:32-33). Most of this new population inhabited land outside the Epicenter, unlike the previously densely packed village arrangement. I submit here that this settlement reshuffling is also indicative of a growing elite class beginning to assert control over the political and religious areas of the site. Whether these move were overt political calculations, the unintended side effects of every day practices writ large, or something else, remains to be determined (Clark 1997, 2004; Joyce 2004). Nevertheless, obsidian from the Guatemalan highlands and shell from the Caribbean Sea continued to appear in deposits from this time, and the ballcourt suggests the continuation and possible expansion of connections to greater Mesoamerica, which surely brought prestige to those commissioning its construction (Baron 2006; Clark and Blake 1994; Reilly and Stross 1990; Scarborough 1991; Taladoire 2001). Garber and Awe (2008:189; also Awe 2013a:36) have reported finding evidence of

venerated rulers at Cahal Pech dating to the previous Middle Preclassic period, demonstrating that the transition to institutionalized inequality was already underway in the area.

More pertinent for this present study is that this period contains the first definitive evidence of ceremonial karstscape use in the Pacbitun region, indicated by ceramics (Healy et al. 1996; Spenard 2013c). Briefly, identified ceramic types and forms indicate that ritual practices began in some caves during the later stages of this phase, and would continue regularly for nearly eight more centuries. Investigations in other caves close to, but beyond the Pacbitun region indicate that subterranean ritual practices frequently began around the end of the Late Preclassic period, as discussed below.

Other archaeologists have reported evidence of regional inhabitants visiting caves much earlier than this time. For example, Moyes (2006b:Table 1) recovered charcoal evidence suggesting that visits to Chechem Ha Cave near the western bank of the Macal River occurred as early as the early Middle Preclassic period (ca. 1000 B.C.). Approximately half of the radiocarbon assays that she collected predate current calculations of the earliest settlement at Pacbitun, as well as most other sites in the Belize Valley. However, why people made those early visits remains unknown. Cave pearls were recovered in Middle Preclassic contexts at both Cahal Pech and Blackman Eddy (Garber et al. 2005:23). These objects are a particular type of cave formation shaped like marbles, growing in shallow, subterranean pools (Hill and Forti 1997:84). Their recovery from the two sites is significant because both settlements are located several kilometers away from any known cave, suggesting that the earliest permanent inhabitants of the

Belize Valley had an intimate knowledge of the landscapes well beyond where they settled, and they were actively visiting them.

Early Classic Period (A.D. 250-600)

Throughout the southern lowlands, the Early Classic period witnessed the establishment of several new prominent centers, the decline of the Mirador Basin polities, and the rise of Tikal, the largest known Maya center (Martin and Grube 2008:25). That site came to dominate the central lowlands economically, politically, militarily, and religiously, and the actions and decisions of its rulers anchor the overall history of this period (Sharer 1994:148, 211). Tikal regents began establishing relations with rulers from sites throughout the Maya area and beyond, gaining access to raw material and exotic goods, and controlling trade routes (Sharer 1994:191). However, Tikal rose to prominence not in isolation, but rather under the sway of the central Mexican center, Teotihuacan, by way of an entourage arriving from that site on January 15, 378 A.D. (Martin and Grube 2008:29; Proskouriakoff 1993). The concurrent death of the reigning Tikal king on that same day and the appointment of a son of a prominent lord from Teotihuacan strongly suggests that the arrival was a hostile military takeover, and that foreign center would wield considerable influence over the Maya area for the next four centuries, even after it collapsed and was abandoned (Stuart 2000; Taube 1992b). Nevertheless, the material influence of this center during the Early Classic period is most tangible in the appearance of the *talud-tablero* architectural style, use of slab-footed

tripod ceramic vessels, and the appointment of rulers in several sites (Stuart 2000). The end of the Early Classic period was marked by the downfall of Teotihuacan, the waning of Tikal's power due to a military defeat at the hands of a lord of Caracol, and the rise to prominence of Calakmul (Martin and Grube 2008:39).

Although Healy (1990a:256) notes that the Early Classic period is poorly represented in Pacbitun, it included several updates to the Epicenter, expansion of contacts to other Maya areas and greater Mesoamerica, the first hieroglyphic and iconographic record of divine royal lineages, and an increase in the Periphery settlement footprint. Archaeologists have identified similar scant components from this time at other sites throughout the Belize Valley, understanding it represented either widespread depopulation or centralization into certain centers (LeCount 2004:31). Awe and Helmke (2005) counter such proposals, suggesting instead that the lack of data may be a result of archaeological practice more so than a demographic decline. They propose that the Early Classic period has traditionally been defined from a Peten-centric elite tomb ceramic framework, determined in part by the presence of particular pottery types and forms (Awe and Helmke 2005:39). Furthermore, they suggest that such a position is unable to account for either local development or the continuity of earlier traditions. They present several lines of evidence from Belize Valley sites, including settlement patterns, data from caves, caching and ritual practices, and the appearance of hieroglyphic writing, to argue that the Early Classic was a highly dynamic period, showing continuity with previous times, and demonstrating innovation, rather than being stagnant or contracting (Awe and Helmke 2005:48). The ceramic data from the Pacbitun karstscape support Awe

and Helmke's (2005) findings, as do later syntheses of settlement data by Healy (Healy et al. 2004; Healy et al. 2007). Overall, the cave ceramic data suggests a continuity of earlier pottery, and an increase in principal central Peten types. Updates to Pacbitun's epicenter included enlargements to the E-group in Plaza A, modifications to the plazas, several heavy replasterings of the ballcourt, and the erection of the only known carved monuments from the site (Healy1990a:256, 1990b, 1992:234; Helmke et al. 2006).

During the Early Classic period, imports of marine shell and highland Guatemalan obsidian continued. A lip-to-lip vessel cache placed in the ballcourt during this phase contained a bifacially flaked laurel-leaf obsidian point, a possible basalt celt, a jadeite bead, a large stemmed chert point, nearly 200 freshwater *jute* snail shells, a stingray spine, two *Spondylus* oyster shells, and eight lozenge-like "Charlie Chaplin" figures consisting of pairs made from slate, conch, and thorny oyster shell (*Spondylus;* Healy 1992:234; Cheong 2011, 2013). Karl Taube (personal communication 2014) suggests that wooden figures may have also been included when the offering was made, but have since degraded. Most of the artifacts from this cache are exotic goods imported from distant locations, including the laurel-leaf point made from green obsidian only available from the Pachuca source in Hidalgo, Mexico (Healy 1990:a259-260). The material for the stemmed chert point likely originated from the Colha source in northern Belize (Healy et al. 2004:216). Jadeite is only found in the Motagua Valley in central eastern Guatemala (Healy et al. 2004:216; Taube et al. 2006). Stingray, conch, and *Spondylus* shell were imported from the Caribbean Sea or Pacific Ocean (Healy et al. 2004:216). The latter would have incorporated some danger to harvest as the animals live offshore at depths

between 9 to 45 meters (30-150 ft.; Graham 2002:410). “Charlie Chaplin” figures are fairly common to Belize sites, where they were first identified (Thompson 1931; e.g. Cheong 2011, 2013; Lomitola 2012). The figures were made from a variety of materials such as shell and stone, and were named “Charlie Chaplin” because they have pointed-out feet and arms crossed over their chests, resembling the character played by that actor (Lomitola 2012:7). Although originally identified in Belize, they have also been recovered at Piedras Negras and Tikal (Coe 1959:56; Healy 1992:234).

The first and only known carved monuments from Pacbitun were erected during the Early Classic period. Both Stela 6 and Altar 3 depict fully-costumed rulers standing in or on quatrefoil motifs suggesting that the depicted activities took place in caves (Bassie-Sweet 1991:91-110; Benson 1985; Coe 1978; Healy 1990b; Helmke and Awe 2008, 2012; Helmke et al. 2006; Thompson 1972:150). Only a small fragment of Altar 3 has been recovered, and the extant portion depicts the lower body of the Pacbitun king holding a bicephalic serpent bar across his chest (Helmke and Awe 2012:69). Additionally, the king stands on two hieroglyph blocks that may be Pacbitun’s name (Helmke and Awe 2012:68). Stela 6 has also been heavily damaged, but the recovered portions include an initial series Long Count date of 9.2.10.0.0.0 3 Ajaw 8 Kumk’u, corresponding to March 22, A.D. 485 (Helmke et al. 2006:73). The remainder of the text discusses a mythological event preceding an accession rite witnessed by an overlord (Helmke and Awe 2012:68; Helmke et al. 2006:72-74). Together, these monuments suggest that the Pacbitun rulers understood themselves to be lording over an independent polity during the Early Classic period, and the shared iconographic and hieroglyphic

traits on royal monuments from other sites indicates their active participation in a pan-regional royal community (Awe and Helmke 2005:42).

Excavations revealed that Pacbitun's population increased slightly during the Early Classic period. Archaeologists investigating the periphery recorded that 14 percent of the 211 mounds excavated contained artifacts dating to this period, up from 11 percent in the preceding Late and Terminal Preclassic periods (Campbell-Trithart 1990; Healy et al. 2007; Sunahara 1995). These data indicate a population between 700 and 900 persons (Healy et al. 2007:32).

This period also marks the first definitive evidence of satellite centers in Pacbitun's periphery. Preliminary investigations at the hilltop site of Sak Pol Pak documented a small sized center consisting of twelve structures arranged around three plazas named, A, B, and C (**Figure 12**; Conlon 1999:32; Reece 2012; Spenard et al. 2012). A large cave system into which a creek flows over a five-meter tall cascade, two independent caverns (Slate Cave and Tzul's Cave), a series of rockshelters, and at least one spring are all located at the foot of the hill (Flavell et al. 1994:15; Spenard 2011a:34). Two of the structures in the site are ceremonial, including an eleven-meter tall temple-pyramid, and a round shrine ten meters in front of and slightly off center from it, while the remaining constructions appear to be habitation (**Figure 13**; Conlon 1999:32). The developmental chronology of this site has yet to be fully determined, but preliminary investigations suggest that major construction began at least as early as the Early Classic period for the ceremonial structures and Plaza A, but the only dateable ceramics recovered from Plazas B and C, the habitation areas, date to the Late Classic (Conlon

1999:37; Reece 2012:57; Spenard et al. 2012:144). Nevertheless, most of the ceramic material and architecture was poorly preserved and earlier ceramics dating from 300 B.C. to A.D. 250 were also recovered from mixed contexts indicating a possible earlier, and long-term occupation.

The overall appearance of the site prior to the Late Classic period is currently difficult to define due to the preliminary nature of investigations and the poor preservation of artifacts. Nevertheless, I believe that the site consisted simply of a hilltop pyramid-temple through the Early Classic period, until a construction boom in the Late Classic adding Plazas B and C. One final modification was the addition of the round temple in the 8th to 10th century A.D. Population estimates suggest a maximum of 50 inhabitants during its height (Conlon 1999:32). Investigators have proposed a variety of reasons for its initial settlement including cosmology and military, the former of which I subscribe to for reasons elaborated in Chapter 8 (Conlon 1999:37; Reece 2012:61-61; Reece and Spenard 2010; Spenard et al. 2012). Suffice it to say for now that the pyramid structure coupled with the presence of the cave network into which the stream flows at the base of the hill suggest a focus on water related rituals.

Late Classic Period (A.D. 600-900)

Although the Late Classic period encompasses a relatively short time span, it is often regarded as the pinnacle of Maya history (Sharer 1994:211). The population peaked during this time, it experienced its greatest social complexity, and art and other

intellectual pursuits reached their highpoint (Martin and Grube 2008:9). Nevertheless, the downfall of Tikal at the end of the Early Classic period resulted in a power vacuum, fostereing competition between several sites vying for control over the various arenas that superpower previously held sway over. This competition resulted in the formation of new alliances and shunning of old ones, establishment of new settlements, balkanization of larger territories, and the concomitant rise to power of previously subordinate lords, and warfare in some places (Demarest et al. 1997; Sharer 1994:338-339). By A.D. 900, the elite political structure centered on divine kingship was defunct throughout the southern lowlands, and many of those centers were abandoned at the end of the period. These events have historically been known as the Maya collapse, and it occurred at different times at different sites, but primarily during the ninth century A.D., in a period called the Terminal Classic. Recent research throughout the Maya area suggests that different regions responded variably to these events, and as will be seen in the following section, several centers in Belize survived well into the Postclassic period while others appear to have been completely abandoned (Aimers 2004, 2007; Brown 2011; Chase and Rice 1985; Demarest et al. 2004; Graham et al. 1985; Graham et al. 1989; Hoggarth 2012; Iannone 2005; Jones et al. 1986; Morris et al. 2007:8; Pendergast 1981, 1993b). The timing and events of Pacbitun's collapse are poorly understood and therefore, its final century is included here as part of the Late Classic period. Nevertheless, ceramic material helps divide these three centuries into early (A.D. 600-700) and late (A.D. 700-900) facets, which I refer to as the early Late Classic and late Late Classic periods respectively.

Pacbitun's early Late Classic period (A.D. 600-700) witnessed a massive construction boom, greatly altering the appearance of the Epicenter, Core and Periphery Zones, as well as a doubling of the sustaining population (Healy 1990a:257, 1992:234; Healy et al. 2007; Reece 2012; Spenard et al. 2012; Weber 2011b:91-95, 2012; Weber et al. 2012:123; Weber and Powis 2011:202-204). Additionally, several rich burials from this time were encountered, and evidence of sub-royal elites and increased craft specialization were recovered (Cheong 2011, 2013; Healy 1988, 1990a:255; Healy et al. 2004:229; White et al. 1993). The early Late Classic period construction boom included enlarging the E-group, adding to the palace complex, expanding, stuccoing, and painting red the North Group, the establishment or extensive expansion of the causeway system, and the construction of Plazas B and C at the secondary center of Sak Pol Pak mentioned above (Bill 1987; Cheong 2013:92; Healy 1990a:252-257; Healy et al. 2004:209-211; Weber 2011b:91-95, 2012; Weber et al. 2012:123; Weber and Powis 2011:202-204). E-group enlargement consisted of adding superimposed structures on top of the already existing buildings, while expansion of the palace complex included the erection of a partial masonry superstructure. The ballcourt was also extensively modified in two stages (Healy 1992:234). The first added a vertical side half wall over the previously sloped ones, while the second raised the summit of the court, and changed the location of the audience access stairs (Healy 1992:235).

The sacbe system is currently under study by PRAP co-director, Jennifer Weber for her doctoral dissertation at Bonn University in Germany. Her research reveals that the causeway network is more extensive than originally described (Healy 1990a:257; Weber

2013:148-149). Five roads have now been documented, two linking components of the Epicenter, another connecting the site core to the foot of the hill on which Sak Pol Pak sits, a fourth joining two groups in the site's periphery, and a possible fifth, just discovered, running north to a hilltop settlement cluster, although not yet confirmed by PRAP (Chase et al. 2014:8683; Weber 2011b:91-95, 2012, 2013; Weber et al. 2012:123; Weber and Powis 2011:202-204). Both Healy (1990a:257) and Weber (2011b:105-106) agree that construction of much of the system occurred during the later part of this phase, but the latter has found some evidence indicating that its history may be more complex than it is currently understood (Weber 2013:148-149). These discrepancies are one of the major foci of her ongoing research, and currently remain poorly understood.

The Late Classic period burials are the richest yet found at the site, one of which is a royal tomb, and the most complex yet uncovered there (Healy 1990a:255). The archaeologists who excavated this feature posit that it may have been the single most significant event on Pacbitun's history (Healy et al. 2004:229). The ruler's body was placed in the only known vaulted tomb at Pacbitun, along the centerline of Structure 1, the largest temple-pyramid at the site, which also is the central structure of the E-group. The tomb chamber had been prepared by excavating a five-meter deep shaft into the core of the preexisting structure, and then an ovular cavity was shaped at the bottom of the pit by stacking cut-limestone blocks. The body was laid to rest in the ovular cavity, covered generously with red pigment, and then 19 painted vessels, jadeite and pyrite beads, shell ear ornaments, a possible bone panpipe, a slate mirror backing, and a *Spondylus* shell with a painted hieroglyph on its interior, were included as burial costume and furniture

(Healy et al. 2004:231-232). The top of the tomb was then sealed with sixteen large, uniform slate slabs, which, in turn were covered by a dense lens of thousands of chert flakes (Healy et al. 2004:230). The excavated shaft was then refilled, and the structure was reshaped with the addition of a special stair block over the tomb, inside of which two additional interments were placed (Healy et al. 2004:233). Lastly, a stela and altar complex was erected at the foot of the stairs, below which three additional human sacrifices were interred (Healy et al. 2004:233).

Several of the other Late Classic period burials from Plaza A and the North Group of the Eastern Court were accompanied by a variety of figurines and musical instruments (Cheong 2013; Healy 1988, 1990a:255; Healy et al. 2004:214-215, White et al. 1993). These objects include a drum, figurine ocarinas, flutes, flute-maracas, and flute-rattles (Cheong 2011:117; Cheong 2013:C1-C16; Healy 1988; Healy et al. 2009). Among the instruments from the Eastern Court were a series eight mold-made, seated-figure ocarinas, likely pressed from the same cast, and a large palanquin-shaped whistle (**Figure 14**; Cheong 2013:Figure C5, Figure C16-C18). Actual palanquins have yet to be recovered in an archaeological context, but they are represented in Classic period art and graffiti throughout the Maya area (**Figure 15**; e.g. Harrison 1999:Figure 94; Houston 1998:339). These objects are depicted as elaborately decorated and used to carry kings and other high-level elites. The recovery of the palanquin-flute further attests to a royal presence at Pacbitun that is part of a broader Maya Lowland elite cultural community. Furthermore, musicians likely held an elevated status in the Classic period, as is evidenced by the presence of more than a dozen musical instruments recovered from two

elite burials at Pacbitun, and the iconographic depiction of musicians playing at elite events on polychrome ceramics and in the Bonampak murals (**Figure 16**; Healy 1988:27; Healy et al. 2009:28). Cheong (2013:92) posits that the presence of burials with instruments in the North Group, in addition to the Eastern Court's location adjacent to and shared elevation with Plaza A, and high quality of jadeite artifacts suggest that secondary or sub-royal elites inhabited the group.

Evidence of increased craft specialization is seen in a slate workshop attached to the palace structure (Str. 23) in Plaza B (Bill 1987; Healy et al. 1995). That material appears in the earliest dated deposits at Pacbitun, but it is most heavily used for artifacts throughout the Late Classic period (Healy et al. 1995:343). Worked slate was regularly encountered in ritually-charged, elite spaces, including caches, caves, and burials throughout Pacbitun, the latter of which was discussed above, while a low density scatter of debitage litters the surface of the Epicenter (Healy et al. 1995:340). Excavations of the workshop revealed it as a three-meter square annex for production and storage, added to the palace complex during the Late Classic period (Bill 1987). Slabs similar to those found capping the royal burial discussed above were stacked on a masonry bench in the structure (Healy et al. 1995:343).

Previously, archaeologists have suggested that the most likely source for the slate was an outcrop at the headwaters of Slate Creek, five km from Pacbitun, because the pieces from the workshop are in excess of one meter long, and rocks that size would be unavailable in the nearby creek beds (Healy et al. 1995:345-346). My research in the landscape suggests otherwise. I observed numerous large, raw slate slabs in the creek bed

draining into Rocky Crab Cave, located just over one and a half km southeast of Pacbitun. Whether slate destined to be used in the workshop was harvested from this waterway is difficult to determine, but the raw form of the material was found in all of the investigated karstscape features surrounding it, suggesting that smaller creek sources were also harvested by the Pacbitun Maya.

An unusual trend in settlement at this time suggests that the elite exerted tighter control over Pacbitun's Epicenter than in previous periods. Total overall population during the first century of the Late Classic period expanded to between 1400 and 1800 persons, inhabiting roughly 31 percent of the periphery mounds tested, but only five percent of the structures in the Core area continued to be occupied (Healy 1990a:33). This population movement out of the Epicenter and into the periphery suggests habitation of the central area may have been restricted to the royal family and court (Healy (1990a:33). A similar centralization of elite and concomitant expulsion of non-elite from core areas may account for the disparity in dates between the ceremonial and habitation areas of Sak Pol Pak.

The latter portion of the Late Classic period (A.D. 700-900) began as perhaps the most lavish time in Pacbitun's history, but it quickly disintegrated, and current evidence suggests that the site was nearly completely abandoned by A.D. 900 (Healy 1990a:259; Healy et al. 2004; Skaggs and Powis 2014; Weber 2014). However, data are beginning to emerge, suggesting otherwise, including my recovery of Early Postclassic period ceramics in the karstscape, and a few from the epicenter (Terry Powis, personal communication 2013).

During these two hundred years of the late Late Classic period, the Epicenter was renovated for a final time, accompanied by an increase in caching behavior throughout the site (Healy 1990a:259). Diversification of craft specialization continued, particularly in the development of a ground stone production industry in the periphery of the site core (Ward 2013; Ward and Micheletti 2013). Additionally, the periphery settlement quintupled, intensive agriculture experiments were attempted, primarily in the form of terracing to feed the newly expanded population, and a spike in cave ritual activity occurred, the latter of which is one of the main foci of this dissertation (Healy et al. 1980; Healy et al. 2007:33; although see Weber 2011b:90 for a smaller, revised figure). Furthermore, a recent reevaluation of regional hieroglyphic texts suggests Ruler VII of the massive site of Caracol, in southern Belize, may have conquered the king of Pacbitun in A.D. 702 (Helmke and Awe 2008:73-74; 2012:70). This proposed conquest remains to be archaeologically verified, although the perceived threat from that site does strengthen the military-related proposal for establishing the secondary center of Sak Pol Pak discussed above. Both Conlon (1999:37) and Reece (2012) note that its hilltop location would have afforded a view both of the Belize Valley and the Mountain Pine Ridge, beyond which Caracol is located. Future research is necessary to determine what role this proposed conquest of a Pacbitun king by the Caracol ruler had on the former site and surrounding region, and, what role, if any, it played in ushering in the changes seen in the early part of this period.

Epicenter renovations at Pacbitun included the enlargement of the structures in Plaza A and closing off at least its north side with the construction of Structure 3, a final

renovation to the ballcourt, and an update to the palace complex (Healy 1992:235; Healy 1990a:251-253; Micheletti and Stanchley 2014). Modifications made to the ballcourt include the addition of a low-platform superstructure and stairs along the rear of each of the buildings. Final updates to the palace-complex added a series of interior and exterior chambers topping range structures, several containing masonry benches (Healy 1990a:253). Many of these renovations throughout the site included caches, although with the exception of a single *Spondylus* shell, all contained only locally manufactured items, indicating a disruption of long-distance contacts (Healy 1990a:256; Healy et al. 2004:216).

Although disruption of some external ties is suggested in the changes in caching behavior, recent investigations demonstrate that others may have become available. A mound littered with mano performs was excavated approximately 0.75 km northwest from the site core, just outside of Sunahara's (1995) transect boundaries, revealing an extensive groundstone workshop (Ward 2013; Ward and Micheletti 2013; Ward and Powis 2013). Preliminary ceramic analysis of its pottery suggests a primarily late Late Classic period (A.D. 700-900) use, although some material dating to the Late Preclassic period was recovered (Ward 2013: Appendix A, Appendix B). Another settlement, Cahal Higo, and a cave near it, Actun Hayach Naj, located 6 km south of Pacbitun in a valley abutting the western edge of the Mountain Pine Ridge, both contained unusually high densities of mano performs visually similar to those uncovered in the groundstone workshop (**Figures 17, 18**; Spenard 2012a:178-179; Spenard et al. 2012:139-141; Ward 2013; Ward and Micheletti 2013). Although speculative, the data gathered at these sites

tentatively suggests that Pacbitun may have been a hub of a regional groundstone production network during the last two centuries of the Late Classic period that included harvesting granite from the nearby Mountain Pine Ridge, creating performs in the outlying settlements, and then exporting the objects to markets yet identified. The presence of similar preforms in the cave suggests ritual may have been an aspect of the production.

Other notable changes during these two centuries were made to the landscape. The population boomed, and all of the 211 mounds tested in the Core and Periphery Zones showed evidence of being inhabited (Healy et al. 2007; see also Campbell-Trithart 1990; Richie 1990; Sunahara 1995). Some estimates place Pacbitun's population between 5400 and 6800 people, although more recent calculations suggest a number closer to 4000 (Healy et al. 2007:33; Weber 2011b:90). Regardless of which is more accurate, both recognize a substantial population expansion of several thousand people occurring during the final two centuries at Pacbitun that required greater agricultural production. Attempts at intensification in the form of hillside terrace agriculture were made around Pacbitun and elsewhere in the greater Belize Valley during this time, likely in response to this increased need for food (Fedick 1994, 1995; Healy et al. 1983; Healy et al. 1980). Such techniques may have been necessary because all of the prime farmland was likely already in use, and the more established fields were unable to accommodate the new increased demand for food (Healy et al. 2004:222; see McAnany's [1995:95-96] discussion of the "principle of first occupancy"). Isotopic data collected from both human and faunal remains recovered in the Core and Periphery Zones show differential access to maize

during the Pacbitun's late Late Classic period (White et al. 1993:366). These data indicate the agricultural intensification was insufficient to meet the needs of the recently expanded population, and the lack of food may have been partially responsible for the site's demographic collapse (White et al. 1993:370).

Recent regional paleoclimatological data collected from cave formations in Belize indicates drought as another factor that affected food production (Kennett et al. 2012; Webster 2000; Webster et al. 2007). These studies point to two multidecadal droughts between A.D. 800 to 900, the latter coinciding with the abandonment of Pacbitun. Ritual cave and karst feature use throughout the region also peaks during this phase (Kennett et al. 2012:791; Moyes et al. 2009). I explore these connections more fully in the coming chapters, but I follow others who propose that much of this increase in ritual activity was rain related (Moyes et al. 2009). In other words, it was a response to a portion of the multivariate crisis that defined the "Terminal Classic period" seen elsewhere in the Belize Valley, discussed at the beginning of this section.

Socio-political Territories, and Making Pacbitun a Place in the Late Classic Period (A.D. 600-900) Greater Belize Valley.

In this section, I devise a territorial model for understanding Pacbitun as a place within the Late Classic period geopolitical landscape of the Belize Valley and southern Maya Lowlands, providing context for my ceramic discussion in Chapter 6. Nevertheless, the known early origins of several of the sites indicate the organizational principles

guiding the settlement were over a millennia old by that time. Place in this model refers to a demarcated geographic location inhabited by a community of people whose shared practices bound them together as members of a polity (Anderson 2006; Connerton 1989; LeCount and Yaeger 2010; Yaeger 2000:131; Yaeger and Canuto 2000:5). Geopolitics is the relationships and interactions among polities in a given area, which in this case is the southern Maya Lowlands with a particular focus on the eastern Peten and Belize Valley (Smith 2003:115). This discussion focuses primarily on the Late Classic period due to the abundance of karstscape data dating to that time, and the comparative paucity from earlier. It is also presented with the understanding that the individual spaces and places within the karstscape have their own unique histories, some of which are discussed in later chapters, but that as the scale of resolution decreases, so too do the idiosyncrasies distinguishing them. In other words, this regional perspective highlights practices and patterns shared between the sites of the karstscape compable to other areas, determining similarities and differences, and thus political affiliations and geographic territories.

Archaeologists have long debated pre-Hispanic Maya socio-political organization, a pursuit that was greatly assisted with the identification in the late 1950s of a class of hieroglyphs called Emblem Glyphs (Adams 1986; Adams and Jones 1981; Ashmore 1981; Barthel 1968; Berlin 1958; Bullard 1960; Lucero 1999b; Marcus 1973, 1978, 1993; Martin and Grube 1995, 2008; Mathews 1985, 1996; Schele and Mathews 1996; Tokovinine 2011, 2013). These hieroglyphic collocations are a combination of royal title and unique place name, historically understood by epigraphers as references to political territories akin to kingdoms, although recent research has suggested that they allude to

any place significant to a ruling dynasty including an area of a site, or even specific buildings (Martin and Grube 1995, 2008; Mathews 1985, 1996; Schele and Mathews 1996; Tokovinine 2011, 2013). Regardless of the specific type of place referenced, they can be translated as "Divine Lord of X," and their use indicating politically semi-autonomous kingdoms (Barthel 1968; Berlin 1958; Hammond 1996:276; Mathews 1996:29; Tokovinine 2011, 2013). These hieroglyphs helped clarify Classic period socio-political organization because many of the texts where they are found frequently discuss a variety of friendly and hostile political interactions between lords of different sites including visits, warfare, prisoner capture, marriages, and betrayals (Looper 2003; Schele and Mathews 1996; Taube 1992b).

These texts also recorded hierarchical relationships between the ruling dynasties, leading to the recognition that Tikal and Calakmul were warmongering, hegemonic superstates, and the hostility between them was largely responsible for the historical trajectory of the Classic period (Marcus 1973, 1976; Martin and Grube 1995, 2008; Schele and Mathews 1996:248-249). Those records tell that the rulers of the two sites sponsored kings of subordinate centers, supervised their accessions, and even established new cities, all in an effort to create broad networks of client kingdoms. Among the goals of these networks was controlling trade routes and the flow of people between regions (Barrientos and Demarest 2007; Demarest 2013; Demarest et al. 2007; Houston 2008; Woodfill 2007, 2010; Woodfill and Andrieu 2012; Woodfill et al. 2006; Woodfill et al. 2012). Nevertheless, warfare was a primary concern of the rulers of these superstates, and they used their networks to attack one another, particularly during the Late Classic period

(Martin and Grube 2008). The texts from that time frequently mention subordinate centers instigating hostilities with the enemies of their overlords under the auspices of their superstate patrons, events that frequently left the defeated in the throws of long-lasting political turmoil (Fash 2001:151; Looper 2003; Martin 1996, 2001; Martin and Grube 1995, 2008).

Undoubtedly, Emblem Glyphs and the contents of the texts in which they appear have provided a wealth of information regarding Classic period socio-political dynamics, but those writings have yet to prove useful for demarcating actual geographic boundaries of the kingdoms. Instead, archaeologists have drawn on a wide range of data sets and theoretical approaches for addressing that latter problem. For example, the extent of Tikal's territory is suggested by the presence of a series of massive earthworks associated with significant drop-off in settlement density in its outskirts (Haviland 2003:134-142; Houston 2008; Puleston 1983; Puleston and Callender 1967). Other walled sites are found in northwest Yucatan, several identified through aerial photography (Bullard 1952; Kurjack and Andrews 1976). Nevertheless, current evidence indicates that walled centers were the exception rather than the norm in the Classic period, particularly in the southern Maya Lowlands (Sharer 1994:409). As mentioned in Chapter 4, a series of natural and artificial cenotes were used as conceptual boundaries for the site of T'isil in Quintana Roo, but this arrangement too is unusual given the existing state of knowledge, although Colonial period documents indicate natural landmarks were considered important territorial markers throughout Mesoamerica, and were likely to have been more common

than currently recognized (Coe 1965; Fedick et al. 2012; Garcia-Zambrano 1994; Miles 1957:771; Pohl et al. 1997; Sapper 1906).

Theoretical approaches to pre-Hispanic Maya socio-political organization have frequently drawn on settlement patterns, Central Place theory, and plotting Thiessen polygons, the latter of which are boundary lines drawn equidistant between centers meeting criteria determined by the researcher (Ball and Taschek 1991; Christaller 1966; Crumley 1979; Hammond 1974; Inomata and Aoyama 1996; Lösch 1954; Marcus 1973, 1978; Mathews 1985, 1996). For example, Hammond (1974) plots polygons around "major centers," a phrase that he admits lacks an explicit definition but that have particular architectural forms including monuments, ball courts, and E-groups. This exercise identified 83 territorial units of vastly variable sizes, but with capitals spread 10.4 km apart on average. However, the territories of major cities such as Tikal and Calakmul are among the smallest in this reconstruction, challenging its utility for identifying provinces meaningful to the Maya. Mathews (1985, 1996) also draws Thiessen polygons but instead chooses only sites with Emblem Glyphs assuming they represent politically autonomous kingdoms as discussed above. The result was the identification of up to 70 independent polities in the Maya Lowlands in A.D. 790 (Mathews 1996:29). Marcus (1993) notes that both of these territorial reconstructions suffer from several similar problems. First, they are static, even though hieroglyphic and archaeological evidence indicates socio-political relations were dynamic (Lucero 1999b; Marcus 1993:114). Secondly they are unable to account for known hierarchical relationships between centers, such as Bonampak's subordination to Yaxchilan, or

Quirigua's to Copan (Marcus 1993:113-114). I add that Thiessen polygons are not dependable, independent indicators of emic territorial boundaries because they are based only on distance between centers, rather than material data (see also Houston 1993:8).

Archaeologists have also proposed a regional state model of Late Classic period socio-political organization and territory size based on the prevalence of warfare during that time (Chase and Chase 1998b:14). This model is founded on a maximum military marching distance of 60 km, geographic distances between paramount centers matching that measurement, and inter-site relationships documented in hieroglyphic inscriptions, although it does not equate Emblem Glyphs as definitive markers of independent polities (Chase and Chase 1998b:13; Houston 1993:137-138). Hassig (1988) previously established the 60 km military marching distance for the Aztec based on the need for armies to traverse uneven terrain, and the ability of porters to carry provisions without needing to resupply. Thus, marching distance represented the maximum area for effective territorial control (Chase and Chase 1998b:17). This distance is also the average space between paramount centers throughout the Late Classic period, suggesting that polity size was roughly 11,300 km^2 (Chase and Chase 1998b:25; Houston 1993:137). Geographic data combined with inter-polity relationships documented in hieroglyphic texts suggest the existence of 21 polities using this model, some of which were primary capitals and others border centers (**Table 3.2**; Chase and Chase 1998b:14). Primary capitals are major centers, on par with the superstates described above, and that are all located at distances greater than 60 km from each other. Border centers are those that developed within the 60 km radius of the primary capitals, some of which may have acted as resupply depots

Table 3.2. Primary capitals and border centers (after Chase and Chase 1998b:Figure 1).

Primary Capitals	
Copan	Caracol
Tikal	Calakmul
Dos Pilas	Site Q
Palenque	Piedras Negras
Comalcalco	Edzna
Uxmal	Dzibilchaltun
Coba	Chichen Itza
Border Centers	
Quirigua	Naranjo
Yaxchilan	Tonina
Izamal	Xlampak
Pomona	

(Chase and Chase 1998b:18). Nevertheless, hieroglyphic texts indicate that these smaller centers had varied histories, and they could have been possessed by other primary centers over time, become their own independent polities, or even had their own subordinates (Chase and Chase 1998b:24).

Overall, this warfare model is a convincing attempt at understanding Late Classic period Maya socio-political territorial organization from a broad, pan-regional perspective. Undoubtedly, the Maya practiced extensive warfare, and the known paramount centers identified by the researchers conform to the 60 km spatial model (Demarest 1997; Houston 1993; Inomata 1997; Taube 1992b). However, restricting discussion to the Late Classic period overlooks the fact most of the primary capitals had already been established for hundreds of years, and very few of those have any recognizable indications of inter-polity warfare in those earlier times (Sharer 1994:143). On a more local level, I note here that the utility of this warfare model is restricted

because it is unable to account for smaller settlements such as those found in the Belize Valley, except to note that some were located within these large proposed territories, like Pacbitun being subsumed into the Caracol state (Chase 2004:330). More specifically it ignores the undoubtedly more regular and local interactions between small-scale settlements, and it disregards any possible agency that those populations may have had in determining their wider political affiliations. As will be seen, these issues are particularly salient for understanding Pacbitun's role of the socio-political organization of the greater Belize Valley and eastern Peten.

With nearly 70 years of continual archaeological investigations, the Belize Valley is one of the most comprehensively surveyed and mapped regions anywhere in the Maya area (Chase and Garber 2004:11). This work has allowed archaeologists to recognize major seats of power along the Belize River throughout the lower Belize Valley, the area to the east of the confluence of the Mopan and Macal Rivers, conform to a regular spaced pattern indicative of central places (**Figure 19**). Specifically, the sites along the Belize River are positioned in intervals that average 9.9 km apart, with a special class of secondary centers located at the midpoints between them in all instances (Driver and Garber 2004:292; Iannone 2004). Seats of power in this model are defined as those located on high ground, and displaying architecturally sophistication including multiple plaza groupings with large temples, multi-roomed palaces, ball courts, and carved stone monuments (**Table 3.3**; Bullard 1960; Driver and Garber 2004:288; Iannone 2004:282). The presence of palace complexes and carved monuments depicting named kings at many of these centers indicate they were independent polities (Bill 1987; Healy 1990b; Healy

Table 3.3. Major and minor Belize Valley centers identified by Driver and Garber (2004:Map 4).

Major Centers	
Baking Pot	Blackman Eddy
Buena Vista	Cahal Pech
Camelote	El Pilar
Las Ruinas	Pacbitun
Minor Centers	
Esperanza	Floral Park
Ontario	Nohoch Ek
Warrie Head	

et al. 2004; Helmke and Awe 2008, 2012; Helmke et al. 2010; Helmke et al. 2006). Nevertheless, several of the sites to the west of the confluence of the Macal and Mopan Rivers, particularly Buena Vista and Las Ruinas de Arenal, and Pacbitun on the southern rim of the Belize Valley were considered outliers when the model was first developed for reasons discussed below (Driver and Garber 2004:289-290). Secondary centers in the Belize Valley are appreciably smaller and less architecturally complex than the seats of power and fall into three subgroups based on location, Types 1, 2, and 3 (Driver and Garber 2004:288). Type 1 secondary centers are within two kilometers of major centers and often have one or two temple structures and little to no residential areas, such as terminus groups (Cheetham 2004; Driver and Garber 2004:291; Weber and Kieffer 2013). Type 2 secondary centers are near critical resources beyond the two-kilometer range of primary centers, and may be indicative of dispersed elite control of them (Driver and Garber 2004:201-292). Type 3 secondary centers are consistently at points equidistant between seats of power suggesting them to be territorial boundary markers

(Driver and Garber 2004:292). Thus, these data collectively indicate the existence of political territories controlled by the major centers along the Belize River extending approximately five kilometers in all directions from the primary settlement.

This territorial model had previously proven difficult to apply to the upper Belize Valley due to the complexity of the sociopolitical relationships of the sites there, in particular disagreement over where the seats of power were located during the Late Classic period (Ball and Taschek 1991; Ford and Fedick 1992; Leventhal and Ashmore 2004:169; Taschek and Ball 2004). I suggest here that this general uncertainty, a lack of archaeological data, and the exclusion of the major unexcavated center of Guacamayo has prevented expanding this model to the greater Belize Valley. Nevertheless, archaeologists have reported on similar distribution patterns elsewhere in the Maya Lowlands, even though the distances vary slightly by area. For example, major sites in the greater Peten region average 10.4 km apart (Hammond 1974:325, Table 1). Around Tikal, minor centers cluster into spatial groups of 3, 5, and 10 km distant from the epicenter (Puleston 1983:25). Houston (1993:137-138) proposes territories of around 60 km for primary capitals, with secondary centers falling between 11 and 25 km distant. Overall, the presence of regularly spaced minor centers between seats of power throughout the Maya area indicates specific, geographically defined, politically controlled territories. As will be discussed in more detail below, new evidence uncovered during my research indicates that the 9.9 km territorial model of the lower Belize Valley is also applicable to the Northern Boundary Fault area, albeit in modified form.

Before moving on to discuss the details of the sociopolitical organization of the Northern Boundary Fault region, one further recent model of territorial organization must be examined because it assists in establishing the major Belize Valley centers as autonomous polities. This model is based on updated readings and several previously unreported hieroglyphic texts from the sites of Baking Pot, Xunantunich, and Pacbitun (Helmke and Awe 2008, 2012; Helmke et al. 2010). The texts contain formerly unrecognized titles, Emblem Glyphs, and toponyms indicating the presence of royal lineages at those three sites, and clarifying the socio-political organization of the centers in the Belize Valley, and their interactions with the major centers of Caracol and Naranjo. Overall, the new data indicate the rulers of the Belize Valley centers considered their territories to be autonomous polities at least by the end of the Early Classic period, roughly A.D. 450 to 500, but they were primarily subsumed under the Naranjo sphere of influence (Ashmore 1998, 2010; Ball and Taschek 1991; Healy 1990b; Helmke and Awe 2012:65; Helmke et al. 2010; Helmke et al. 2006; Houston et al. 1992).

I briefly summarize this recent model, paying particular attention to the data from Pacbitun (see Helmke and Awe 2008, 2012 for full discussion). Two inscribed vessels dating to the Early Classic period were recovered from a small plaza group in the periphery of Baking Pot, one of which contained the title, 9-TZ'AK-AJAW, a common Early Classic period royal title (Colas et al. 2002; Helmke and Awe 2012:66). Two fragmentary carved stone panels were found at Xunantunich, one containing a "flint and shield" warfare expression in conjunction with two toponyms for unknown locations in the greater Naranjo area, although likely in the Belize Valley (Helmke and Awe

2012:67). The panels contain a third toponym reading, "Clay-bearing Mountain," incorporated into an Emblem Glyph, which is likely the name of Xunantunich (Helmke an Awe 2012:67-68).

The data from Pacbitun comes from a previously unpublished carved stone monument fragment called Altar 3, with its extant component displaying the visage of a king standing on a hieroglyphic text while holding a ceremonial bar across his chest. The entire scene is framed by a quatrefoil suggesting the depicted evens may have occurred in a cave (Bassie-Sweet 1991, 1996). The legible part of the text is a logogram that the ruler stands on, which contains the *Chan-Ch'e'n* (Sky-Cave) phrase, a term referring to key settlements (Martin 2001:178). The prefix portion of the collocation is a gopher's head with a mirror attached to its forehead. The authors of this model propose that this hieroglyph is the Early Classic period name of Pacbitun, tentatively suggesting it as the same place name appearing on Caracol stela 21 dating to the Late Classic period (A.D. 702; Helmke and Awe 2012:68). The significance of the Caracol monument is its description of the defeat of a foreign king, who was possibly the ruler of Pacbitun, according to the new reading. If these new interpretations of Pacbitun Altar 3 and Caracol Stela 21 are correct, then they challenge previous suggestions that Pacbitun was under the direct control of Caracol, at least until its defeat at the start of the late Late Classic period (A.D. 700; Chase 2004:330).

Recent discoveries of the secondary site of San Antonio Viejo, and major center, Tipan Chen Uitz, and consideration of the site of Guacamayo, indicates a previously unrecognized chain of polities located along the northern Boundary Fault distributed in a

pattern similar to the Belize River sites. Beginning from the west, these sites, which I refer to collectively as the Northern Boundary Fault polities, are Guacamayo, Pacbitun, Tipan Chen Uitz, Deep Valley, Hershey, and, as will be clarified below, another undiscovered center proposed to exist between the former two (**Figure 20**; **Table 3.4**). San Antonio Viejo, a secondary settlement I identified during regional reconnaissance, but that has not yet been excavated, is southwest of Pacbitun (Spenard 2011a). Tipan Chen Uitz, a major center with monumental inscriptions, is located in the Roaring Creek valley (Andres et al. 2014; Andres et al. 2010). As mentioned previously, Guacamayo is on a peninsula on the eastern bank of the Macal river and has yet to be investigated archaeologically, but the Xunantunich Archaeology Project and PRAP have both visited the site and have confirmed that it is a monumental center on par, if not larger than Pacbitun, although its dates of occupation are unknown (Neff et al. 1995; personal observation 2011).

Guacamayo and Pacbitun are separated by 9 km. Tipan Chen Uitz is the closest documented major site to the east of Pacbitun, but is 18 km away. Continuing east from Tipan Chen Uitz is Deep Valley at 10.8 km distant, and then the Hershey site an additional 9.3 km away. These five major sites thus form a chain along the Northern Boundary Fault averaging just over 9 km distant from one another with the only exception being the area between Pacbitun and Tipan Chen Uitz. However, those two centers are 18 km apart, exactly double the average distance between the other Northern Boundary Fault polities. Halving the distance between them places one just east of Barton Creek Cave, an area that has received little archaeological attention besides the cavern

Table 3.4. Proposed Major and Secondary Centers of the Northern Boundary Fault Polities.

Major Centers	
Guacamayo	Pacbitun
Barton Creek?	Tipan Chen Uitz
Deep Valley	Hershey
Minor Centers	
San Antonio Viejo	Cahal Uitz Na?

and a few small mounds adjacent to it (Gibbs et al. 1999; Helmke and Ishihara-Brito 2002; Mirro 2007; Mirro and Mirro 2001; Mirro et al. 1999). These data thus indicate that a major, undiscovered center likely exists somewhere in the vicinity of Barton Creek Cave (see also Helmke and Awe 2012:Figure 11 for similar reconstruction). Such a center may have just been discovered by an aerial LiDAR (Light Detection and Ranging) survey of west-central Belize, confirming this proposed model, although it is located just north of the cave in the eastern upland area (Chase et al. 2014:8683).

San Antonio Viejo is located directly between Pacbitun and Guacamayo at 4.5 km from each, suggesting that it is a Type 3 border site for the two. Its relation to Pacbitun is further strengthened when considering the alignment of its main structures. More specifically, its primary plaza is arranged so that Pacbitun's epicenter is visible over the top of the eastern pyramidal structure when sighted from the center of the western edifice, although the significance of this design is unknown (**Figure 21**). Nevertheless, the identification of San Antonio Viejo as a boundary marker settlement suggests that the settlement pattern of Northern Boundary Fault polities is similar to that of the Belize Valley, and therefore other Type 3 border sites are likely to be found as archaeological

investigations in those areas become more intensive. For example, the site of Cahal Witz Na stands out as a strong potential candidate due to its location approximately halfway between Tipan Chen Uitz and the proposed Barton Creek center, as well as its connection by *sacbe* to the former site (Andres et al. 2014; Andres et al. 2010; Conlon and Ehret 1999). Overall, these data indicate that the Northern Boundary Fault polities were distributed over the landscape in a similar pattern to those located on the Belize River, but that their territories were smaller on average by almost one kilometer, a fact that may be explained by several being located on the banks of the major creeks running out of the Mountain Pine Ridge to the Belize River. These water connections suggest that specific Northern Boundary Fault polities may have been affiliated in some way with their down creek Belize River counterparts, although in a manner that has yet to be determined.

Postclassic Period (A.D. 900-1543[1544])

Evidence that both Pacbitun and its sustaining area continued to be occupied in this period is currently scarce. A single burial was recovered from fill in the Epicenter appearing to be a post-abandonment interment (White et al. 1993:350). Healy (1990a:259) reports a lack of any Postclassic period ceramics at the site, although PRAP investigations in 2013 recovered two sherds dating to the early component of this period (A.D. 900-1200; Terry Powis, personal communication 2013). Some of the karst features I investigated had small quantities of pottery dating to this time, but they were mixed with earlier material dating to the late Late Classic period, suggesting that the Postclassic

use of the caves lasted for only a short while. Other sites in the Belize Valley are known to have survived into the Postclassic period including Barton Ramie, Baking Pot, and Tipu, and many other sites near the confluence of the Macal and Mopan Rivers, although it appears there in low densities and typically outside of core areas (Aimers 2004:36-37; Gifford 1976; Graham et al. 1985; Graham et al. 1989; Hoggarth 2012; Jones 1989; Jones et al. 1986; Pendergast 1993b; Pendergast and Graham 1993; Pendergast et al. 1993).

Evidence of reoccupation or possibly continual occupation of the greater Pacbitun region comes from the west, on the banks of the Macal River at the site of Negroman-Tipu (Graham et al.1985; Jones 1989:13; Jones et al.1986). The two names given to the site refer to the pre-Hispanic and colonial occupations respectively (Graham et al. 1985:210). The occupational history of the pre-Hispanic component of this site dates back to the Preclassic period and continues through the Late Postclassic and possibly beyond (Graham et al. 1985:207; Jones 1989:13). Most research and published accounts at the site have focused primarily on its later historic occupation in which the earlier settlement is mentioned only in passing (Graham et al.1985; Jacobi 2000; Jones 1989; Jones et al.1986). Directly across the river is the unstudied large site of Guacamayo, which has four substantial plazuela groups, and that may have been the administrative center for the earlier pre-Hispanic settlement on both sides of the river (Ashmore et al. 2004:322; Neff et al. 1995:145-146). Most of the structures of the prehispanic settlement date to the fourteenth and early fifteenth centuries, and ceramic data suggest strong ties to the Itza Maya settlements in the Peten, Guatemala (Jones et al. 1986:44).

Tipu was the political center of the Yucatec Maya Dzuluinicob polity, and was as major cacao producer (Jones 1989:12; Jones et al. 1986:41; Muhs et al. 1985). This latter role would continue through the Spanish conquest, when it became a major source of wealth for the Maya elite, although annatto, and vanilla were also grown (Graham et al. 1985:213; Pendergast et al. 1993:61; Thompson 1991:14). The center appears to have been in a state of partial disrepair on the eve of the first Spanish conquest, although the Spanish constructed their church and administrative center adjacent to the pre-Hispanic ceremonial architecture, indicating the settlement remained significant to the Maya of the region (Graham et al. 1985:207). The end date given to this period, 1543 or 1544, is based on the occurrence of the first Spanish conquest in this region (Graham et al. 1985:210; Jones 1989:14; Jones et al. 1986:41).

Spanish Colonial Period (1543/1544-1707)

The Colonial period as presented here remains focused on Tipu and is best described as a series of attempted military conquests, resistance movements, settlement concentrations and abandonments, ending with a prophesized agreement between the local Maya and Spanish, resulting in the former's resettlement in the central Peten of Guatemala. The significance of this period for this dissertation lay in its potential for future avenues of research. As will be discussed, Tipu researchers have noted continuity in pre-Hispanic ritual practices at the settlement after the Spanish established their presence there. Cave research in the Belize Valley has documented purely pre-Hispanic

use, with only a couple of exceptions (Awe and Helmke in press; Schmidt 1976-1977:112). The continuity of pre-Hispanic ritual practices in Colonial Tipu indicates the area may have also been used for cave ceremonies at that time, and thus a new potential venue of underground research in the Belize Valley.

The following summary of Tipu's Colonial period comes primarily from the works of Elizabeth Graham (Graham et al. 1985; Graham et al. 1989), Grant Jones (Jones 1989; Jones et al.1986), David Pendergast (Pendergast et al. 1993), and J. Eric S. Thompson (1991). These researchers reveal Tipu being first conquered in either 1543 or 1544 as part of a campaign by Spanish cousins, Alonso and Melchor Pacheco who were attempting to gain control of the lands between Chetumal, Mexico, and the Verapazes, Guatemala, a fight that would ebb and flow for the next 150 years. The cousins were moderately successful in their attempt, but they failed to establish firm political control. The Maya throughout this newly conquered area began revolting, some of which was centered at Tipu. Yucatan's Lieutenant Governor, Juan Garzon, returned between 1567 and 1568 to reconquer the rebellious provinces. He was successful in his attempts, but the Tipuans remained indignant, and they tried allying with the Maya of the Chetumal province. A church was constructed sometime in the last half of the 1500s, although burial data from it suggest it was typically run by converted Maya, and only visited on occasion by a European priest (Harvey 2011; Jacobi 2000; Graham et al. 1989:1255). Spanish control again waned after Garzon's expedition until 1608 due largely to uprisings of the Itza Maya in the Peten lakes region, Guatemala, which drove the Europeans away (Thompson 1991:15).

In 1608, the Spanish began reasserting their authority over the Tipu Maya by centralizing the population and making a modest update to the church. Although the town had a church, a priest visited it from Bacalar only on occasion. Such irregular interaction allowed the Tipu Maya to continue many of their pre-Hispanic practices. Thompson (1991:15) tells of a visit to the town by a friar in 1619 who, after discovering that all of the inhabitants were practicing "idolatry," immediately threw some of the figures into the river, burned other, and had the leaders whipped and threatened with further torture should the practices continue. Three years later, the Spanish appointed a new *encomendero*, an individual responsible for centralizing the rural population into Tipu proper, overlooking the security of the settlement and its inhabitants, their conversion to Christianity, and finally, collecting tribute (Jones et al. 1986:41). Another widespread rebellion against the Spanish occurred in 1638, centered in Tipu that successfully drove the Europeans out of the area for the next 50 years.

By 1641, Tipu's leaders were vying to establish an independent polity with the full support of the Itza (Jones 1989:214, 1998:52). The Spanish sent a messenger to Tipu that year allowing them to return to the crown without punishment and free of tribute for four years (Jones 1998:52-53; Thompson 1991:17). The offer was met with indignation and the messenger was turned around long before reaching his destination (Thompson 1991:19). The Spanish made indirect contact next in 1655 when the mayor of Bacalar collected a census of the town. Most of the inhabitants used Christian names, suggesting the Maya rejected the Spanish, not their religion (Graham et al. 1989:1259). The

document also listed several Maya individuals foreign to Tipu, indicating it had become a place of refuge for resistant Maya.

Prophecy played a role in the following chapter of Tipu's history. The Spanish made several fierce *entradas* into the independent Maya regions beginning in the mid 1690s from both Guatemala and the Yucatan with the goal of conquering the Itza (Jones 1989:241, 1998). These incursions coincided with a prophecy predicting the downfall of an Itza polity in the mid 1690s (Jones 1989:241, 325). The Tipuans were already demoralized by the Spanish *entradas*, and the prophecies suggested that capitulation was inevitable (Jones 1989:241; Jones et al. 1986:43). Facing these seemingly unstoppable pressures, the Tipu Maya made peace with the Spanish who proceeded to baptize several hundred of the inhabitants, and went on two years later to use the town as a staging ground for conquering the capital of the Itza, which fell on March 13, 1697 (Jones 1998:295; Jones et al. 1986:43). Tipu's history ends ten years later in 1707 when the Spanish relocated all of the Maya living there to Tayasal, Guatemala, and their presence in the area also disappeared at this time, with the exception of occasional military sweeps to round up any Maya who tried to flee their new home (Thompson 1991:20).

British log cutters began entering the region after the Spanish and Maya left Tipu in 1707 although they only proved to be temporary inhabitants camping at the abandoned centers (Jones et al. 1986:43). Unbeknownst to the Spanish, some Maya remained in the area, who seemed to have welcomed the English. For example, Thompson (1991:21) describes a 1787 map of Belize that has "Indios bravos in friendship with the Baymen" written above the Belize River. Nevertheless, the region was largely abandoned between

1707 and 1876 when Yucatec Maya refugees fleeing the Caste War in Mexico settled in Pacbitun's periphery.

Recent (1876-Present)

Historic accounts and oral histories indicate four families from Mani, Mexico established the village of San Antonio three km west of Pacbitun's epicenter, escaping from the Caste War in 1876 (Fox and Cook 1996:815; Tzul 1993). Local PRAP members have related some of this history to me too during my fieldwork, and the summary below is based largely on my observations and experiences living in the village for several weeks, and those daily workday conversations.

The four founding families originally settled in the Mountain Pine Ridge due to the presence of abundant water there, but the acidic granitic soil was incapable of supporting *milpa* slash-and-burn agriculture. Soon after, the families set out again to find a more appropriate place to live, and encountering three pre-Hispanic mounds and numerous springs in the region, they resettled, naming the new village, Ox Mul, after three pre-Hispanic mounds, remaining visible in the yards of administrative and commercial buildings in the village center. Farm labor, and cash cropping oranges, peanuts, and watermelon sold in San Ignacio and Belize City, offers the main sources of local income. Other residents have obtained work visas in the United States, sending money back to their families. Ecotourism and archaeology also provide sources of seasonal income. Most villagers are descendents of the four founding families, and, as a

result, the village is often described as Maya (Yucatec). But, at least one powerful Mopan family from Punta Gorda, and several North American expatriates live there. Additionally, foreigners own several tracts of land, eco-resorts, and adventure tourism businesses that are often managed locally.

Religion is large component of life in the village, as indicated by the quantity of churches present. At least six were present in the early 1990s and construction of another one was underway in 2012, all of which are Pentecostal (Colas 2009:10; Fox and Cook 1996:Figure 1). Nevertheless, belief in supernatural forces and trickster-like demons remains prevalent, as detailed in **Appendix D.** This strength of religious faith also regularly draws in missionary groups that often incorporate development projects. For example, during my fieldwork in 2011, I witnessed over a two-week period a group construct a second floor for one of the local schools. Another provided the resources to build the first internet café in the village center, which had been open sometime before 2011.

Some people in the village and surrounding area had been pursing Maya cultural maintenance that transitioned into a revitalization movement between 2011 and 2012. With help from foreign investors, this movement called Maya First, maintains a local museum, practices traditional pottery making, is investing heavily in Maya cultural tourism, and some within it make offerings at the caves to the southwest of the village. In these ways described, contemporary San Antonio resembles pre-Hispanic Pacbitun. They are both relatively modest settlements compared to their contemporaries in the region, but they also demonstrate strong and wide connections to the world beyond whether it be

green obsidian from central Mexico and conch shells from the Caribbean for Pacbitun, or Facebook accounts and working in the United States for San Antonio.

Chronology of Cave Use in Belize

Seven major cave-rich regions have been investigated in the greater Pacbitun area in addition to the one studied for this dissertation (**Figure 22**). Aspects of some of these areas have already been discussed, but they are summarized here again to establish a diachronic regional pattern of use. The regions include:

1. Barton Creek Valley (Awe 2006; Mirro 2007; Owen 2002).
2. Caracol-Chiquibul (Anderson 1962; Feld 1994; Ishihara-Brito 2003; Ishihara-Brito et al. 2011; McNatt 1986; Moyes 2012; Moyes et al. 2012; Pendergast 1964, 1968a, 1969, 1971).
3. Caves Branch River Valley (Bonor 1995; Bonor and Glassman 1999; Bonor and Klemm 1996; Glassman and Bonor 2005; Graham et al.1980; Hardy 2009; Morton et al. 2012; Wrobel et al. 2012; Wrobel et al. 2007).
4. Rio Frio-Mountain Pine Ridge (Anderson 1962; Mason 1928; Pendergast 1962, 1970; Spenard 2011a, 2012a).
5. Roaring Creek River Valley (Awe 2006; Awe and Helmke in press; Awe et al. 2005; Awe et al. 1998; Ferguson and Gibbs 1999; Gibbs 1997, 1998; Griffith 1998, 1999a 1999b; Halperin 2000, 2002, 2005; Halperin et al. 2001; Helmke

et al. 2012; Miller 1989, 1990; Mirro and Awe 1999; Mirro and Halperin 2000; Mirro et al. 1999; Morehart 2001b; Moyes 2001, 2005a; Moyes and Awe 1998; Owen and Gibbs 1999).

6. Sibun-Manatee River Valley and karst (Griffith and Torres 2002; Pendergast 1974; Peterson 2006; Peterson et al. 2005).
7. Northern Vaca Plateau (Awe 2006; Colas et al. 2000, 2003; Gifford 1976; Griffith and Helmke 2000; Griffith et al. 2002, 2003; Griffith and Morehart 2001; Ishihara-Brito 2001b; Moyes 2003, 2004, 2005b, 2006a 2006b; Reeder et al. 1998; Reeder et al. 1996; Schmidt 1976-1977).

Most of the caves investigated in these seven regions demonstrate a similar chronological pattern (see also McNatt 1996). The first evidence of ritual use occurred in the Late Preclassic to Protoclassic periods (300 B.C. to A.D. 250) and continued through the end of the Late Classic (A.D. 900). The later period witnessed a drastic increase in cave activity both in those that already had rich ritual histories, as well as those that had never been used prior (Anderson 1962; Graham et al. 1980; Moyes et al. 2009; Pendergast 1968b, 1969, 1970). Some had evidence of substantially earlier use particularly on the Vaca Plateau where discontinuous human use extends as far back as the Paleoindinan period (11,500 to 8,000 B.C.; Griffith and Morehart 2001; Lohse et al. 2006). Continuous use can be pushed back to near the onset of the Middle Preclassic period (1000 B.C.) at Chechem Ha Cave where visitors minimally explored its recesses by torchlight (Moyes 2006a:449). The transition from the late Late Classic (A.D. 700 to 900) to Postclassic

(A.D. 900 to 1200) period marks the end to nearly all cave use in the seven regions. The only exceptions currently known are Actun Uchentzub (Flourcamp Cave, Black Rock Caves) near Tipu, used through the Late Postclassic period, and two caves in the Roaring Creek valley from which Colonial period Spanish artifacts have recently been recovered (Awe and Helmke, In press; Ishihara-Brito 2001a; Schmidt 1976-1977). These finds indicate that subterranean ceremonial practices continued for several hundred years in some limited fashion after most of the major centers in the Belize Valley had been abandoned.

Overall, the karst features investigated in the Pacbitun region reflect the typical regional chronological pattern. Most were used beginning in the Late Preclassic-Early Classic period, and activities continued through the early Postclassic. Material from the Middle Preclassic and earlier periods, as well as those from the Late Postclassic and beyond has yet to be recovered. The recovery of the Pleistocene sloth remains discussed above, as well as the continuation of settlement at nearby Tipu through the Colonial period, indicates the caves in Pacbitun region hold great potential for use during those earlier and later times.

CHAPTER 4

HISTORY OF MAYA CAVE ARCHAEOLOGY AND CURRENT INTERPRETIVE FRAMEWORKS

Interest in Lowland pre-Hispanic Maya cave use has a long history extending as far back as the first modern Western exploration of the area in the mid 1800s (Stephens 1969). Nevertheless, I argue in this chapter that subterranean investigations only arose as a self-aware and accepted part of Maya archaeology in the late 1990s (see also Scott 2012). I discuss that history and the resultant interpretive frameworks below to contextualize my investigations within the current thinking in the field. In short, the current paradigm of Maya cave archaeology stresses that karst features were socially significant places used by both elites and commoners for ritual interactions with the sacred animate earth and a variety of supernatural beings thought to inhabit those underground locations including ancestors and the rain god, Chahk (Brady 1997a; Brady and Prufer 2005a:9; Kieffer and Scott 2012). This ritual model stands in direct contrast to earlier interpretative frameworks for pre-Hispanic Maya cave use based on patterns of habitation of underground spaces common to the Paleolithic Old World (Brady 1989:11; e.g. Mercer 1975[1896]). My goal for this chapter is self-reflection. I locate and trace my own academic heritage through the latter part of this history and explore my introduction, participation, and interactions with the field and its participants, which have subsequently influenced my research.

James Brady (1989) compiled the first overview of the historical development of Maya cave archaeology as part of his dissertation on Naj Tunich cave, Guatemala, in which he identified three main periods. He noted that the World Wars created research gaps coinciding with changes in methods and quality of reporting on the subterranean features (Brady 1989, 1997b, 2000; see also Brady and Prufer 2005a:1). He later defined a fourth period for a 1997 presentation at the Society for American Archaeology (SAA) meetings because, as he noted, nearly half of the literature cited in his dissertation appeared after 1980 (Brady 1997b). This finding indicated to him that a recognizable subfield of Maya cave studies had arisen around the same time he began his doctoral investigations (Brady 1997b). He named the new divisions, "The Early Period" (1840-1914), "Inter-War Period" (1914-1950), "Post War Period (1950-1980), and "Recent Period" (1980-present; Brady 1997b). Ann Scott (2004, 2007, 2012) suggests a reformulation of Brady's "Recent Period" because she argues that a cohesive group of speleoarchaeologists had yet to develop, major publications were few in number, they appeared in venues obscure to archaeology, and cave studies remained a fringe discipline to mainstream archaeology through the early 1990s. Instead, she proposes adding a "Foundation Period" from 1980-1997, during which time the current theoretical paradigm and field methods were established and cave research became widely accepted as a legitimate pursuit of Maya archaeology. I use both Brady's (1989, 1997b), and Scott's (2004, 2007, 2012) named periods to frame my discussion in this chapter, although I suggest reconsidering the significance of some of the scholarship that occurred during the Post War Period. In the discussion below, I only briefly summarize Brady's first two

periods before providing a more detailed discussion of the development of the field after 1950 because little of substance can be added to the already extensive remarks that he and others have made about them (Brady 1989, 1997b; Brady and Prufer 2005a; McNatt 1996; Scott 2004, 2007).

Early Period (1840-1914)

Early Period scholarship (1840-1914) was relatively competent in terms of reporting and field methods, although little standardization existed between projects (Brady 1989:15). Some reports contained maps, illustrations, and photographs, while others simply included written descriptions of particular features (compare Mercer 1975 [1896] and Thompson 1897 to Gann 1894-1895 and Gordon 1898). Overall, most of the cave information gathered during this period was reported in short descriptions of the geologic features themselves or of a few select artifacts found within them.

Interpretative frameworks were devised during this period from Old World patterns of Paleolithic cave habitation, but that approach began to change. For example, Mercer (1975 [1896]) initiated a regional cave project in the Yucatan Peninsula searching for evidence of deep human antiquity as found in the caves in Europe. His endeavor was unsuccessful considering his goals even though he recovered ceramic sherds and faunal material. His survey was the most extensive study of caves in the Maya area at the time; unfortunately, most of the copies of his report were lost when the print shop publishing the volume burned down (Brady 1989:11). Gordon (1898) realized that the materials that

he encountered in caves around Copan, Honduras were coterminous with that site, and they may have contained some ceremonial residues, but he believed that most of the artifacts were habitation debris. Edward Thompson's (1897, 1904, 1938) research on the High Priest's Grave at Chichen Itza, Loltun, and other caves in Yucatan, Mexico, around the turn of the 19th century began to change archaeological perceptions about human habitation in caves in the Maya area. His greatest impact on the field came from his purchasing of the site of Chichen Itza, Yucatan, and subsequent dredging the Cenote of Sacrifice there, but legal disputes with the Mexican government prevented him from publishing of any of the work until the 1950s, even though many archaeologists were familiar with it (Brady 1989:12-13; Coggins 1984:25, 1992; Coggins and Shane 1984; Lothrop 1952; Proskouriakoff 1972; Tozzer 1957). Overall, the end of the period witnessed a shift in thinking about caves as ceremonial locations, but a lack of publishing, improper translations of Maya names for significant landscapes, and a warehouse fire that destroyed nearly all copies Mercer's (1975 [1896]) regional cave report stymied any possibility for a broad synthesis of the material (Brady 1989; Coggins 1984:25; Gordon 1898, Seler 1901).

Inter-War Period (1914-1950)

Cave scholarship suffered during the Inter-War Period (1914-1950), even as large-scale institutional projects such as the British Museum's work at Pusilha, and the Carnegie Institution's work dominated Maya archaeology (Brady 1989; Brady and Prufer

2005a:1; Grunning 1930; Joyce 1929; Joyce et al. 1928; Pollock 1962; Ricketson and Ricketson 1937; Scott 2012:9; Smith 1950). Overall, Brady (1989:19-20) notes that most subterranean research made during the Inter-War period was only to "gather up the choicest artifacts," that interpretations returned to the Old World habitation model, and that cave researchers tended to produce substandard work, especially when compared to the scholarship of the Early Period. Ann Scott (2012:10) adds that these institutional projects allocated few resources to cave investigations, marginalizing their study and importance to understanding Maya history, a stigma that would remain for decades. For example, she recalls interviewing a prominent Maya archaeologist for her 2012 history of Maya cave archaeology chapter mentioned above (Scott 2012). She redacted the scholar's name, but published this person's beliefs about cave investigations,

> "They [caves] seemed to call for very large investments of effort, planning, etc. for relatively *small scientific returns*…It seems to me to be a rather limited field and one which produces information and interpretation, which are *difficult to integrate with the mainstream data* produced by site and regional projects" (Scott 2012:12; emphasis added).

I interpret these remarks to mean that this archaeologist believes that cave data do not fit current models of Maya society, and are therefore best ignored. However, I hope to demonstrate with this dissertation that if analyzed carefully, the material traces of human interactions with caves provide a wealth of information that can help refine significantly and improve our understanding of Maya society.

Post War Period (1950-1980)

The Post War Period (1950-1980) was significant for the development of contemporary Maya cave archaeology because the scholarship produced during that time began to transform how caverns were studied, reported, and interpreted (Brady 1989:27-28). Six archaeologists were largely responsible for these advances: A.H. Anderson (1962), E. Wyllys Andrews IV (1961, 1965, 1970), David Pendergast (1962, 1964, 1966, 1968a, 1969, 1970, 1971, 1974), Dennis Puleston (MacLeod and Puleston 1978), J. Eric S. Thompson (1959, 1975), and Doris Heyden (1973, 1975, 1981), the latter who worked at Teotihuacan, Mexico. In general, the research was centered in Belize, was largely responsible for establishing caves as ritually charged places, and raising the standards for methods and reporting to a level used in surface archaeology (Brady 1997b).

A.H. Anderson, the first Belize Commissioner of Archaeology, focused considerable energies on cave investigations because he recognized them as significant and threatened sites (Anderson 1962). Unfortunately, he published infrequently, Hurricane Hattie destroyed many of his research materials and collections when it devastated Belize in 1961, and he passed away due to complications from surgery in 1967, just after he had retired from his Commissioner post (Pendergast 1968b, 1971:90). Nevertheless, others were able to reconstruct some of his research for publication (Digby 1958; Pendergast 1970).

I suggest here that his contributions to the development of Maya cave archaeology primarily lay in two areas. The first is his insistence that caves were viable research loci

for understanding the pre-Hispanic Maya (Anderson 1962:331). This belief led directly to the second, and arguably the more significant contribution, which was his relentless push to draw in foreign interest to Belize archaeology, achieved with his regular participation in the Congress of Americanists (Pendergast 1968b:92). Although his impact in this regard is related only indirectly to cave research, I suggest here that his efforts established a pattern of openness to foreign archaeology in Belize that continues to this day (Awe 1997; Graham et al. 1980:155). Furthermore, this openness set the stage for Jaime Awe's Belize Valley Archaeological Reconnaissance/Western Belize Regional Cave Project (BVAR/WBRCP) in the 1990s, the impact of which I discuss more fully below.

E. Wyllys Andrews IV's (1961, 1965, 1970) work in Balankanche and Gruta de Chac caves in Yucatan, Mexico, is perhaps most directly responsible for finally moving the common cave interpretive framework away from the Paleolithic habitation model and replacing it with one focused on ritual use (Brady 1989, 1997b). Yet, the conditions under which the investigations were made exemplify the continued marginality of cave studies to Maya archaeology. The Balankanche project was an unexpected salvage operation prompted by the accidental uncovering of a previously sealed passage in the otherwise well-studied and heavily visited cave, five weeks prior to the start of a planned field season at the site of Dzibilchaltun (Andrews 1970:v). The passages beyond the blockage led to chambers littered with massive quantities of intact effigy censers decorated with the visage of Tlaloc, the Central Mexican rain god, a multitude of other ceramic vessels, scores of miniature manos and metates, spindle whorls, and even

wooden artifacts such as a drum (Andrews 1970:19-55). Still, Andrews (1970:5) consistently remarks in his report of an overall hurried feeling lording over the investigations because of the mandatory start date of the Dzibilchaltun project. On the other hand, his Gruta de Chac investigations were made under a less pressing schedule, but were the result of voluntary weekend excursions, rather than problem-oriented research (Brady 1989:23).

The significance of Andrew's (1970) Balankanche research is fourfold. First, the richness of the deposits he recovered were indisputably ceremonial, providing an interpretative baseline for future projects, as mentioned above (Brady 1997b). Second, he contextualized the Balankanche data in a regional historic framework by comparing his findings in the cave with those he made at the sites of Dzibilchaltun and Chichen Itza (Brady 1989:22-23). Third, his team recorded a contemporary ceremony performed in the cave by local Maya *h-men* shaman, who were attempting to appease the spirits that the local Maya believed lived in the cave, and whom the archaeologists were thought to have disturbed with their investigations (Arzápalo 1970; Barrera Vásquez 1970). Lastly, it marked a return to, and an exceeding of the quality of, reports produced at the end of the Early Period. Included in the report were extensive black and white, and color illustrations and photographs, plan and profile view maps s of the cave, and a regional one that locating it in relation to contemporary and ancient settlements. Lastly, a long play record and transcription of the actual ceremony was included with the volume. I suggest here that Andrew's approach to recording and disseminating information via a range of multimedia venues went unmatched until recently with the rise of project

websites and inexpensive digital recording devices, marking it as a truly unique and visionary report among its contemporaries.

Unfortunately, Andrews passed away prematurely in 1971 from health complications at the age of 54 (Stirling 1973:295; Wauchope 1972:394). Scott (2012:10-11) notes that his passing "removed the foremost field archaeologist at the time with experience in caves," and she speculates that his position with the Mesoamerican Archaeology Research Institute (MARI) at Tulane University would have afforded him the authority and influence to promote cave archaeology as a viable avenue of investigation in mainstream Maya archaeology had he survived.

David Pendergast was the most prolific cave scholar writing during the Post-War period. He produced four articles and four monographs about his cave research in Belize, one of which was the report of A. H. Anderson's work in Rio Frio Cave E, located south of Pacbitun (Pendergast 1962, 1964, 1966, 1968a, 1970, 1971, 1974). Pendergast's main contributions to Maya cave studies included treating caverns as any other archaeological site both in terms of investigative techniques and reporting, setting the standard for future projects that remains to this day. His reports provide detailed site descriptions, including comprehensive discussions of the caves, their locations, and surrounding environments. Additionally, he produced accurate maps, discussed his excavations, described and illustrated artifacts, and was among the first cave archaeologists to utilize specialists, particularly botanists and zoologists to assist with data analysis. Nevertheless, Pendergast's investigations were typically salvage operations rather than problem-oriented programs, and, unfortunately for cave archaeology, his research interests drew

him out of caverns to elsewhere (Pendergast 1981; Pendergast et al. 1993; Scott 2012:10).

Dennis Puleston was the youngest scholar of the Post War period who began investigating caves in the late 1970s. Three of the most senior cave researchers, Anderson, Andrews, and Thompson, the latter of whom is discussed below, had already passed away when he began his studies, leaving him as the only established Maya archaeologist actively pursuing underground research. Puleston's curiosity lay in understanding the relationship between caverns and the Maya underworld of fright and disease, Xibalba, an argument informed by archaeological, cosmological, ethnohistoric, iconographic, and epigraphic data. He and Barbara MacLeod presented his initial impressions of those connections at the Tercera Mesa Redonda de Palenque conference in Chiapas, Mexico in 1978, although tragically, thirteen days later, a bolt of lightning struck and killed him on top of the Castillo in Chichen Itza, Mexico (Harrison and Messenger 1980:274). MacLeod (MacLeod and Puleston 1978) went on to publish their work, but has since shifted her attention to Maya iconography and epigraphy (MacLeod 1989, 1990; MacLeod and Stone 1995). The primary significance of this piece is that it was the first theoretical article on Maya cave use based on serious fieldwork in a cave, even though his suggestion that caverns were portals to the dangerous underworld has since largely fallen out of favor (Adams and Brady 1994, 2005; Brady 1989; Colas 1998; Fedick et al. 2012; Spenard 2006a; Vogt and Stuart 2005; although see Moyes 2012).

Sir J. Eric S. Thompson was the preeminent Maya scholar throughout much of the 20th century, and his ability to synthesize large and disparate bodies of data was

unmatched. He turned that attention to caves during the Post War Period, producing the first ever syntheses of Maya cave archaeology (Thompson 1959, 1975). The impact of these works was somewhat stunted because he published the first in an obscure German journal, and the other came out the same year that he passed away (Brady 2005a:f-6; Hammond 1977; Scott 2012:10). Nevertheless, Andrews (1965, 1970), Pendergast (1962, 1964, 1969, 1970, 1971, 1974), and cultural anthropologist Evon Vogt (1964a, 1969:595) cite the earlier report, indicating that it had some influence on cave scholarship at the time. Furthermore, the ideas from both pieces had a long-term impact as evidenced by their prominent incorporation into James Brady's research (1989; 2005a), and Awe's (1997, 1998) project introduction essays in the BVAR/WBRCP project readers. As discussed in more detail below, James Brady is primarily responsible for establishing the subfield of Maya cave archaeology, and he notes that Thompson's (1975) synthesis has been the largest influence on his work (Brady 2005a:f-7). BVAR/WBRCP was a research project and field school dedicated to training cave archaeology graduate students in western Belize, running from the mid 1990s to mid 2000s.

Thompson (1975) identified eight common pre-Hispanic Maya uses of caves including— sources of drinking water; sources of "virgin" water for religious rites; locations of religious rites; burials, ossuaries, and cremations; "art galleries," possibly related to religious rites; depositories of ceremonially discarded utensils; places of refuge, a minor use; and other uses. The significance of these syntheses lay in their details. In particular, five of the eight categories contain allusions to ritual, and he makes an explicit argument against the habitation model (Thompson 1975:xli). Overall, the impact of

Thompson's (1959, 1975) works resides in its utility as an interpretative framework for Maya archaeologists that remains largely useful today, and more significantly, that they represent the first true broad statements about Maya cave use, focusing on their religious nature (Brady 1997b; 2005a).

Dorris Heyden's (1973, 1975, 1981) research has had a long-term impact on Maya cave archaeology even though she wrote about the tunnel beneath the Sun Pyramid in Teotihuacan, Mexico. Heyden's specific argument was that the passage was a natural feature, and the catalyst for the placement and orientation of the Sun Pyramid, and was thus ultimately responsible for the orientation of the entire city (Heyden 1973:8-9, 1975:139, 1981:3-4). More specifically, she drew heavily on ethnohistoric and ethnographic data, arguing it to be a Teotihuacan version of the Mesoamerican belief in caves as emergence places, best known by its Aztec name, Chicomoztoc, discussed below (Heyden 1973, 1975:140-141). I include her work in this discussion because she had identified core components of a belief system that subsequent research has demonstrated is a pan-Mesoamerican phenomenon (Aguilar et al. 2005; Brady 1997a; Brady and Prufer 2005a:5; Heyden 2005; Kieffer and Scott 2012; Prufer and Brady 2005c:404; Spenard 2009, Spenard and Skirvseth 2009). Additionally, as Brady (1997b, 2000) notes, she offered a fundamentally different way of interpreting caves than was common in the Maya area in the late 1970s (Heyden 1973, 1975). Whereas Maya archaeologists then tended to view caves simply as spaces for ritual performances, Heyden understood that they were fundamental components of social systems (Brady 2000:6). In other words, she was a pioneer in socializing cave studies (Ashmore 2002,

2004b). My interpretations of the Pacbitun karstscape draws heavily from such a theoretical framework as discussed in Chapter 1.

Later studies performed in the tunnel have called into question its being a natural feature (Manzanilla et al. 1994; Sugiyama et al. 2013). They revealed that the "cave" was one of a series of quarry tunnels excavated around the time of the pyramid's construction, which only afterwards took on an ideological function (Manzanilla et al. 1994). Nevertheless, Brady (1997a, 2000) suggests that the tunnel's original excavation in conjunction with the pyramid's construction validates Heyden's (1981) observation that caves and architecture were closely related in the minds of the Teotihuacanos. Similar connections have been widely recognized throughout the Maya area indicating the influence of Heyden's ideas on speleoarchaeology (Andres et al. 2010; Brady 1991, 1997a, 2000, 2004, 2012a; Brady and Ashmore 1999; Brady and Bonor Villarejo 1993; Brady et al. 1997; Brady and Veni 1992; Fedick et al. 2012; Halperin 2002, 2005; Ishihara-Brito 2007, 2008; Spenard 2005a, 2005b, 2006a, 2011a; Spenard et al. 2012; Stuart and Houston 1994; Woodfill 2007;Woodfill et al. 2001, 2002).

New research at Teotihuacan affirms Heyden's stance that the Sun Pyramid was built where it was because the spot had previously been a sacred location, although reveals a different reason for its placement (Sugiyama et al. 2013). These new studies affirms that both the Sun Pyramid and the tunnel beneath it were likely coterminous, but they have also provided a series of radiocarbon assays, offering a revised date of the beginning of the third century A.D. for the entire construction program, nearly one hundred years later than previous estimates have suggested (Sugiyama et al. 2013:428).

More significant is their uncovering of a series of pre-Sun Pyramid ceremonial structures buried beneath the monument that indicates the centrality of the spot to the social landscape (Sugiyama et al. 2013:428).

Although these newest findings support the new understanding of the nature of the tunnel, they simultaneously reinforce the connection between monumental architecture, caves, and political power mentioned above (Heyden 1973, 1975, 1981; Manzanilla et al. 1994). In fact, the findings further strengthen that argument because the Sun Pyramid and its tunnel were constructed during a period of state monumentality occurring between A.D. 170-310, which also witnessed the erection of the Moon and Feathered Serpent pyramids, the latter of which also has an artificial cave beneath it (Chavez and Quezada 2013; Sugiyama et al. 2013:429). I note here that newest investigations at the Sun Pyramid and its tunnel suggest that the cave-temple complex became a new legitimizing force for state-level power for the Teotihuacan rulers (Chavez and Quezada 2013; Sugiyama et al. 2013). Furthermore, these new dates closely correspond to the well-known Teotihuacan *entrada* into the Maya area (A.D. 378) suggesting that the construction of the cave-temple complexes may have helped consolidate the necessary political power for broad-ranging military expansion (Proskouriakoff 1993; Stuart 2000; Taube 1992b, 2000b).

To summarize, the scholarship produced during the Post War period was revolutionary to Maya cave studies in several ways. Most notably was a shift away from habitation-based interpretive models and the adoption of ritual-based ones among the practitioners, but Maya archaeologists in general remained skeptical about the ability of

cave data to contribute to the field. Additionally, caves came to be understood as legitimate archaeological sites that should be investigated and reported as such, rather than treated as novelties. Furthermore, the research of this period established the utility of using a multi-disciplinary approach to analysis and interpretation. In particular, ethnographic, ethnohistoric, iconographic, and hieroglyphic data were demonstrated to be particularly useful in that regard, and the origins of socialized cave archaeology appeared in Heyden's (1973, 1975, 1981) Teotihuacan research. Lastly, the framework for what would become a legacy of cave archaeology in Belize had begun during the period.

Reevaluating the Early Foundation Period (1978-1989)

In general, the events of the Post-War Period discussed above should have set the stage for Maya cave archaeology studies to flourish. In fact, Brady (1997b) previously proposed they led directly to the rise of a self-aware discipline in the mid-1980s (see also Brady and Prufer 2005a:1). Reflecting now back on this time nearly 2 decades later, I disagree with his assessment, and instead suggest that the establishment and broad acceptance of the field only occurred in the late 1990s as discussed below (Spenard 2011b). Scott (2012) has also marked a late 1990s date, although our understandings of previous two decades vary. The primary distinction stems from our different understandings of the disruption caused by the passing of four of the six major Post War Period cave scholars discussed above, and the impact of the other work produced that followed. Anderson, Andrews, and Thompson had all passed away by 1975, and Puleston

soon followed in 1978 (Hammond 1977; Harrison and Messenger 1980; Pendergast 1968b; Stirling 1973; Wauchope 1972). Brady (1989, 1997b), who began his dissertation research in the early 1980s, saw direct continuity between his work and those earlier scholars. Countering Brady (1989, 1997b), Scott (2012:11-14) believes that the deaths led to a complete disruption of the developing field because of a lack of a senior scholar fully dedicated to cave research. Furthermore, Brady began his research several years after Puleston had passed away, and he struggled to find acceptance of his ideas due largely to his status as a graduate student (Scott 2012). Brady would go on to become one of the major vocal proponents for cave archaeology, but only after completing his dissertation. I split Scott's (2004, 2012) Foundation Period into early and late facets in the following sections and refined its origination date for ease of discussing the events following Puleston's passing in 1978 and Brady's completion of his dissertation in 1989.

I have previously suggested that the four deaths were certainly disruptive and Brady's impact on the field began around the time he completed his dissertation on Naj Tunich in 1989, but cave research, particularly in Belize, and iconographic studies provided a bridge over that gap (Spenard 2011b). Many of the investigators writing at that time continued using the methods and themes developed by the deceased researchers both explicitly and indirectly, demonstrating some continuity in the field, specifically that caves were ritual spaces, and adopting a multidisciplinary approach to understanding them. For example, Bonor Villarejo (1987, 1989a, 1989b) studied caves and rockshelters in Yucatan, Mexico in the 1980s, and published on Maya cave ritual and symbolism, much of which was informed by ethnographic and ethnohistoric documents. Graham,

McNatt, and Gutchen (1980) began investigations in Footprint Cave, Belize in 1979, comparing their findings to other cavern and settlement assemblages from that country in their report on their work. They draw specifically on Thompson's and Puleston's studies, as well as ethnographic and ethnohistoric records, determining that Footprint Cave was used as a ritual location (Graham et al. 1980:169). McNatt continued periodic cave investigations on the behalf of Department of Archaeology, now Institute of Archaeology, in Belize from 1983 to 1986 (McNatt 1986, 1996:83). He draws specifically on Thompson's list of Maya uses of caves for understanding the subterranean archaeological record in Belize (McNatt 1996:85-93; Thompson 1959, 1975).

Pohl (Pohl 1981, 1983) authored a series of papers, one with her brother (Pohl and Pohl 1983) combining ceramic, iconographic, faunal, ethnographic, and ethnohistoric data, arguing caves were places where *cuch*, or burden transfer, rituals occurred and that those underground places may have been the loci of accession ceremonies. Although her interpretations have not been born out by further research, her use of such sources for understanding caves as ritual locations demonstrates the influence and continuity of work from the cave scholars who immediately preceded her (Spenard 2011a). While Pohl's research interests guided her elsewhere following those publications, her influence reemerged in the early 2000s as the chair of several Maya cave archaeology-related Master's degrees, demonstrating her lasting influence on the field, as discussed below (Spenard 2011b).

Barbara MacLeod and Dorie Reents-Budet teamed up for a project at Petroglyph Cave, Belize in 1978, from which the latter produced a Master's thesis and a short article

focusing on the ceramics from that cave (Reents-Budet 1980a, 1980b). In her work, she notes the pre-Hispanic Maya considered caves to be ceremonial places, and uses that information to inform her interpretations (Reents-Budet 1980b:10). Lastly, several Archaeological Commissioners of the Department of Archaeology in Belize conducted periodic cave work, a tradition that continues through today (Awe 1997; Graham et al. 1980; McNatt 1996:83).

Matthias Strecker (1976, 1977, 1981, 1982, 1984, 1985a, 1985b, 1987a, 1987b) published extensively on the petroglyphs in caves throughout the Yucatan Peninsula, Mexico. Andrea Stone (1982, 1989, 1991, 1995, 1997a 1997b) began her studies of the Naj Tunich cave paintings in the early 1980s, culminating in her 1995 volume on Maya cave art. Taube (1983, 1986) wrote about the symbolic significance caves as emergence places in Mesoamerican and American Southwest iconography and architecture as a partial follow up to Heyden's interpretations of the tunnel beneath the Sun Pyramid at Teotihuacan. As the above discussion suggests, cave-related investigations and publications drawing on Anderson, Andrews, Puleston, and Thompson's research continued after they had passed away, but much of it also went unpublished or appeared in difficult to access venues such as progress reports to government agencies (see bibliography in McNatt 1996). Nevertheless, Scott (2004) rightfully notes that none of the established North American Maya scholars investigating caverns in the late 1970s through 1980s became full-time cave archaeologists, except for James Brady.

James Brady's study of Naj Tunich cave, Guatemala, was a significant milestone for Maya cave archaeology for several reasons (Brady 1989). It was the first problem-

oriented cave project that lasted multiple field seasons rather than a short salvage operation, and it ultimately resulted in the first dissertation focused solely on a Maya cavern (Scott 2012). His research demonstrated that elites used the cave for ceremonial purposes, an observation backed up by Andrea Stone and Barbara MacLeod's analysis of the paintings and hieroglyphs found within (Brady and Stone 1986; MacLeod and Stone 1995; Stone 1989, 1991, 1995). He noted that many of the paintings depicted a variety of sexual acts, indicating a previously unrecognized fecundity of those places (Brady 1988; Nielsen and Brady 2006; see also Strecker 1987b). Lastly, his analysis revealed that physical differences in the cave, such as wet and dry areas and light versus dark zones, impacted ritual behavior, thus he called for caves-specific methods because no two caverns are the same (Brady 1989:15-16).

As the above discussion suggests, while the deaths by 1978 of Anderson, Andrews, Puleston, and Thompson left Maya cave archaeology without a senior scholar driving the discipline forward, their influence on it remains tangible to this day. Most importantly, underground research continued, and most practicing cave archaeologists adapted the ritual interpretive framework their predecessors had established. Furthermore, the multidisciplinary approach for analysis and interpretation largely pioneered by Pendergast's (1962, 1964, 1966, 1968a, 1970, 1971, 1974) studies remained the norm. Brady's (1989) dissertation undoubtedly established him as the authoritative voice in Maya cave archaeology, but as Scott (2004, 2012:12) argues, the field remained without validation because of a lack of senior scholars to champion for the field. She further notes that a lack of institutional base throughout the Foundation Period made

attracting new students to the field difficult (Scott 2012:13). I propose here that a few senior champions and an institutional base emerged during the late Foundation Period, finally legitimatizing the discipline (Spenard 2011b).

Late Foundation Period (1989-1997)

I define the Late Foundation Period as the time after Brady completed his dissertation in 1989 and a series of significant events in 1997 indicating that Maya cave archaeology had finally received mainstream acceptance as a legitimate avenue of research. Perhaps the most significant event to occur during this decade was Arthur Demarest's invitation to Jim Brady to lead a regional cave study, fully integrated into the larger Petexbatun project (Brady 1997a; Demarest 1997; Spenard 2011b). That venture led to a series of publications in major venues, firmly establishing caves as vital ceremonial components of pre-Hispanic Maya life (Brady 1997a; Brady and Ashmore 1999; Brady et al. 1997). The period also witnessed the origins of a sustained effort by Mesoamerican cave archaeologists presenting their research in annual "cave sessions" at the Society for American Archaeology meetings, typically co-organized by Brady. Lastly, Jaime Awe's WBRCP research project and field school emerged at the end of the period, providing the main research opportunities and training for budding Maya cave scholars, many of whom have pursued graduate degrees in the field, going on to become the first generation of scholars fully trained in the established paradigm.

Brady's investigations of the Petexbatun caverns represent the first time a large-scale regional archaeology project incorporated a long-term, problem-oriented cave survey component (Brady 1997a; Brady et al. 1997; Demarest 1997:217). Furthermore, the results indicated the Petexbatun caverns as a significant source of political power for the region's elite as evidenced by the placement of their palaces and other administrative buildings directly above entrances (Brady 1997a; Brady and Ashmore 1999). These places also played a primary role in determining general settlement configuration, and were the principal focus of ritual activity for all inhabitants throughout the region (Brady 1997a; Brady and Ashmore 1999; Brady et al. 1997; Demarest 1997; Stuart and Houston 1994). The rituals themselves had a substantial impact on the pre-Hispanic Maya economy as significant portions of the artifacts imported to the site, including ceramics, obsidian prismatic blades, chert, jadeite, hachas, hematite, and worked bone and shell, wound up in the caves (Brady 2005b; Brady et al. 1997; Demarest 1997:218). Although polychrome pottery was prevalent, most of the ceramic material consisted of unslipped and monochrome wares typically found in utilitarian or domestic settings; nevertheless, the vessels were smudged with residue, indicating that they were used as incense burners, and were thus ceremonial refuse (Brady et al. 1997:361). Such a use of "utilitarian" vessels for ceremonial purposes had previously been demonstrated when Brady (1989:212-213) dried smudged, undecorated and monochrome-slipped sherds from Naj Tunich cave in a heated oven and the smell of incense permeated the air of his laboratory. Lastly, several lines of evidence pointed to the caves being used long before the area was

settled, up to a millennium in some cases, indicating a deeply-imbedded sacredness likely been established by early pilgrimages into the region (Brady et al. 1997:357).

Cave-related publications abound during this period including several books on Maya art and writing related to caverns. Bassie-Sweet (1991, 1996) authored two volumes on the role of caves in Maya religion and their significance to rulership. She focuses on iconography but uses hieroglyphic, ethnohistoric, and ethnographic data to support her argument that many royal rituals such as accession ceremonies and Period Ending events may have been performed in caves. Stone (1995) compiled all then currently known examples of Mesoamerica cave art in a volume related to the paintings in Naj Tunich cave, Guatemala. In the volume, Stone (1995:16) draws on ethnographic data, providing an emic understanding of caves in Maya thought, particularly that the Maya understood caves as *k'aax*, wild, dangerous, supernatural places associated with the forest, and the antithesis of the ordered community. Both Bassie-Sweet (1991, 1996) and Stone (1995) discuss the close relationship between mountains, caves, rain, and corn. Lastly, Stuart and Houston (1994) discovered a "formula" in Maya hieroglyphic texts they used to decipher the words for place names. Although not directly related to caves, they noted that landscape terms such as mountain, earth, and cloud regularly appeared in pre-Hispanic Maya texts (Stuart and Houston 1994:43-56).

The year 1997 was a true watershed for Maya cave archaeology (Scott 2007; Spenard 2011b). Brady published an article in *American Anthropologist* describing the role of caves in settlement configuration at Dos Pilas, another in *Geoarchaeology* on the large-scale removal of speleothems from caverns, and their caching and use in

settlements, and another in a special edition of *Ancient Mesoamerica*, summarizing the work of the Petexbatun Regional Cave Survey (Brady 1997a; Brady et al. 1997a; Brady et al. 1997b; Demarest 1997). Furthermore, the first Mesoamerican cave archaeology session that included both senior and junior scholars was held at the Society for American Archaeology (SAA) meetings in Nashville (Scott 2007). Scott (2007) notes that session saw the creation of an informal e-mail network and the compilation of a large bibliography of Mesoamerican cave literature, still added to and circulated among the Maya cave archaeology community today, even though annually recurring meetings were to be a few years away (Brady 2009). In other words, the 1997 SAA session began the ongoing dialogue that continues to shape the discipline today. That group of presenters and their contemporaries were responsible for establishing the current interpretive paradigm both in print and at conferences, all of which culminated in the legitimization of Maya cave research (Kieffer and Scott 2012; Spenard 2011b). In an explicit statement of the current paradigm, Kieffer and Scott (2012:19) note that it is founded around four basic propositions: 1) Caves were used primarily as ritual locations; 2) Caves must be understood from an indigenous perspective; 3) Caves played a significant role in Pre-Columbian Society; 4) Cave archaeology can address wider theoretical issues.

To summarize, the multitude of publications and conference presentations produced during this period firmly established cave archaeology as a legitimate field of study within Maya archaeology, and they cemented the major theoretical frameworks for the subdiscipline. Furthermore, Demarest's invitation to Brady to participate in the Petexbatun project provided cave archaeology with a vocal senior scholar, helping

validate the field (Demarest 1997:217; Scott 2012:12). Brady's leadership of that subproject, and his earlier dissertation work at Naj Tunich cave, established him as the preeminent Mesoamerican cave scholar. Nonetheless, he found difficulty securing an academic position, which Scott (2004, 2012) interprets as resulting in few options being available to students interested in cave investigations, and an institutional base for research. I disagree with this assessment, and in my view, Jaime Awe's Western Belize Regional Cave Project and field school that began 1997, and the willingness of Florida State University's Anthropology Department to accept several Maya cave-focused students into the graduate program in the early 2000s as discussed below, largely filled this void (Spenard 2011b).

The Roles of the Western Belize Regional Cave Project, and Florida State University

The Western Belize Regional Cave Project (WBRCP) was a subproject of the Belize Valley Archaeology Reconnaissance (BVAR) project, both directed by Jaime Awe, emeritus Director of the Institute of Archaeology, Belize. I have suggested elsewhere that the WBRCP provided the main field opportunities for budding Maya cave scholars from 1997 to 2001 (Spenard 2011b, see also Scott 2012:13). I focus the discussion on this date range because the project was greatly scaled back and only periodically run after the 2001 field season. Awe's (1998:2) goals for the WBRCP were broad, including understanding the role of caves in pre-Hispanic Maya society in general, determining temporal, social, and regional differences in their use, and lastly, training

graduate students in cave research. Each of these goals was met with success, but I focus here on the training of graduate students because I suggest that had the greatest impact on firmly establishing Maya cave archaeology. The results of the other goals are discussed in the following section. The current section culminates with a discussion of the role of Florida State University in providing an early institutional base for WBRCP graduate students.

I have previously noted that the WBRCP junior staff and students made up the first group of cave archaeologists directly trained under the contemporary interpretive paradigm, established with the spate of publications and conference presentations of the 1990s (Spenard 2011b; e.g. Kieffer and Scott 2012). Many of those staff and students went on to pursue graduate work in the field, and, five of the nine Maya cave archaeology Ph.D. holders after Brady are alumni of those years of the project, and several others are nearing completion at the time of this writing (Helmke 2009; Ishihara-Brito 2007; Moyes 2006a; Slater 2014a; Woodfill 2007). My own introduction to Maya cave archaeology came as a member of that project from 1998-2000.

Most of the WBRCP graduate students in the late 1990s and early 2000s began their careers pursuing Master's degrees on pre-Hispanic Maya ritual cave use, but most were scattered in universities throughout North America and Europe, including: Bonn University, Florida Atlantic University, Indiana University, State University of New York, Albany, Trent University, and University College, London. Nevertheless, Florida State University (FSU) had the largest concentration of Maya cave archaeology graduate students at that time with three, all of whom were mentored by Mary Pohl. Two of the

FSU theses directly stemmed from WBRCP research, and the third, which is mine, was heavily influenced by my training and interactions on the WBRCP even though it was based on research in Guatemala (Halperin 2002; Morehart 2002b; Spenard 2006a). These theses demonstrate that Pohl had a previously unrecognized significant impact on the field during the early part of the Late Foundation Period as evidenced by her having chaired the graduate degrees of 20 percent of the first group of cave archaeologists directly trained under the contemporary interpretive paradigm (Spenard 2011b). Furthermore, the research performed under her tutelage resulted in numerous conference presentations, publications in several journals, and edited books including two chapters in the first edited volume dedicated to cave research in the Maya area, and a stand-alone book (Halperin 2002, 2005; Halperin et al. 2003; Morehart 2001a, 2001b 2002a, 2002b, 2005, 2011; Morehart et al. 2004; Morehart and Butler 2010, Morehart and Helmke 2008; Morehart et al. 2005; Spenard 2005a, 2005b, 2006a, 2006b, 2008, 2010, 2011b, Spenard and Woodfill 2007; Woodfill et al. 2001, 2002; Woodfill and Spenard 2008).

Current Approaches (1997-present)

This section of the chapter is organized differently than the others because it integrates the remaining history of Maya cave archaeology investigations with a discussion of current interpretive models, with most having been developed in master's theses, doctoral dissertations listed above, and three edited volumes (Brady 2012c; Brady and Prufer 2005b; Prufer and Brady 2005b). Furthermore, I group the section by themes

rather than following a linear historical trajectory for ease of discussion, although refer to it as the Recent Period. This organization allows me to trace the impact of the Petexbatun and WBRCP projects on the current approaches of Maya cave archaeology, allowing me to situate the main topics of this dissertation within the broader frameworks in the field. Much of this work has been greatly informed by iconographic, hieroglyphic, ethnographic, and ethnohistoric research, which I discuss in following sections.

The legacy of the Petexbatun caves study is obvious in research performed throughout the Recent Period. One of the most visible areas of impact of that project is a focus on the variety of strategies that elites used to control cave-like features, and the effect that practice had on pre-Hispanic settlement configuration (Brady 1997a; Brady and Ashmore 1999). In some cases, control was directly expressed by the placement of administrative nodes adjacent to or above primary cave entrances, or indirectly by constructing roads between site cores and caverns (Andres et al. 2011; Brady and Kieffer 2012; Demarest 2013; Halperin 2002, 2005; Spenard 2011a; Spenard et al. 2012; Woodfill et al. 2002; Wrobel et al. 2012; Weber 2011b). In other cases, elite control was maintained through ideological appropriation of those spaces with the performance of state-level rituals, ancestor veneration, and pilgrimage (Brady 1989; Colas 1998; Demarest 1992, 2013; Ishihara-Brito 2007, 2008; Moyes 2006a; Patel 2005; Petryshyn 2005; Sandstrom 2005; Spenard 2006a; Stone 1992, 1995, 2005a; Woodfill 2007).

Both the Petexbatun cave research and WBRCP demonstrated the utility of incorporating regional cave surveys with settlement studies for obtaining a more refined understanding of pre-Hispanic Maya life. The success of these research programs is

demonstrated by the now regular inclusion of cave components on many projects throughout the Maya area. For example, Halperin (2002, 2005) examines how the elite of the site of Cahal Uitz Na in the Roaring Creek Valley, Belize appropriated Actun Nak Beh cave, using it to legitimize and augment their social and political power. Peterson (2006) explores the evidence for interaction between surface and cave sites in the Sibun Valley, Belize. In particular, she found evidence that the Terminal Classic period Maya collected vessels previously deposited in caves–as indicated by their being coated in calcium carbonate, yet recovered in purely alluvial fill–were removed and reburied in caches in settlements in that area (Peterson 2006:260-261). Furthermore, she focused on identifying speleothems in settlement excavations, concluding that removing and transporting those formations occurred on a scale previously unimagined (Peterson 2006:235). In the southern Maya Mountains, Belize, community identity was reinforced through shared ritual practices (Prufer 2002:634, 2005:205-206; Saul et al. 2005). Specifically, members of the Ek Xux community buried their dead in rockshelters throughout the surrounding valley, while the inhabitants of the nearby site of Muklebal Tzul interred their deceased in substructure chambers instead (Prufer 2002, 2005). My research in the caves of the San Francisco hills near Cancuen, Guatemala, indicates the elite from that site used the geologic features as their temple-pyramids, a pattern replicated in other sites throughout that region (Demarest 2013; Spenard 2006a; Woodfill et al. 2002). Woodfill (2007) found that traveling merchants used the caves in the massive Candelaria system, located at the interface of the Maya Highlands and Lowlands in central Guatemala, to secure their safe passage over the landscape. Furthermore, he

speculates that such visitors bolstered the economies of smaller settlements, particularly those located near cave entrances, through the payment of tariffs, donations, or the purchasing of ritual paraphernalia (Woodfill 2007:574).

Most underground investigations during the Recent Period have documented that the pre-Hispanic Maya extensively modified caves in a variety of ways including importing and moving around stones and boulders, breaking formations, constructing architecture, and even creating artificial caverns. The importation and moving around of foreign rocks is a recently identified phenomenon that has yet to be well studied and is therefore only mentioned here, but it appears to have been a widespread practice (Brady 2012b; Brady and Prufer 1999; Mirro 2012). Formation breakage has been widely documented throughout the Maya area, and the primary reason appears to have been for incorporation into surface architecture as discussed above, although some were used in constructions and to demarcate paths within the caves (Brady et al. 2005; Brady et al. 1997; Lorenzen 1999; Moyes 2005a; Peterson 2006:235; Peterson et al. 2005; Weber and Kieffer 2013). Nevertheless, a growing body of evidence suggests the Maya and other Mesoamerican groups worshipped speleothems as the physical manifestations of divine beings, particularly the rain god, Chahk (Bassie-Sweet 1991:152; Brady 1999:63; Fitzsimmons 2005; Josserand and Hopkins 2007; Navarrete and Martinez 1977; Seler 1901:163-169; Stone 2005b). In another case, a broken formation recovered from a cave in the Sibun Valley, Belize has a chemical composition similar to a rockshelter 28 km away, suggesting that the Maya of that area moved speleothems between karst features over great distances (Nation et al. 2012).

Architectural modifications have long been noted as regular features in caves, but little effort has been made to understand their functions until recently. For example, Mercer (1975[1896]:27) believed that they were hunting blinds for shooting doves. Thompson (1975:xlii) mentions that they are present in some caves but spends little effort analyzing them. He notes, "[i]t seems possible that [their use as blinds for shooting doves] was a secondary use of walls perhaps constructed long ago, but it appears more probable that they were constructed as blinds [sic]" (Thompson 1975:xlii). Archaeologists began to pay closer attention to such constructions following the discovery of a massive artificial feature that included seven structures nicknamed, "The Balcony," in the entrance of Naj Tunich cave, Guatemala (Brady 1989; Brady and Stone 1986; Stone 1995). The openness of the chamber containing the Balcony, as well as the monumental nature of the construction, led to Brady's (1989) suggestion that area of the cave was used for elite public performance. Terraced areas in large, open chambers in other caves have similarly been identified as spaces of large public performances (Moyes 2012:96). Rissolo (2001, 2003b, 2004, 2005b) documented several constructions in caves in Quintana Roo, including a pyramidal structure related to water ritual. Prufer (2002:604-613) reports on several caves in the southern Maya Mountains, Belize containing constructions possibly used to guide movement through them, bound spaces, prevent access to certain areas, and provide venues for public performance. Ferguson (2000, 2001) documented approximately 30 terrace features in Actun Chapat cave, Belize, most located near one of the cavern's primary entrances. Although she excavated several of them, their functions remain elusive. Kenward (2005:254) proposed that the

constructions found in several of the caves in the Sibun region, Belize were modified to facilitate traffic flow through them. Peterson (2006:263) agrees with that assessment overall, but adds that the locations and diminutive size of some of the modifications indicate a prescribed set of rules for moving around the sacred landscape. Colas (1998; Brady and Colas 2005:154-155) found hieroglyphic and archaeological evidence suggesting some modifications were the result of desecration during times of warfare. Lastly, Moyes (2012:98) has argued that the practice of architectural constructions in caves helped organize those spaces, and create mythical narratives guiding participants on symbolic journeys through the Underworld during their rituals.

Subterranean modifications were not only limited to architecture, they also involved creating artificial caves, a practice common throughout pre-Hispanic Mesoamerica. Perhaps the best-known example is the tunnel system underneath the Sun Pyramid at Teotihuacan, discussed earlier (Manzanilla et al. 1994). Elsewhere in Mexico, seven adjacent cavities excavated into a natural escarpment have been located at the site of Acatzingo Viejo in Puebla (Aguilar et al. 2005). Malinalco, located to the southwest of Mexico City, contains a circular temple cut into living bedrock, the front of which is decorated with the massive open jaws of a snake signifying its role as a symbolic cave (Townsend 1992a:101-104). Hirth (2000:73) recorded approximately 70 large artificial caves throughout the site of Xochicalco, Morelos, many with multiple chambers underneath the administrative precinct of the site. He believes that the inhabitants of that city created them as limestone mines for lime production, and then repurposed them as storage areas (Hirth 2000:73). Furthermore, he notes specifically that only one contains

any evidence of ceremonial use (Hirth 2000:216). However, his conclusion of their roles in Xochicalco society is problematic because their placement and configurations within the site center fits the broader pattern of the symbolic significance of cave found throughout Mesoamerica just discussed, particularly the relationship between caverns and primary administrative nodes.

Artificial caves are particularly common in the volcanic Maya Highlands of Guatemala, where the igneous and metamorphic bedrock geology lacks the karst processes of limestone. Brady and Veni (1992; see also Brady 1991) discuss the human-made passages associated with the sites of Mixco-Viejo, Esquipulas, and Utatlan (Gumarcaj), all in Guatemala. Those from the latter site are the most extensive of the three settlements, and they mirror the layout of the architecture above (Brady 1991). Two of the features collapsed during an earthquake in the mid-1970s, but the one that remains is an important pilgrimage shrine for Maya diviners from municipalities surrounding Santa Cruz del Quiché, and beyond who go there in search of religious knowledge (Brady 1991:2; Tedlock 1982:148-149). Overall, Brady and Veni (1992:165) suggest that such artificial features were likely present in all areas of the Maya Highlands, an observation that subsequent research has borne out (Brady 2004). This proposal has most recently been verified by the discovery of two additional artificial caves in the Guatemalan highlands, one at Utatlan (Gumarcaj) and another near Quetzaltenango (Woodfill 2014).

Artificial caves are also present in the southern Maya Lowlands although they are a different character than those in the highlands (Brady 2004, 2012a). In particular, *chultunob*, underground excavated cavities, appear to be analogous to caverns, but used

on the household level as cave shrines for to the animate earth (Brady 2004:10). This proposition is based largely on the results of storage experiments on the features at Tikal, Guatemala (Brady 2004:10; Puleston 1965, 1971). Briefly, these experiments revealed the excavated features were not constructed to hold water and were too humid for dry storage in the southern Maya Lowlands as commonly believed (Puleston 1971). Instead, this new interpretation draws on ethnographic and linguistic data suggesting that any hole penetrating the ground took on a sacred character analogous to caves, even those that originated from utilitarian activities such as mining (Brady 2004:12). As such, *chultunob* likely fell into this category, and thus their ubiquity at sites indicate that "caves" were features of first importance to Maya society (Brady 2004:12). Furthermore, their ritual significance for the pre-Hispanic Maya is attested to by the regular placement of burials within them, and the presence of inverted vessel caches, a pattern typically encountered in caves (Brady 2004; Gray 2000; Griffith et al. 2000; Lee et al. 2000). A previously unrecognized type of artificial karst feature was recently documented at the site of T'isil, Quintana Roo, Mexico, where the Maya had excavated to the southwest of the site an artificial *cenote*, a sinkhole leading to the water table (Fedick et al. 2012). The archaeologists investigating that site have also identified four natural *cenotes* to the northwest, southeast, northwest and one near the center of the site forming a quincunx pattern together with the artificial one, and they propose the spaces between the corner four likely provided conceptual boundaries for the community (Fedick et al. 2012:121-122).

Architectural caves are a second type of recently identified artificial cavern (Brady 2012a). These features are exceedingly rare, but have been identified in Mexico at Yaxchilan and Tonina, in Chiapas, and Oxkintok, in Yucatan, in Sabalam in the southeastern Peten, Guatemala (Brady 2012a; Rivera Dorado 1987). Brady (2012a:61) argues that they are part of a larger Mesoamerican pattern of equating building interiors with caves, which I discuss in more detail below.

In addition to excavated and architecturally constructed caves, recent archaeological research demonstrates the pre-Hispanic Maya performed "cave" rituals in a wide variety of karst features. Overall, these findings reveal the Maya perception that any hole or cavity penetrating the earth was considered a *ch'een*, commonly translated into English as "cave" (Laughlin 1975:132; Vogt and Stuart 2005). Thompson (1975:x) notes the difficulty in differentiating between caves and cenotes found in the Yucatan Peninsula, but his discussion is tied to an overview of sources of drinking water, rather than being offered as part of an archaeological interpretation. Brown (2005:377) discusses this issue specifically at the site of Mayapan, Mexico, noting the various features had a ritual relationship with the settlement at that site. Juan Louis Bonor Villarejo (1987, 1989a, 1989b, 1995; Bonor Villarejo and Glassman 1999; Bonor Villarejo et al. 1996; Bonor Villarejo and Sanchez y Pinto 1991) was an early advocate for interpreting rockshelters as ritual spaces analogous to caves. His primary focus was in southwestern Yucatan, although he also led a salvage program in Caves Branch Rockshelter in Belize. One of his primary research goals was understanding the cosmological significance of underground sites for the pre-Hispanic Maya (Bonor

Villarejo and Glassman 1999:18). WBRCP archaeologists similarly investigated rockshelters from the start of that project, and found that they were analogous to caves in pre-Hispanic Maya thought and ritual practice (Awe et al. 1998; Gibbs 1998; Griffith 1998, 1999a; Griffith and Helmke 2000; Griffith and Morehart 2001; Mirro et al. 1999). Brady (1997a:610; Brady and Ashmore 1999:130-131) noted that small bedrock chambers were for household rituals throughout Dos Pilas, Guatemala. Rissolo (2001, 2003b, 2005a) explicitly tested the relationship between the caves and rockshelters of the Yalahau region in Quintana Roo, concluding that the similarities of physical characteristics as well as the artifact assemblages indicate that they part of the same emic concept. Peterson (2006), Prufer (2002), and I (Spenard 2006a) incorporated rockshelter excavations into our respective regional karst studies in Belize and Guatemala, and Ishihara-Brito (2007, 2008) interpreted the ritual use of two chasms at the site of Aguateca, Guatemala, as equivalent to cave ceremonies. Lastly, Kinkella (2004, 2009) comments on the cognitive overlap of caves, bodies of water, ballcourts, and sweat baths in his study of the Cara Blanca pools in the Valley of Peace area, Belize. In that study, he proposed that the symbolic draw of those features outweighed the poor soil quality of the area when it was settled.

Overall, such recent studies have revealed that the pre-Hispanic Maya concept of *ch'eenob* incorporates a wide variety of karst features including caves, *cenotes, chultuns*, rockshelters, and sinkholes. Nevertheless, the collective focus of the archaeologists has been on those caves and rockshelters that are relatively large, even though evidence of ritual use of more diminutive features is regularly attested to by the presence of ceramic

sherds and modifications in a variety of small features such as large boulders with overhangs, or irregularities in otherwise straight walls of bedrock outcrops, such as alcoves and cracks. Thus, one of the primary goals for my dissertation research is documenting and investigating such small karst features and determining their nature of use.

Iconographic and Hieroglyphic Approaches

Breakthroughs in hieroglyphic decipherment and iconographic interpretations particularly since the start of the Recent Period have bolstered our understanding of the symbolic significance of karst features for the pre-Hispanic Maya, as well as other Mesoamerican groups and even cultures in the Southwestern United States. In particular, such studies reveal a deep tradition of reverence for the animate, fecund, sacred earth with mountains, caves, and water at its base (Brady 1988; Brady and Ashmore 1999; Broda 1987:92-93; Grove 1968; Hays-Gilpin and Hill 1999; Hill 1992; Nielsen and Brady 2006; Prufer and Brady 2005c:403; Saturno et al. 2005:14; Schaafsma 1999:167; Stone 1992, 1995; Taube 1986, 2001, 2003a, 2003b, 2004a, 2006, 2010a). Furthermore, as indicated above, they further demonstrate the "cave" concept in pre-Hispanic thought extended well beyond caverns and included a wide range of natural features that even extended to human constructions.

A brief point of clarity about the following section is in order before continuing. I employ "K-numbers" when discussing particular hieroglyphic vessels, and use them in

figure captions. They refer to an online searchable database of rollout photographs of vessels maintained by Justin Kerr, located at, http://research.mayavase.com/kerrmaya.html (Kerr 2014). The "K-numbers" are unique identifiers for individual vessels that can be used to navigate to Kerr's photographs of them.

Caves were one of many natural and human-made holes, and other cavity-like features called *ch'een* (pl –*ob*) in Yucatec Maya that penetrated the *kab*, earth, and *witz,* mountains/hills (Boot 2004; Brady and Ashmore 1999:127; Laughlin 1975:132; Stone and Zender 2011:133; Stuart 1987, 1997; Vogt and Stuart 2005:157). Maya scribes used different hieroglyphic collocations to distinguish between the various types of *ch'een*, including caves, cenotes, and hilltop-rocky outcrops (**Figure 23**; Bassie-Sweet 1991:95-96; Houston and Taube 2012:44; Looper 2000; Thompson 1962:291; Tokovinine 2013:n12; Vogt and Stuart 2005:157-163). The so-called impinged bone glyph for *ch'een* is among the most frequent in all texts suggesting that caves were a regular topic of discussion (Vogt and Stuart 2005:157). Martin (2001:178) notes that these glyphs seem to refer to towns and cities, but they may be abbreviations of the couplet *chan ch'een*, "sky cave," which he believes was used to denote key population centers. Both of these readings find support in Postclassic period Central Mexican iconography. For example, the Nahuatl term for village and community was *altepetl*, literally water-mountain, depicted iconographically as water-spewing mountains with caves at their feet (**Figure 24**; Boone 2000:53; Broda 1987:93). Both the Mixtec and Borgia group of codices depict caves in a similar fashion, but also include red-filled "Ω" shapes and zoomorphic mouth-

like elements on toponyms for settlements (Pohl and Byland 1990; Spenard 2009). Nevertheless, Tokovinine (2013:38) recently found that the placement of the impinged bone glyphs in Maya texts may have been used as general referents to the holy grounds of polities, that is, the houses of gods and lords, when appearing by themselves, rather than only signifying caves. Using the new reading, he argues that the *chan ch'een* couplet mentioned above is used as a general referent for the sacred domains of gods and ancestors, but that it includes caves, mountains, and other geographic features such as canyons, and rockshelters (Tokovinine 2013:42).

The Maya and other pre-Hispanic Mesoamerican people depicted *ch'eenob* in a variety of ways. The quatrefoil motif is the most common form, appearing by itself or on the brows of breathing, zoomorphic *witzob* (Grove 1968:486; Looper 2000; Miller and Taube 1997:56-57; Taube 2001, 2004a, 2004b, 2006, 2010a; Taylor 1978). For example, Andrea Stone (1995:36) discusses K1485, a Late Classic period vessel depicting large jars and other vessel types inside of a quatrefoil, and the remainder of the scene has speckles of dots, suggesting rain-related events, as elaborated below (**Figure 25**; Robicsek and Hales 1982:Vessel 1). Elsewhere, these motifs contain images of ancestors and other gods, such as Piedras Negras Stela 40, depicting Ruler 4 performing a ritual to his deceased mother enclosed within a partial quatrefoil chamber (Martin and Grube 2008:149; Taube 2010a:89). The ancestors of Pakal of Palenque, Chiapas, emerge from the dead as orchard trees sprouting from quatrefoil-shaped cracks in the earth (Schele and Freidel 1990:221). The form also appears in the back of a turtle in the West Wall mural at San Bartolo, framing the maize god dancing and playing a drum for the gods of rain and

terrestrial water (Taube 2009; Taube et al. 2010:71-72). When depicted in this fashion, the turtle is a symbol for the world, floating on the primordial sea, indicating the depicted events on that portion of the mural occurred underground during the time of creation (see **Figure 29**; Taube 1988, 2010b, 2010c).

C*h'eenob* are also represented as "U"-shaped skeletal jaws of the centipede, as well as Γ-shaped elements, closely resembling depictions of architectural temples (**Figure 26**; Stone 1995:35; Stone and Zender 2011:53; Taube 2003b). Deities, primarily the rain god, Chahk, are shown sitting on hieroglyphic thrones inside these elements, indicating that these underworld abodes are their homes (**Figure 27**; Bassie-Sweet 1991:102; Stone 1995:35). In at least one case, the Maya replicated this iconographic program in physical form, as discussed by Graham (1997), who describes a stucco sculpture in the entrance of La Pailita Cave, Guatemala depicting the rain god on a throne (**Figure 28**; Graham 1997; Stuart and Stuart 1977). Research by Brady (1999), and Stone (2005b) indicates that other carved or undecorated cave formations were similarly revered as the rain god, suggesting that sculptures similar to that found in La Pailita Cave may have been more common than current evidence indicates (see also Fitzsimmons, 2005; Navarrete and Martinez 1977). Among the other gods affiliated with *ch'een* are Zip, the hunting god, and, the Maize God, Hunaphu, the latter of whom is frequently depicted emerging through a crack in the earth (**Figure 29**; Brown 2004, 2005, 2009; Brown and Emery 2008; Quenon and le Forte 1997; Taube 1985, 1992a:92-99, 2003a, 2004a, 2009).

An insightful observation by Stone and Zender (2011:136-137) demonstrates the concept of *ch'een* as the abode of Chahk extends to mines, in addition to the artificial and architectural caves discussed above. In particular, they note that Dresden Codex page 67 has the god on a *kab*, "earth" throne, surrounded by a Γ-shaped element containing the same markings (**Figure 30**). Additionally, the front of the structure is decorated with a *sak*, "white" hieroglyphic sign, which together with the *kab* elements they read as, "*sak kab*," or "*saskab*" a white limestone powder mined for making cement (Stone and Zender 2011:137). A nearly identical scene appears on page 30 of the same book, although the *sak* glyph is absent. Instead, an element at the rear of the throne resembles the god's ear spool assemblage, or perhaps the third person possessive syllable "-yu." Unfortunately the text above explaining the scene is destroyed, but if the latter interpretation is correct, it may label the *kab* cave specifically as Chahk's *kab* "cave." The ear spool interpretation is less secure and its meaning remains elusive. Either way, both appearances further add to our understanding of the types of *ch'eenob* that the rain god inhabited, even if they originated as utilitarian human endeavors. Interestingly, Stone and Zender's (2011:137) interpretation of the Chahk scene on Dresden codex page 67 closely parallels the origin story of the San Diego, the patron saint of Chan Kom village, Yucatan, Mexico, whose effigy was found in a saskab mine on the outskirts of that village (Redfield and Villa Rojas 1934:109).

Many *ch'eenob* display *kawak* symbolism, and depicted as breathing, zoomorphic entities, identifying them as living beings (**Figure 31**; Bassie-Sweet 1991:102). The *kawak* symbol is composed of clusters of circles and associated groups of concentric

circles rimmed with dots, the former of which Bassie-Sweet (1991:109; see also Fash 2011:128) notes resembles the dripstone formations found in caves (Taylor 1978). Maya scribes employed *kawak* signs to indicate rock, and if Bassie-Sweet's (1991:109) dripstone formation identification is correct, then it may indicate limestone objects specifically (Stone and Zender 2011:70; Stuart 1997:14). Such a reading would not be unprecedented as hieroglyphs and iconographic symbols for other stones, particularly flint, jade, and obsidian are already known (Miller and Taube 1997:88, Stone and Zender 2011:70-71,74-75, 82-83; Taube 1991, 2005a). *Kawak* stone symbols mark the *ch'eenob* as mountains, attesting to the inextricable connection between these two categories of landscape features (Brady and Ashmore 1999).

Mountains were thought of as water receptacles, and their breath, symbolized by snakes exhaled from their cave maws, carried the liquid out of the underworld and into the sky, creating clouds of rain (**Figure 32**; Broda 1991:84; Taube 2001:104). Rands (1955:344) discusses several related myths from the Aztec and contemporary Central Mexican communities telling of gods who collect and store jars of water in their caves, which they then pour out as rain over the land. In the Titles of Tetzcotzingo, the king, Nezahualcoatl, mentions that the hills surrounding the Valley of Mexico are filled with water (McAfee and Barlow 1946). Furthermore, the Aztec called mountains, *atoyatl*, "running water," in reference to the rivers that flow from them (Townsend 1992b:181). They also believed that mountains could dissolve if necessary, releasing enough water to flood the world (Sahagun 1963:247). Similarly, carrying and lifting water filled jugs was a metaphor for rain was common to ancient Mesoamerica and Puebloan thought

(Schaafsma 1999). For example, Late Classic period Quirigua Zoomorph P depicts flying Chahks pouring water from jars (Schaafsma and Taube 2006:249). Late Preclassic period Izapa Stela 1 depicts the god with a jar strapped to his back from which flow torrents of water, producing stream that he fishes (Norman 1973). Thus jars deposited in caves, such as those depicted on vessel K1485 mentioned earlier, as well as those commonly recovered from archaeological contexts indicate rain rituals performed inside of mountains.

Zoomorphic mountains often have flowers and other foliage growing out of them, and wild animals cavorting on their outer surfaces, representing Flower Mountain, the mythological place of paradise, ancestors, abundance, life and fertility (Taube 2004a, 2005b; 2006; see also Saturno et al. 2005). The most explicit representation of these qualities of that mythical place is the North Wall mural from San Bartolo, Guatemala, summarized here from their initial publication (**Figure 33**; Saturno et al. 2005). The mural shows a zoomorphic Flower Mountain dominated by a gaping, stalactite-fanged cave maw, out of which a large, feathered breath snake emerges. The exhaled serpent running along the base of the scene eventually turns upwards, and emits its own moist breath as "S"-shaped scrolls similar to those that Taube (2001:107) argues are rain clouds. Although eight individuals engaged in various activities stand on the back of serpent, the scene pivots on an individual with Olmecoid maize god features. He grasps a water gourd while looking over his shoulder at a kneeling woman who appears ready to receive the object, with another kneeling woman in the maw of the cave holding a basket of tamales (Saturno et al. 2005:25, 31). Together, the water and tamales from the cave

indicate the fecundity of Flower Mountain, and the entirety of the scene bracketed by the Flower Mountain Cave and its upturned Feathered Serpent breath shows an early Maya version of the emergence myth (Saturno et al. 2005:31; Taube 2010a:95).

As suggested by the iconographic relationship between Γ-shaped *ch'een* elements to architectural temples, recent studies also reveal that aspects of the built environment and natural landscape were reciprocal metaphors for one another (Benson 1985; Houston 1998:348; Sandstrom 2005; Schávelzon 1980). Such metaphors are based on the recursive relationships between cognitive domains where information from one is used to shape and systematize the other, to understand the former (Houston 1998:348). For example, houses, table altars, milpa agricultural fields, and the human body, are microcosm of the universe with four sides, a center direction, and the names for some parts are used to label those from other domains where overlap is perceived (Gillespie 2000:143; Houston 1998; Stuart 1998; Taube 1998, 2000b, 2013). Alternatively, the idea of the dwelling also gives meaning to other objects in the world, such as tombs and mountains being called houses of the deceased and specific gods respectively (Gillespie 2000:151-152; Houston 1998:351; Stuart 1998). Taube (1998, 2004a, 2013) discusses examples of anthropomorphic pyramids in a variety of media, demonstrating that the Maya considered buildings as person-like living beings. For example, he describes a particular Tikal graffito displaying a temple as a seated person whose body parts and costume are composed of anthropomorphized architectural elements, such as a staircase as the loin cloth, the supporting platform as the body and lower legs, and the roof as the head and headdress (Taube 1998:464). Similarly, Structure 10L-16 and its antecedents at

Copan, Honduras were constructed as a massive symbolic censer, used for fire rituals to conjure the soul of the dynasty founder, K'incih Yax K'uk' Mo', and infuse it into the building (Taube 2004b:265). An early incarnation of that temple is depicted as an anthropomorphic pyramid on a vessel known as the Dazzler Vase (K6785), portraying the king (Sedat 1997, cited in Taube 2004b). On that vase, the regent's goggled face looks out from the temple superstructure, and he extends his winged arms from its sides, alluding to his resurrection (Taube 2004b:279).

Other times, the metaphors are more explicit. For example, Stuart and Houston (1994:86) note that the idioms for human constructions in hieroglyphic texts often incorporate the word, *witz,* labeling them as metaphorical mountains. In more public displays of this idea, buildings were commonly decorated with zoomorphic *witz* masks, identifying them as "mountains," and their doorways were fanged indicating them as *ch'eenob* (Stuart 1987, 1997:13; Stuart and Houston 1994:83; Vogt and Stuart 2005:156-157). Structure 10L-22 at Copan, Honduras, serves as a prime example of this practice. The corners of that building have stacked zoomorphic *witz* masks, and its entrance is in the form of a gaping maw (Fash 2001:122-123). Together, these elements transform the building into a mountain and its interior space into a sacred cave where the ancestors could be contacted (Fash 2001:123). Such architectural decorative practices were not restricted to Copan. In fact, local variations of it are indicative of Rio Bec, Chenes, and Puuc style architecture in Campeche, Quintana Roo, and Yucatan (Andrews 1995, 1997, 1999; Gendrop 1980, 1998). The façades of these buildings contain the breath scrolls in

the corners of their mouths, and flowers on their brows, indicating they too were perceived as Flower Mountains (Taube 2010a:95).

Ethnographic and Ethnohistoric Approaches

Although many of the breakthroughs in iconographic interpretation and hieroglyphic decipherment for understanding the role of the mountain-cave-water ideational complex for the pre-Hispanic Maya have come about relatively recently, the origins of the idea were proposed over 50 years ago by ethnographers Evon Vogt (1964a, 1964b) and William Holland (1964). At that time, Vogt (1964a:194, 1964b:501), and Holland (1964), were studying the Tzotzil Maya in the highlands of Chiapas, and observed that they worshipped a variety of supernatural beings on mountains and suggested the pre-Hispanic Maya may have used pyramids for similar purposes. In other words, the landscape was a reciprocal metaphor for components of the built environment in the past.

The most important supernatural beings for the Zinacantecos are the ancestors, *Tolilme?iletik*, and the Earth Lord, *Yahval Balamil*, believed to live in caves penetrating the hills and mountains of the municipality (Vogt 1969:298-303). A review of ethnographic literature from the Maya area, and other parts of Mexico reveal the belief in similar beings is widespread, and the discussion in the previous sections indicates their deep history. In general, ancestors are understood as the keepers of tradition that they guard fiercely. For example, Vogt (1969:301) notes that the *Tolilme?iletik* use their

punitive powers on individuals straying too far from the norms of society. Nash (1970:19-23) reports that the *me?tiktatik*, the ancestors of the Tzeltal Maya of Amatenango del Valle, Chiapas, lived in a cave in the hills on the periphery of the town where they protected the settlement from evil. Oakes (1951:54) recorded a belief of the Maya of the village of Todos Santos Chuchumatán, Huehuetenango, that anyone who strays from the customs of the ancestors dies. Fought (1972:205-211) recounts a story among the Chorti Maya of Chiquimula of grandparents who curse their descendents for not obeying them. Warren (1978:49-50) found that the Maya of San Andrés Semetabaj around Lake Atitlan, follow the *costumbres*, the ways of their ancestors, to hold the Devil and the wilds at bay. For the Maya of Chan Kom, Yucatan, the dead may bring sickness if they are ceremonially neglected (Redfield and Villa Rojas 1934:119).

Among the most prominent myths surrounding mountain dwelling ancestors is that humanity originated in caves, and that each community has a specific landmark considered as their emergence place. For example, Holland (1964) reports that mountains were considered the mythological origin places of patrilineal groups for the Tzotzil Maya of Larraínzar, Chiapas. But, he notes that the original ancestors resided in a stone palace to the east called *Vashak Men*, from which four groups dispersed to the four directions to found settlements, the western group ending in Larraínzar (Holland 1964:302). Similarly, the *Popol Vuh,* the 16th century Quiche Maya account of creation tells that the gods measured out the corners of the world, setting the stage to eventually form humans from corn found in a cave (Tedlock 1996). Later, the Quiche lineage heads returned to *Tulan Zuyua*, Seven Caves, where they received their gods (Miller and Taube 1997:60). The

San Bartolo murals discussed above depict a similar story including establishing the world corners, and then the four ancestral couples taking out of the cave corn and water, the items of human subsistence (Saturno 2009a, 2009b; Saturno et al. 2004; Saturno et al. 2005; Taube et al. 2004; Taube et al. 2010).

Rincón Mautner (2005) analyzes cave art in conjunction with pre- and post-Hispanic codices, demonstrating caverns in the Sierra Madre del Sur area of the Mixteca Alta, Oaxaca were used for rituals related to wind and rain, and emergence. A similar underworld emergence myth is also found today among the Nuyoo Mixtec of Oaxaca, Mexico. Monaghan (1995:202) reports that the Nuyootecos believe their ancestors live inside the earth and that they all emerged from a place called *Soko Usha*, or "Seven Caves," a place they liken to a womb. He notes that the name seven generally refers to a sacred place and not necessarily the number of chambers in this origin cave (Monaghan 1995:202). In another case, many Aztec painted manuscripts concern their emergence and migration from the mythological place, Chicomoztoc, Seven Caves (Boone 1997:409; Durán 1994:10; Heyden 1973, 1975, Miller and Taube 1997). The cave appears as a seven-chambered place inside of a mountain, although it often has zoomorphic elements (Spenard 2009; Spenard and Skirvseth 2009). Each of the chambers within the cave housed one of the seven Aztec lineages prior to their emergence (Heyden 1975:134).

In addition to being considered the origin places of humans, mountains and caves were vital components in foundation rituals for establishing of new communities, indicating the continued active role of the landscape in settlement configuration. Garcia-

Zambrano (1994: 217-218) compiled a list from town and land titles discussing ritual practices and desirable landscape features sought by people wanting to establish new towns during the Colonial period in Mexico. Referring to the ceremonial actions as "rituals of foundation," he notes the practies were fairly standardized throughout southern Mexico and adjacent areas (Garcia-Zambrano 1994:217). To sum up his findings, each new location needed to replicate the primordial landscape of creation, including having four corner mountains and one at the center. The central mountain needed to contain a cave with a spring to act as the mythological origin place, with the settlers excavating an artificial cavern if one was absent. Territorial boundaries were established, beginning with the selection of a central mountain, becoming the heart of the realm. From there, four corner boundary mountains were sighted, beginning with those on the east and west. Processions then set out beginning to the north and proceeded counterclockwise. Twisted cords temporarily marked the borders until stone markers could be established. A feast at the foot of the central mountain consummated the completion of the processional circuit, but the rituals continued. A circle of boughs were burned and arrows were shot off to the four directions that ended the establishment of the territorial boundaries.

Although the selected landscape features were a primary concern for the establishment and maintenance of community boundaries, other landmarks also held symbolic significance. For example, in Tzeltal and Tzotzil-speaking communities throughout Chiapas today, lineage patronyms are derived from the most important sacred hill (Nash 1970:19). Vogt (1969:Table 11) lists 20 mountains and hills that are the principle sacred places of Zinacantan, each of which has cross-shrine portals for

communicating with the ancestors (Vogt 1981:120). Laughlin (1975) reports on over one thousand sacred and profane place names surrounding Zinacantan, among these being waterholes around which patrilineal groups are organized (Vogt 1969:140-144). Gossen (1974:11-12) reports that waterholes were equally significant for the Tzotzil Maya of Chamula, Chiapas. Such social groups were likely present in pre-Hispanic Copan, Honduras, indicating that the organization around such landmarks was likely widespread and the practice has a deep history (Davis-Salazar 2003, 2006; Fash 2005; Fash and Davis-Salazar 2006;). All of these scholars report that such features were maintained ritually and, as watery holes that penetrated the earth, they were likely considered a type of *ch'een* (Fash and Davis-Salazar 2006:141-142; Gossen 1974:11; Vogt 1976:99, 1981).

While caves and mountains have strong affiliations with origins and ancestors, they are also the homes of local manifestations of the owner of earthly things and rain, commonly referred to in the literature as the "Earth Lord." Although the specific traits of this deity vary between communities, he is often a cave-dwelling deity, maintaining corrals for wild animals in his mountain and issuing rain and lightning from his subterranean home (Spenard 2006a:134). Nevertheless, he is an ambivalent force. On the one hand, he distributes wealth generously, but petitions to him are wrought with danger, as failure to perform the ceremonies properly, or sometimes without cause, he metes out punishment (Cruz Guzman et al. 1980). Overall, the contemporary versions of the Earth Lord shares many attributes with the pre-Hispanic gods Chahk and Zip, the deities of rain and wild animals (See Taube 1992a for discussion of these gods in pre-Hispanic Mesoamerica).

The Tzotzil Maya of Zinacantan call the Earth Lord, *Yahval Balamil* and communicate with him through any *ch'een*, including caves, sinkholes, and waterholes (Vogt 1969:302-303). For the Maya of Amatenango del Valle, Chiapas, he is one of many *čuleletik*, spirits that mediate the link between people and place (Nash 1970:11). The owners of the hills and caves are particularly dangerous and most people avoid any interactions with them, except for the most powerful curers and witches, and the careless greedy. Those that interact with the hill and cave owners fear having to work for them after they die, and possibly losing the souls of their first born children to them (Nash 1970:23-24). The Chol Maya near Palenque, know him as "Don Juan" (Cruz Guzman et al. 1980:116). There, he prefers to live in the cave bearing his name, but he can live wherever he pleases, even *en los Estados*, in the United States, as I was once told (Spenard 2006a:133). The deity is manifest as multiple beings collectively referred to as the *yuntzilob* to the Yucatec Maya of Chan Kom, which include the gods of rain, guardians of the milpa, and the deities of the forest who own the woods, maize, honey, and wild food animals (Redfield and Villa Rojas 1934:112-113, 127-132). Similarly, the Lacandon Maya of Najá, Chiapas, Mexico, believe that the gods of rain (Mensäbäk), hail and lakes (Itsanok$^{?}$uh), and the forest (Känänk$^{?}$ax) live in caves (McGee 1990; Petryshyn 2005). Brown (2004, 2005, 2009; Brown and Emery 2008) reports on a series of personal and communal hunting shrines surrounding Lake Atitlan, Guatemala, both used to ceremonially petition the Earth Lord prior to a hunt, and to offer a ritual of thanks if successful. These shrines are particularly noteworthy because many of them are small, nondescript rockshelters, tumbled boulders, and shallow bedrock alcoves. Scott (2009)

investigated many of the same features around Lake Atitlan, but instead took a diachronic approach to the cultural practices that led to the deposition of materials at those sites. Parsons (1936) tells that the Zapotec of Mitla, Oaxaca believe in the *dueño*, a cave-dwelling deity who owns the animals, the land, and its fertility.

Perhaps the best-studied manifestation of the Earth Lord are the *tzuultaq'a* of the Q'eqchi' Maya of Alta Verapaz, and El Peten, in Guatemala, and parts of Belize (Adams 2001; Adams and Brady 1994, 2005; Carlson and Eachus 1977; Danien 2005; Hernando Gonzalo 1999; Ochoa 2006; Sapper 2000; Schackt 1984; Weeks 1997; Wilson 1993, 1995). Their name literally translates to "mountain-valley," and they are considered the owners of everything on and outside the earth, the old men who discovered maize and how to cultivate it, and those responsible for all climatological and atmospheric phenomena (Adams and Brady 2005:305; Hernando Gonzalo 1999:260-261; Schackt 1984:19). Furthermore, they are simultaneously understood to be animate mountains, also having human forms that live in caves within. Similar to ceremonial interactions with the manifestations of the Earth Lord in other Maya communities, the Q'eqchi' must petition and thank the *tzuultaq'a* properly whenever they use or harm anything that belongs to the beings (Hernando Gonzalo 1999:260). Failure to do so is met with disaster and retaliation, including harmful winds, invasions of pests and wild animals, injury by one's own tools, and ecological degradation (Adams and Brady 2005:305; Schackt 1984:23).

In general, Q'eqchi' recognize 13 primary *tzuultaq'a*, all located in northern Guatemala, but every hill has its own spirit, and thus they are innumerable (Schackt 1984:19; Thompson 1970:273). Additionally, ethnographers have noted that the Q'eqchi'

also call other karst features such as bluffs, boulders, cliffs, overhangs, springs, rivers, and riverbanks "tzuultaq'a," suggesting the term is a conceptual category (Adams and Brady 2005:306; Schackt 1984:23, 25-26; Thompson 1970:273). These animate landscape features are at the heart of community identity. Wilson (1993:127) notes that villages are owned by individual mountains, and the community names are determined by which hill is closest. Furthermore, inter-household relationships are expressed through which sections of the landscape each uses, similar to the Zinacatecan water groups discussed above (Wilson 1993:128).

Overall, the above discussion demonstrates that Maya cave archaeology has moved well beyond the habitation model dominating the early research in the field. Much of this understanding is the result of research done over the last two decades, but its foundations lay in research done in the 1950s through 1980s. The overarching themes emerging from these studies have established the interpretive framework I use for understanding Pacbitun's karstscape. Collectively, they demonstrate "cave" as a broad concept in pre-Hispanic Maya thought, including a variety of natural and artificial features permitting ceremonial interaction with supernatural beings. Furthermore, these spaces are extensively manipulated through formation breakage, the creation of art, and building architecture at both small and massive scales. These practices demonstrate that interactions with the karst landscape played a vital role in the ancient accumulation and maintenance of elite power, territorial organization, and community identity. Lastly, caves are where rain and the moist breath carrying it into the air originates, and as such, rituals in those locations focused on interactions with Chahk.

CHAPTER 5

ARCHAEOLOGICAL INVESTIGATIONS IN THE PACBITUN KARSTSCAPE

This chapter describes my archaeological investigations of the Pacbitun karstscape during my three field seasons on the PRAP, which began with a short reconnaissance trip in December 2010 and continued over two terms in May through July 2011 and 2012. A team of two other cave archaeologists, Mike Mirro, and C.L. Kieffer, and a shifting group of local collaborators, particularly Javier Mai, Oscar Mai, Lute Mai, John Mai, Joe Tzul Rene Mai, and Gary Canto, and field school students assisted me. Mirro and Kieffer made up my regional reconnaissance and primary mapping team, while Kieffer, the local collaborators, and field school students assisted with excavations.

As discussed in Chapter 2, the Boundary Fault is a tectonic fault stretching across central Belize rich in caves and other karst features, and the area of my investigations reaffirms this glut. Seventy-eight features have been documented in the greater Pacbitun region through the 2012 field season, most located along the front range of the Maya Mountains between Pacbitun and the minor center of Sak Pol Pak (**Table 5.1**). I have recorded 50 of these for the first time, while other researchers —including archaeologists, geologists, and cavers— had previously located the remaining 28, but only seven received any previous archaeological attention prior to my arrival. Of those, Barton Creek Cave has been the sole subject of long-term investigations, although this cavern is located outside of PRAP's concession (Mirro 2007; Owen 2002). Each of the features discussed

Table 5.1. List of karst features in the greater Pacbitun region, and source of original publication. "Type of feature" refers to those discussed in Chapter 2 and presented in Table 2.1. "Other names" refers to variations in local names for the features. "Original publication" is the reference to the first publication of the feature. Those listed as N/A are presented here for the first time. *Individual features of the NTC are listed in **Table 5.3**. **Offering Cave is currently under investigation by the Belize Regional Cave Project directed by Holley Moyes and Jaime Awe. ***These sinkholes only appear on the settlement map in Healy et al. 2007, they are not described within that text, nor was I able to relocate them.

Feature name	Translation	Other names	Type of feature	Described in dissertation	Original publication
Actun Bosh Tunich	Black Rock Cave		Fossil isolated phreatic	N	Spenard 2012a
Actun Caapel Tam Hol	Very Deep Cave	Unique Cave	Blind Vertical Shaft	N	Flavell et al. 1994
Actun Cannshan				N	Spenard 2012a
Actun Chak Sinik	Red Ant Cave		Cenote	N	Spenard 2012a
Actun Dzonot	Sinkhole Cave		Fossil isolated phreatic	N	Spenard 2011a
Actun Guacamayo	Macaw Cave		Fossil isolated phreatic	N	Spenard 2011a
Actun Ha	Water Cave		Piratic conduit	N	Spenard 2011a
Actun Hayach Bosh Tunich	Small Black Rock Cave		Rockshelter	N	N/A
Actun Hayach Naj	Small House Cave		Fossil isolated phreatic	Y	Spenard 2012a
Actun Hoyanko	Pothole Cave		Unidentified phreatic, part of Actun Mai	N	Flavell et al. 1994
Actun Kaalan	Blocked Cave		Rockshelter	N	Spenard 2012a
Actun Kacha Shana	Broken Boot Cave		Karst hollow	Y	Spenard 2012a
Actun Kitam	Peccary Cave		Fossil isolated phreatic	N	Spenard 2011a
Actun Kix Och	Porcupine Cave		Fossil isolated phreatic	N	Spenard 2012a
Actun Koxol	Mosquito Cave		Rockshelter	Y	Spenard 2012a
Actun Lak	Pottery Cave		Fossil chamber stratum	Y	Flavell et al. 1994
Actun Mai	Mai's Cave	Actun Bettadan	Trunk Conduit	Y	Flavell et al. 1994
Actun Merech	Lizard Cave		Fossil isolated phreatic	Y	Flavell et al. 1994
Actun Migdalia				N	Helmke and Ishihara-Brito 2002
Actun Naj Che	Home Stake Cave		Rockshelter	Y	Spenard 2013c
Actun Pe'ech	Squashed Cave		Fossil isolated phreatic	Y	N/A

Actun Pech	Tick Cave		Fossil isolated phreatic	Y	Healy et al. 1996
Actun Sinan	Scorpion Cave		Fossil isolated phreatic	Y	Spenard 2012a
Actun Solbetunich	Wall Cave		Fossil isolated phreatic	Y	Spenard 2011a
Actun Sukunoob	Brother's Cave		Fossil isolated phreatic	N	Spenard 2012a
Actun Uchentzub	Gibnut Cave	Flour Camp Cave; Black Rock Cave	Fossil isolated phreatic	N	Gifford 1976; Schmidt 1976-1977
Actun Xux	Wasp Cave	Skeleton Cave	Sinkhole	N	Spenard 2012a
Actun Yax Tunich	Green Rock Cave		Vertical shaft connected to horizontal passage	Y	Spenard 2012a
Actun Zotz	Bat Cave		Fossil isolated phreatic	N	Spenard 2012a
Actunob Balam	Jaguar Caves		Fossil isolated phreatic	N	Spenard 2011a
Barton Creek Cave			Trunk Conduit	N	Gibbs et al. 1999
Blind Pit			Blind vertical shaft	N	Flavell et al. 1994
Bol's Museum Cave				N	N/A
Chaan Hol rockshelter	Window Rockshelter		Rockshelter	Y	Lee and Valdez 2011
Cocohil Cave		Gibnut Cave	Vadose, possible trunk conduit	N	Flavell et al. 1994
Cool Spot Cave			Vadose, possible trunk conduit	N	Flavell et al. 1994
Rocky Crab Cave			Trunk conduit	Y	Flavell et al. 1994
Crystal Palace			Fossil isolated phreatic	Y	Powis 2010b
Cueva del Indio Perdido	Lost Indian Cave		Fossil isolated phreatic	N	Flavell et al. 1994
Empty Cave 1			Rockshelter	N	Spenard 2012a
Hole in the Ground			Phreatic Cave	N	Spenard 2011a
Nohoch Tunich Bedrock Outcrop Complex (NTC)*	Great Wall Bedrock Outcrop Complex		Bedrock outcrop	Y	Spenard 2012a
Offering Cave**		Actun Ka'am	Fossil isolated phreatic	N	N/A
Sink One			Sinkhole	N	Flavell et al. 1994;
Sinkhole 1			Sinkhole	N	Spenard 2011a

Sinkhole 2			Sinkhole	N	Spenard 2011a
Sinkhole 3			Sinkhole	N	Spenard 2011a
Sinkhole 4***			Sinkhole	N	Healy et al. 2007
Sinkhole 5***			Sinkhole	N	Healy et al. 2007
Sinkhole 6***			Sinkhole	N	Healy et al. 2007
Sinkhole 7***			Sinkhole	N	Healy et al. 2007
Slate Cave			Fossil isolated phreatic	Y	Spenard 2011a
Small Cave 1			Fossil isolated phreatic	N	Spenard 2011a
Solbetunich Shelter 1			Rockshelter	Y	Spenard 2011a
Solbetunich Shelter 2			Rockshelter	Y	Spenard 2011a
Stone Cache			Bedrock niche	Y	Spenard 2012a
Temple Complex Cave			Sinkhole	N	Spenard 2011a
The Sinkhole			Sinkhole	N	Spenard 2011a
Tunnel System			Fossil isolated phreatic	N	Spenard 2012a
Tzonot	Cenote		Trunk Conduit: part of Actun Mai	N	Flavell et al. 1994
Tzul's Cave			Fossil isolated phreatic	Y	Powis 2010b
Unnamed Cave 1			Fossil isolated phreatic	N	Flavell et al. 1994
Unnamed Cave 2			Fossil isolated phreatic	N	Spenard 2011a
Unnamed Cave 3			Fossil isolated phreatic	N	Spenard 2012a
Unnamed Rock Shelter 1			Rockshelter	N	Spenard 2011a
Unnamed Rockshelter 2			Rockshelter	N	Spenard 2011a
Valley Sink			Sinkhole	N	Flavell et al. 1994

in this dissertation, particularly the proper caves, were brought to the attention of PRAP archaeologists by our local collaborators or had been previously reported elsewhere as detailed below.

Three of the first four karst features discussed in this chapter, Actun Lak, the Nohoch Tunich Bedrock Outcrop (NTC), and Actun Naj Che, are ordered by the level of

intensity that I investigated them (**Figure 34**). The fourth is Rocky Crab Cave, which the Late Classic period Pacbitun Maya connected to Actun Lak by a way of a rough staircase, indicating the two were part of a ritual complex. Even though it was not investigated, it is vital to understating the archaeology of Actun Lak, and it is thus they are presented in sequence. The remaining karst features are listed alphabetically for ease of presentation. These other features received minimal archaeological attention, typically having only a brief description recorded and few photographs taken. Several other previously unrecorded karst landmarks that I visited are left out of this discussion because too little data about them has been collected. Nevertheless, my preliminary observation is that most contained similar archaeological remains as those found in the better-studied features, indicating shared practices throughout the region.

Extensive descriptions are given for all of the features chosen for discussion to facilitate an analysis of the pre-Hispanic Maya use and creation of spaces within them. Each of the discussions is arranged as if the reader were walking through the feature. For example, the description of Actun Lak begins on the hillside in front of it and continues to the rear of the cave. Ledges are discussed separately, although information regarding their relations to the chambers below them is given to situate them in the cave. My excavations assisted in understanding both the cultural and geologic spaces within the features and are therefore interwoven into their descriptions.

Lists of artifacts and ceramic types are given for each excavation level or cultural strata in which they were found, providing context to the data. Full descriptions of all artifacts are found in Chapters 6 and 7, and Appendix C. Ceramic complexes and

chronological information are included in the ceramics lists providing use dates. The chronology of the ceramic types provided come from Gifford's (1976) analysis of the pottery from site of Barton Ramie on the Belize River, although later studies have refined some of his work, particularly in relation to the Late Classic, and Early Postclassic periods (Awe and Helmke 2007; LeCount 1996, 1999; LeCount et al. 2002). In most cases, the later works have demonstrated that particular ceramic types, and in some cases only modes, were prominent either longer or for less time than Gifford found. Nevertheless, for this chapter, Gifford's (1976) study is used for ease of discussion, and the names of his ceramic complexes and associated timeperiods are presented in **Table 5.2**.

Maps and discussions indicating the precise locations of the caves and karst features that I investigated are withheld, as is customary practice among the professional caving community. Doing so is a cautionary measure for preventing increased visitation that typically results in the destruction of the fragile geology and ecosystems within them. Archaeological cave sites have an added human history component that draws in curious and, unfortunately, sometimes malicious, visitors, demanding even greater discretion when considering revealing their location (Brady 1990). As discussed in Chapter 3, the caves in the Pacbitun region have long suffered from pot hunting and looting activities, and continue to be affected by them. Withholding precise locational information thus offers these already threatened archaeological sites some protection from potential further destructive activities.

Table 5.2. Gifford's (1976) ceramic complexes and corresponding time periods and date ranges. A "?" indicates that date is uncertain.

Gifford's ceramic complexes	Time period	Dates
Early facet Jenny Creek	Middle Preclassic period	? B.C. - 600 B.C.
Late facet Jenny Creek	Middle Preclassic period	600 B.C. - 300 B.C.
Barton Creek	Late Preclassic period	300 B.C. - 100 B.C.
Mount Hope	Late Preclassic to Protoclassic period	100 B.C. - A.D. 250
Floral Park	Protoclassic period	0 - A.D. 250
Hermitage	Early Classic period	A.D. 250 - A.D. 600
Tiger Run	Late Classic period	A.D. 600 - A.D. 700
Spanish Lookout	Late to Terminal Classic period	A.D. 700 - A.D. 900
Early facet New Town	Early Postclassic period	A.D. 900 - A.D. 1200
Late facet New Town	Late Postclassic period	A.D. 1200 - ?

A Brief Discussion of "Cave" Terminology

Several of the features that I studied can reasonably be called caves, although many others lack characteristics allowing them to be identified as such for reasons elaborated below. I differentiate between a variety of karst features, particularly caves and rockshelters, while acknowledging that the common parlance for many of them used by cavers is the former term. I separate them because the pre-Hispanic Maya in the Pacbitun region used them differently, and because recent hieroglyphic analyses suggest that they were conceived as distinct landscape features. Following Palmer (2007:1), I define caves as natural voids beneath the land surface large enough for a human to enter, and which some accessible part extends into total darkness. Rockshelters are natural voids in bedrock large enough for a human to enter, but that terminate before total

darkness. Known caves in the Pacbitun region vary in size from only a few meters in length to nearly one-kilometer long, while rockshelters are typically shallow, single-chambered open spaces at the feet of hills or other bedrock exposures. Their sizes demonstrate a wide range of variation from tens of meters wide to shallow hollows beneath boulders less than a few square meters in volume only.

I documented several small-scale geological bedrock features with associated cultural remains that can be variously described as niches, crevasses, nooks, alcoves, and boulders, as well as others for which proper names are nonexistent. I avoid using the term "cave" as a general descriptor for these features because that expression suggests a particular grandeur and structural complexity that is lacking in many of these spaces. Instead, I prefer to use the more neutral term, "karst feature" as a general referent for all of them, including proper caves. Furthermore, I use the term "karstscape" to collectively refer to and acknowledge the variability of karst features, including caves and rockshelters that the pre-Hispanic Maya interacted with, and thus doing so necessitates understanding them in relation to one another, and to the overall natural and cultural geography of which they are a part.

Distinguishing caves and rockshelters from one another has archaeological merit in light of recent hieroglyphic data. Evon Vogt and David Stuart (2005) propose that the hieroglyph, **CH'EEN**, best translates to "cave," but they note that the word seems to refer to any dark place in the ground. More recently, Alexandre Tokovinine (2013:38) has suggested that the term is better understood within a broader landscape context that refers to "holy lands/places" in general that are possessed by someone or something, and this

new reading considers caves to be only one form of **CH'EEN**. Houston and Taube (2012:44) have identified the term, **tzi-ti**, or **ti-tzi** on the Dumbarton Oaks Carved Panel, as the location for one of the key rites of passage for the Classic period Palenque, Mexico king, Kinich Kan Joy Chitam, on either a "rocky outcrop," or "mountain top." This new reading suggests that the pre-Hispanic Maya did in fact differentiate between some karst features.

Methods of Investigation

I implemented a reflexive three-stage investigation strategy that collected increasingly detailed information about each karst feature. This strategy is based on the multistage regional fieldwork model developed by Charles Redman (1973), called here the "Redman Model." Briefly, the initial goal of the Redman Model is understanding broad patterns in a region that are then used for formulating increasingly specific hypotheses and research questions as investigations proceed. Hypotheses are verified or nullified with intensive investigations, although regional reconnaissance continues, which allows questions to be reformulated by combining new and old data sets. The primary benefits of the model are its ability to quickly develop a regional understanding of archaeologically unknown areas and to seamlessly incorporate unexpected finds into a larger research project. I adopted the Redman Model because the karst features of the

Pacbitun region have never been systematically investigated archaeologically. Additionally, it assists with understanding regional patterns and site-specific variations in a short period of time by continually devoting time to reconnaissance. For my study, Stage 1 consisted of brief reconnaissance, Stage 2 initiated preliminary investigations, and Stage 3 was intensive investigations in my study.

Stage 1 reconnaissance involved the locating, exploring, and naming the karst features. A short description of each was made, photographs were taken of entrances and significant archaeological features, and locations were recorded on a handheld Garmin GPSmap 60CSx receiver. Occasionally, conditions such as dense forest cover, degree of slope, or general inaccessibility of terrain prohibited photos and good GPS points from being taken. Description information included a general narrative about the feature detailing its approximate measurements including total length, average ceiling height, width of passages and entrance. Additional information included a rough profile sketch of the entrance, its orientation, and whether art, architecture, or other modifications were present. Lastly, determinations were made whether each feature warranted preliminary study, and if so, what was its priority, low, average, or high? Primary determinants were the quantity, condition, and type of surface artifacts, as well as the presence of unusual features. For example, the presence of a potential speleothem altar coupled with intensive burning near the entrance of Actun Lak Chamber 2, suggested a high priority for returning for further work in the cave, but also that that area should be excavated, even though few artifacts were visible on the surface.

The names given to the karst features come from a variety of sources. The Mendip Caving Group from England named several of the larger caves and subterranean systems during their visit to the area in the 1994, most of which are adopted when approrpiate (Francis et al. 1995; Flavell et al. 1994; Hollings 1996). Other names are of local origin, or were given during the preliminary visit based on the presence of particular plants, traces of animals near them, or distinctive features. Additionally, one landowner has incorporated several of the features as parts of a nature trail on his property to which he has given English names. In an effort to maintain continuity with cave naming practices in the Belize Valley, I translated all previously non-published names into Yucatec Mayan with the assistance of my local collaborators. The term, Actun, translates to "cave," and the variable word adjacent to it describes what it was named after. For example, "Actun Lak" is a translation of the landowner's name for "Pottery Sherd Cave."

Stage 2 involved initiating systematic archaeological investigations recording any potentially significant cultural information that may be useful for identifying regional use patterns, as well as those that conflicted with them. Rough sketch maps were made of entire features that marked areas of potential archaeological significance, extensive notes were taken describing them, and those areas were photographed for future reference. Lastly, surface collections of diagnostic pottery and other notable artifacts were made.

Sketch maps at this stage were hand drawn without the aid of measuring tools, and thus not to scale. Their primary function was enabling planning for Stage 3 investigations. Surface collections of diagnostic pottery were made from the entire karst feature, establishing a preliminary chronology. Diagnostic ceramics are those that include

one or more of the following parts– rim, base, flange, ridge, basal breaks, and appendages such as supports, and handles. The collections included all unique and rare samples encountered, but only representative sherds of common types and forms were taken. All encountered appendages were collected as unique samples, as were polychrome sherds, and those that were slipped and modified in some other way, regardless of what part of the vessel they came from. Monochromes and bichromes were only selectively sampled unless only a few were present scattered in with otherwise undecorated pieces. In that case, they were all removed from the karst feature for study.

Stage 3 involved intensive investigations including creating instrument-aided, detailed sketch maps, photographs and descriptions, localized surface collections, and stratigraphic excavations. Mike Mirro and C. L. Kieffer directed the detailed mapping component of this stage with the assistance of PRAP local collaborators and field school students. They used a hybrid cartographic approach combining baselines with tape, laser rangefinder, and compass surveys. The first technique involves establishing a series of interconnected, string baselines in an area to be mapped, and starting and ending points of each used as datums incorporated into the overall map. Distances to pertinent features and cave walls were collected using a tape measure extended perpendicularly from the baseline. Such data points were collected at regular intervals determined by the scale of the map being produced, although most are set at either 25 or 50 cm increments. The benefit of this technique is its ability to capture fine-grained detail about archaeological remains and their overall contexts, but it is hindered by the large amount of time necessary to collect all of the data points. This issue becomes particularly problematic in

areas where few or no archaeological remains are found because the trade off between effort expended and potential knowledge to be gained is minimal.

The latter part of the hybrid technique is the traditional method of cave mapping that typically involves a team of three surveyors, one to draw the map, another to read the instruments, and a third to run a tape measure from pre-established datums to the object recorded (Dasher 2011). The initial component of the survey establishes a series of datums throughout the areas to be mapped. The person drawing the map sketches in the details between each of the datums, while the other two provide measurement data. The benefit of this technique is that it allows mapping to proceed quickly and relatively accurately on a large scale, although is ability to capture detail sufficient for archaeological purposes is lacking because the locations of objects and features are estimated, and the scale is typically too small for understanding context. This technique was used primarily when mapping bedrock outcrops because they contain substantial spatial gaps between cultural contexts, and the baseline mapping technique was retained for the cultural features. Combining these techniques allowed for creating selectively detailed maps uniting all of the cultural features on one general drawing. Overall, the utility of the hybrid mapping technique used on this project is that it allows a feature to be mapped relatively quickly while retaining useful level of archaeological detail.

Localized surface collections and stratigraphic excavations overlapped with the mapping activities whenever possible, allowing for gathering spatial information about the collection areas and excavation units at the same time as the other cartographic data. Localized surface collections were made to understand better particular areas that time

would not allow for excavations, that were low priority, or where soil was absent. They were also made in areas of high tourist traffic, protecting the artifacts from trampling. The same artifact selection criteria described for Stage 2 was also used in Stage 3.

All excavations were made using trowels and hand picks unless otherwise noted. Unit size varied by context, although 1 m by 1 m squares aligned to magnetic north were the norm. Natural and cultural stratigraphy was used when possible, and 10 cm arbitrary levels were imposed when neither of the latter two was present to maintain control over the data being recovered. Photographs were taken at the start and end of every unit and level, and the matrix was screened using ¼-inch wire mesh unless it was collected as part of an paleoethnobotanical sample. In that case, approximately one liter of matrix was collected and then water-screened in the lab using cheesecloth separating heavy and light fractions. The heavy fractions were sorted first into cultural and non-cultural categories and then by artifact class. Megan Parker analyzed many of the collected botanicals for part of her Master's research at Georgia State University, under the tutelage of Drs. Christopher Morehart of Arizona State University and Jeffery Glover of Georgia State University (Parker 2014). Excavations proceeded to bedrock, or, minimally, 10 cm into culturally sterile soil, and nylon string and corner stakes were arranged in an "X" shape at the bottom of completed units after which they were backfilled.

Actun Lak (Pottery Sherd Cave)

Located half way down a hill sloping approximately 30 degrees, and with a west-facing entrance, is Actun Lak, one of the primary foci of my dissertation investigations, (**Figure 35**). Its name comes from a translation of a painted sign at its entrance that reads, "Pottery Cave," and justification for this moniker is readily apparent upon entering. Broken ceramic sherds are ubiquitous, stacks of them line the walls and fill up niches throughout the cave, and they appear to comprise nearly half of the surface soil matrix. This quantity of pottery is much greater than any other cave visited in the region, indicating its status as a place of prime importance in the Pacbitun karstscape. Actun Lak is a relatively straight, yet vertically undulating, single passage fossil chamber stratum cave running to the northeast for 43 m, and terminating at a muddy choke. The ceiling height varies between 0.5 m to 12 m, and the cave's width between 4 m and 12 m. Four areas and four ledges comprise the principal features of the cave, with the main areas being the Entrance Passage, and Chambers 1, 2, and 3 beginning from the front of the cave. The names of the ledges, 1 through 4, start from rear and continue in the sequence they were discovered.

Cultural modifications abound in the cave and around its exterior. Nearly all of the formations in the Entrance Passage had been broken off in the past, as evidenced by their partial regrowth (**Figure 36**). Additionally, all of the large stalagmites throughout Chamber 1 had been broken, and parts of curtain formations in Chamber 2 had been

removed. Piles of large rocks were encountered in niches, partially blocking small passages, and on the ledges. In some instances, one or two rocks had been placed across elevated passage entrances (**Figure 37)**. A pavement of river cobbles and speleothems is located at the foot of a cluster of broken stalagmitic formations in the center of Chamber 1, which is also the approximate middle point of the entire cave.

Two dry-laid terraces of uncut stones and ceiling breakdown boulders were also recorded. Terrace 1 is located in the Entrance Passage just above the junction with Chamber 1. Terrace 2 is located in the middle of Chamber 1 between the snapped formations, artificial pavement, and the cave wall. Chamber 2 contains a speleothem altar constructed from broken curtain formations and other speleothems. Lastly, the exterior of the cave contains an earth and rubble platform, called the Entrance Platform, and the down slope hillside was modified with a cobble staircase leading to Rocky Crab Cave below. Each of these features and their archaeological significance is discussed in further detail below beginning on the hillside and proceeding to the rear of the cave.

Nineteen total excavation units were placed between the downhill modifications around Actun Lak's exterior through to Chamber 2 in the cave's interior. Units 1 through 9 were dispersed throughout the cave investigating potential activity areas, architecture, and transition points. Units 13 and 19 were excavated in Chamber 2 by Powis and Stanchly during the 2012 and 2013 field seasons to locate any potential remaining *in situ* Pleistocene megafauna recovered from disturbed contexts during the 2011 field season (De Iuliis et al. 2014; Stanchly et al. 2013; Spenard 2012a). Units 10 through 12 and 14

through 18 were placed around the cave's exterior investigating the features there, including the Entrance Platform and cobble staircase.

Surface collections were made throughout the cave and on the hillside, primarily gathering ceramics, although other unusual objects were taken if encountered. These collections were made to establish a site chronology, to protect objects from destruction or loss due to erosion on the hillside, to mitigate looting events, and to establish a type collection of cave ceramics. General collections covering the extent of both areas were made during Stage 2 investigations, although specific areas were targeted during Stage 3 operations.

Cave Exterior

The exterior areas of Actun Lak of archaeological significance include the hillside below the cave, which the pre-Hispanic Maya modified with architecture, and the earthen-rubble "Entrance Platform" reconfiguring the cave's entrance in the later part of the Late Classic period. The hillside modifications were first noted during a visit to Rocky Crab Cave in 2012, a cave located at the base of the hill into which Lak penetrates that is described below. The remnants of an artificial construction were noted beneath the lip of a boulder approximately 10 m below Actun Lak's entrance, and clearing leaf litter around it uncovered an extension of the construction beyond the edges of the boulder, and along the hillside (**Figure 38**). The presence of the Entrance Platform was

hypothesized during the 2011 field season when two intersecting rock alignments were discovered a few meters from Actun Lak's entrance.

Cobble staircase. The cobble staircase is on a sloping bluff to the west and south of the Actun Lak's entrance. A steep, cliff-like drop to a seasonal creek bed below delineates the southern portion of the bluff, and a 30-degree downward slope defines the west area, and provides the only navigable trail to the base of the hill and Rocky Crab Cave. The area to the north of the entrance leads uphill to the Nohoch Tunich Bedrock Outcrop complex, which is discussed below. Leaf litter and brush were cleared from the hillside to determine visually the extent of the staircase, revealing they stretch from the drop along the southern area to the west where they terminate near the large boulder beneath which were the remnants of the cobble step (**Figure 39**). The architecture was not always visible, but concentrations of ceramics over the entire denuded hillside indicated multiple activity areas. Additionally, several spots of exposed bedrock dotted the slope indicating that the hillside matrix was shallow.

The extent of the staircase is difficult to surmise because it is in poor condition due to the shallowness of the soil on the hillside, its placement on the 30-degree slope, and exposure to forest growth over the past 1500 years. Excavations revealed a single construction complex that was often times only a few cm thick before reaching bedrock, which was also actively incorporated into the constructions (**Figure 40**). Rocks used in the modifications were uncut but were similarly sized, roughly 15 cm to 20 cm in diameter, and were mixed with limestone pebble fill. Overall, these modifications are considered stairs because the exposed areas closely resemble cleared terminal phase

stepped architecture at Maya settlements (**Figure 41**). Ceramics littered the downhill surface and the area immediately outside of the cave, but neither modifications nor artifacts were encountered above Actun Lak until reaching the crest of the hill.

Ceramics were surface collected during clearing activities, although most were unidentifiable from intensive weathering, but those that were date to the late Late Classic periods. The identifiable specimens include Cayo Unslipped, Dolphin Head Red, and a Negroman Punctated-Incised-like type. The latter is easily identified by a curvilinear incision or series of punctuations that typically run along jar shoulders. Gifford (1976:151) found that it was a Protoclassic period type at Barton Ramie but it has been found in late Late Classic period cave and architectural contexts in Pacbitun region. I expand on this discussion in the following chapter, but it may be a hold over from earlier times, or alternatively at least some of the samples may be related to the Late to Terminal Classic period Macaw Bank Group first identified at Xunantunich (LeCount 1996:381). The latter possibility is the preferred explanation for these materials because those dates are more consistent with the contexts in which they are found.

Excavation Units 12, 17, and 18 formed a 15 m long discontinuous trench down the hillside beginning west of Actun Lak's entrance. I placed these units to determine the nature of the suspected hillside modifications, the extent that they covered the hillside, and to understand their construction history. Unit 18 was placed at the lowest portion of the trench, and its excavations revealed that the modifications continued at least to that far down the hillside from Actun Lak. The west slope turns into a cliff a few meters beyond the excavation trench, although the decline turns toward the north in the same

area. The northern turn in the slope creates a natural, narrow path to Rocky Crab Cave that is approximately 20 m beyond the bend. Although no excavations were made on this northern trending trail, concentrations of pottery and cobbles similar to those uphill were noted, suggesting that the pre-Hispanic Maya had connected the two caves with the staircase. Overall, excavations in the three units determined that the entire sloping bluff in front of Actun Lak was modified during a single complex of construction during the late Late Classic period.

Unit 12. Unit 12 was a 2 m by 2 m square placed at the top of the proposed stepped area of the hillside just below the Entrance Platform and above the large boulder where the hillside modifications were first noted. This unit was excavated to determine if the hillside below Actun Lak was modified, to what extent, and to expose a sample of the terminal complex architecture for ground-based LiDAR mapping (Lund and Weber 2013). Its location was chosen because it was one of the flatter spots on the bluff, several small potential architectural alignments were noted on the surface, and the spot was approximately halfway between the large boulder and fronting stones of the platform. Excavations consisted only of removing the humic layer to expose the terminal complex architecture, which occurred at an average depth of approximately 10 cm, although measurements varied throughout due to the inconsistent shape of the boulders that ranged in diameter from 10 to 30 cm. The unit was terminated once the entire architectural surface was exposed (**Figure 42**).

Artifacts, particularly ceramic sherds, were recovered immediately when excavations began, and they continued to appear in large quantities until digging was

terminated. The artifact totals for this level include: 607 ceramic sherds, 70 g of gray slate, a chert nodule, three chert flakes, and an unidentified calcite object. Identifiable ceramic types include: Dolphin Head Red, Garbutt Creek Red, and Mount Maloney Black, all of which correspond Spanish Lookout complex.

Unit 17. Unit 17 was a 2 m by 2 m square placed 1.5 m directly downhill from Unit 12 and was situated adjacent to the architectural remnants beneath the large hillside boulder (see **Figure 38**). This unit was the middle section of the discontinuous downhill trench. It was excavated to understand what kind of architectural feature the rocks beneath the boulder represented, and what was its construction history. An alignment within the unit intersecting with the architectural remnants beneath the boulder was noted after excavations began. The alignment met up with a patch of exposed bedrock, demonstrating that the modifications consisted of both natural and cultural components (see **Figure 40**).

Excavations proceeded to bedrock in only one level measuring up to 30 cm deep. The level consisted of a shallow root cap and then a mixture of soil, architectural fill (limestone rocks and pebbles), and large quantities of ceramic sherds. Many of the sherds were large, suggesting that they had moved little since their initial deposition. Smaller sherds would have indicated extensive tumbling downhill, as they would have rubbed against each other and been broken against the rocks that they were intermixed with. The boulders used in the construction also ranged in diameter from 10 to 30 cm, suggesting a particular size preference for the construction. Artifacts were recovered throughout the investigations, including on the surface before excavations began. Their totals include

1,003 ceramic sherds, 270 g of gray slate, and an obsidian blade fragment. Typable ceramic sherds include: Cayo Unslipped, Dolphin Head Red, Meditation Black, and Mount Maloney Black, all of which correspond to the Spanish Lookout complex.

Unit 18. At the approximate mid point between Actun Lak, and Rocky Crab Cave, Unit 18 represents the lowest component of the discontinuous downhill trench. More specifically, it was a 1 m by 1 m square placed just above a steep drop in the hillside slope, approximately 10 m downhill from the Entrance Platform to determine if the hillside modifications continued that far from Actun Lak's entrance, and to get a better understanding of the construction process if modifications were present. Its excavation revealed that the modifications did continue that far, although the construction process remains poorly understood because time did not allow the unit to be fully excavated. Nevertheless, significant quantities of artifacts were recovered from this unit including: 239 ceramic sherds, and 137 grams of gray slate. Although no ceramic types were identifiable, sherds from the Belize and Macaw Bank Groups were noted, both of which date to the late Late Classic period.

Entrance Platform

The cobble staircase leading up to Actun Lak terminates at the foot of an earthen-rubble construction named here the "Entrance Platform" at the cave's west-facing entrance (**Figure 43**). The construction's north and south edges are bounded by courses of rocks that also act as retaining walls for the steeply sloping ground on either side of the

cave entrance. A partial visible line of fronting stones delineates the western, front side of the platform, the extant portion of which intersects with the northern retaining wall marking one corner of the platform. Their trajectory also aligns with the end of the southern retaining wall indicating the other corner. The retaining walls incorporate natural outcrops, particularly to the south where another platform higher up on the hill may be present, although time did not allow for testing for it. The eastern edge is defined by a steep slope beginning just outside the cavern's dripline, but a slate "step" located halfway down it suggests that the modification extended into the cave. As will be discussed below, the platform is likely a component of a much larger effort that drastically reshaped the entire cave entrance and Entrance Passage.

Excavation Units 10, 11, 14, 15, and 16 were placed on and around the Entrance Platform to determine if the stone alignment represented a platform, and if so, what was its function and construction history (**Figure 44**). The units were placed to obtain as much information about the constructions as possible while maintaining an access corridor into the cave for tourists to use. Units 10 and 11 were placed adjacent to each other along the fronting stones and center of the platform. Units 14 through 16 made up a trench that incorporated the northern retaining wall, intersected with the northwest corner of the platform, and then continued onto a small landing in front of it. The data collected from these units verified the presence of the platform and that it had been constructed in a single event that included excavating into the soil in front of the cave, all of which occurred during the latter portion of the Late Classic period.

One of our local collaborators claimed that he found the cave while hunting in the late 1960s, and that several whole vessels were on the Entrance Platform during that visit, including one that he believes is currently on display in a local museum in San Antonio village. I have been unable to examine or verify the existence of that vessel, but our collaborator indicated that it is a red dish similar to other Dolphin Head Red samples recovered in the cave, which belong to Gifford's (1976) Spanish Lookout complex. The types and the fates of the remaining Entrance Platform vessels are unknown.

Unit 10. Unit 10 is a 1 m by 2 m rectangle-shaped excavation, the long wall of which runs roughly parallel to the width of cave entrance (**Figure 45**). It was placed to determine if the extant stone alignment is the remnants of the platform fronting stones, overlapping the spot where it disappears visually. Four levels were excavated to a maximum depth of 129 cm where boulders too large to remove made continuing impossible (**Figure 46**). Additionally, they only appeared within the unit on the cave side of the fronting stones, and the matrix surrounding them was mixed with pottery. The matrix of the downhill side of the fronting stones was reminiscent of decomposing limestone and contained few artifacts below the first several centimeters. The variability in the matrix and accompanying artifact distribution patterns verifies that an artificial platform was constructed at the cave entrance. Identifiable ceramics recovered from all of the levels belong to Gifford's (1976) Spanish Lookout complex spanning the final two centuries of the Late Classic period, indicating that the platform was constructed at that time.

Although visible artifacts were absent from the surface, they began to appear immediately after the excavations commenced in Level 1. The artifact totals include 324 ceramic sherds, 25 *jute* (*Pachychilus* sp.) snail shells, a chert flake, and 446 g of gray slate. Identifiable ceramic types belong to Gifford's Spanish Lookout complex and include: Cayo Unslipped, Garbutt Creek Red, and Mount Maloney Black. Sherds from the Belize and Macaw Bank Groups were also identified. The artifact distribution differed throughout Level 1 both horizontally and vertically. The area on the platform contained a higher density of artifacts than the section immediately in front of it, the soil matrix was mixed with fist-sized rocks, and imported slate was encountered more frequently as the level depth increased. The level was terminated after a 10 cm depth was reached.

Artifacts from Level 2 are similar to those recovered above it, with the addition of limestone breccia clasts, and a charcoal chunk. The clasts are angular, suggesting a nearby parent source, indicating that they are natural occurrences or were gathered nearby (Palmer 2007 35). The artifact totals recovered from Level 2 include: 553 ceramic sherds, one *jute* snail shell, three chert flakes, 857 g of mottled gray and red slate, and two g of charcoal. Identifiable ceramic types correspond to Gifford's Spanish Lookout complex and include: Cayo Unslipped, Garbutt Creek Red, Mount Maloney Black, Rubber Camp Brown, and Tu-tu Camp Striated. Several group-level classifications were made from the untypeable sherds including: Belize, Garbutt Creek, and Macaw Bank.

Artifact density and matrix distribution patterns of Level 2 were also similar to Level 1, except that soil color remained dark brown throughout both areas. Furthermore,

the concentration of large rocks continued, but the soil began mixing with angular limestone breccia clasts 3-5 cm wide. Similar clasts were noted in the ceiling of Chamber 2 in the cave, and they are common components of limestone, but none were visible in the immediate area. Several were collected for future analysis and possible sourcing to determine if those found in excavations were imported. The matrix in front of the platform remained the same as in Level 1, but contained no large rocks. Within the platform, large rocks were encountered, and a possible ash pit was buried below them. The level was terminated after all of the rocks were removed and the feature was fully exposed.

Level 3 matrix changed to a dull orange-brown soil, with a high concentration of pebbles that looked similar to unpolished river gravel and had average diameters approximately two centimeters. A seemingly culturally sterile layer was encountered soon after the level began, but excavations proceeded for several centimeters, uncovering several large boulders in the area on the inside of the platform. The top layer of boulders was removed, and ceramics began to reappear, indicating that the latter is construction fill, and verifying that the alignment is part of an artificial platform. The reappearance of pottery after several centimeters of seemingly culturally sterile soil suggested a change in construction events, which prompted the initiation of Level 4.

Only 65 ceramic sherds and 10 g of gray slate were recovered in Level 3. The only identifiable ceramic types are Spanish Lookout phase, Mount Maloney Black and Dolphin Head Red. Most of the artifacts were pressed up against rocks and large tree roots suggesting some bioturbation. Nevertheless, the ceramic sherds were noticeably

larger than in the levels above indicating that they remained little disturbed since their deposition, and their size suggests that they may have been purposefully smashed during the construction process.

Called Feature 1, the ash pit noted at interface of Levels 2 and 3 also extends into Unit 11, which is discussed below. The exposed area in Unit 10 was 28 cm in diameter, and the feature was located in a hollow cavity beneath some of the core fill. Botanical materials, possibly palm fronds, were recorded, although many small roots had grown into the cavity, suggesting disturbance. Additionally, my local collaborators reported that at least two fires burned through the immediate area, one in the 1960s, and another in the 1980s. Thus, the Feature 1 ash pit may be a burned root mass from one of those fires. Nevertheless, artifacts were recovered from the feature including, 12 unidentifiable ceramic sherds, seven cave pearls, a burned red slate piece weighing 174 g, and a microfauna bone. Paleoethnobotanical analysis was inconclusive except to note that single specimens of a monocot and a dicot were recovered (Parker 2014:Table 6.8).

Cave pearls are unusual cave formations that are shaped like marbles and only form in shallow subterranean pools or in some cases in open pockets created by heavy ceiling drip (Hill and Forti 1997:84; White 1956). Their recovery outside of a cave environment further attests to the presence of an artificial platform outside of Actun Lak, and that the construction process included importing materials from other karst features. Two separate flotation samples were taken in which large quantities of charcoal were noted, although they are awaiting further analysis. The first sample contains a mix of matrices from the feature and surrounding dirt, while the second was collected in the pit.

Level 4 was the most stratigraphically complex in the unit. Immediately after the large sherds mentioned above were removed, the matrix transitioned to all rock with little actual soil to excavate. A large boulder that extended into the northern and southern walls dominated the center of the unit. The matrix to the east of the center boulder was bright orange-brown soil mixed with ceramics and other large boulders. The dull orange-brown soil recorded in Level 3 continued on the west side of the central boulder for an additional 30 cm, below which culturally sterile, powdery yellow marl and limestone rubble matrix appeared. This division is significant because the central boulder is aligned with the platform fronting stones, suggesting that the Maya excavated down into the natural hillside and refilled it with dry-laid construction fill. The continual appearance of the ceramics with the dark soil and not the yellow marl suggests that the former is cultural fill.

The artifacts recovered from this level include: 29 unidentifiable ceramic sherds, a quartzite flake, gray slate pieces totaling 18 g, and one *jute* snail shell fragment. The large rocks eventually clogged up the bottom of the unit, and they were impossible to remove without significant expansion of the excavations for which time did not allow. As a result, the level and unit were terminated. Level 4 thickness varied due to the presence of the boulders from 60 cm in the south to 20 cm in the north. The final center depth of the unit was 80 cm below the surface.

Unit 11. Unit 11 is a 1 m by 1 m extension of the northern half of the eastern wall of Unit 10, established to expose fully the Feature 1 ash pit. Unit 10's stratigraphy provided a guide for excavation, proceeding in four levels to a maximum depth of 174 cm

where culturally sterile soil was encountered, although some inconsistencies between the two pits were encountered (**Figure 47**). Overall, the matrix is dry-laid construction fill mixed with orange-brown soil, and Spanish Lookout complex pottery. Level 1 excavations began with the removal of two Spanish Lookout polychrome ceramic sherd clusters encountered just beneath the leaf litter. One of the scatters comes from a fluted Benque Viejo Polychrome bowl, and the other is from a heavily burned Palmar Orange dish. A slate cache, labeled "Feature 2," was uncovered several centimeters directly below these sherd scatters, and situated adjacent to a partially buried boulder. High densities of ceramics continued to appear throughout the level, and excavations of the level proceeded to 15 cm below the surface, until the boulder could be removed. The artifact totals from Level 1 include: 152 ceramic sherds, 2 chert flakes, 1 flake core, 756 g of gray slate, and 121 g of red slate, although the feature artifacts are tabulated separately. Identified ceramic types include: Alexander's Unslipped, Benque Viejo polychrome, Cayo Unslipped, Dolphin Head Red, Mount Maloney Black, and Palmar Orange-polychrome dish. Of the untypeable specimens, some group levels were determined, including Chunhuitz, Macaw Bank, and Saxche-Palmar.

The Feature 2 slate cache is composed of a series of stacked, modified slabs set on top of a concentration of small limestone boulders, all of which was positioned directly above the Feature 1 ash pit (**Figure 48**). An unusually high concentration of sherds, many coming from utilitarian jars, and an obsidian blade fragment were recovered in the center of the limestone boulder concentration. The blade suggests that some form of bloodletting may have taken place there, and the ash pit indicates that the potential

offering was burned (MacLeod and Puleston 1978:75; Schele and Miller 2001:175). Perhaps the most significant aspect of the slate cache is that it is located in the center of the Entrance Platform, and is also aligned with the midpoint of the cave's entrance when accounting for the latter's orientation. Given this positioning, I believe that this cluster of artifacts and features represents a primary axis cache similar to those found regularly in Maya architecture (Becker 1988; Culbert 1993; Healy et al. 2004:215-217).

Medium-sized boulders began appearing in other areas of the unit below the cache suggesting they were architectural fill used for leveling the platform. The level was terminated at 30 cm below surface after the entire slate cache had been removed and noticeably larger boulders appeared throughout the unit (**Figure 49**). The artifact totals recovered from Level 2 include: 748 sherds, 260 g of gray slate, four chert flakes, and an obsidian blade fragment. The total weight of the slate recovered from Feature 2 is 6,080 g, and it is all gray colored. Identifiable ceramics correspond to the Spanish Lookout phase, including: Alexander's Unslipped, Cayo Unslipped, Garbutt Creek Red, Mount Maloney Black, and Yalbac Smudged-Brown. Of the untypeable specimens, others also belonging to the Spanish Lookout phase Belize and Macaw Bank Groups were identified.

Level 3 is the first definitive layer of construction ballast encountered in the Entrance Platform as evidenced by artifacts intermixed with soil and large limestone boulders beginning at 30 cm below the surface and continuing beyond 1 m deep. As discussed with Unit 10 above, the remaining portion of Feature 1 is located in this level. Excavations proceeded deeper than where the yellow marl appeared in Unit 10 further suggesting that the area is an artificial construction. The presence of the limestone

breccias strengthens this position because they are absence from bedrock in the immediate area indicating that they were likely imported for inclusion with the construction ballast, as discussed above.

The artifact density of Level 3 varied with depth. It began with relatively high concentrations of sherds near the top, dwindled to nearly nothing in the middle, and then another dense lens was encountered at its bottom. Artifact totals for this level include: 178 ceramic sherds, 60 g of gray slate, and 3 chert flakes, and several clasts collected in hopes that they can be sourced in a future study. None of the sherds was typeable, although several Spanish Lookout phase groups were identified, including: Belize, Garbutt Creek, and Macaw Bank. The level was terminated when the core fill was no longer present and a soil color change was encountered at 120 cm below surface.

Level 4 was begun when the core fill that defined the previous level was no longer present and the matrix changed color. Only 36 unidentifiable sherds were recovered at the top of the stratum, and no other artifacts were noted for over 15 cm suggesting that color change represents the native soil of the hillside. The level was excavated for a total of 30 cm, bringing the total unit depth to 150 cm in its center.

Platform Trench. Units 14, 15, and 16 were contiguous parts of an elongated trench incorporating the Entrance Platform's northern retaining wall, its northwest corner, and the area directly in front of it (**Figure 50**). For ease of discussion, the three units are referred to collectively as the Platform Trench measuring 1 m wide by 4 m long. Units 14 and 15 were located approximately 0.5 m from the northwest corner of Unit 10. The westernmost portion of the trench terminates just uphill from Unit 12, resulting in nearly

six continuous meters of excavated hillside. Unit 14 measures 1 m by 1 m and encompasses the platform's northern retaining wall. Unit 15 is a 1 m by 2 m rectangle overlapping the platform's corner and fronting stones, and the area where the first few steps leading to the platform should be located. Unit 16, the furthest downhill in the trench and closest to Unit 12, is a 1 m by 1 m square. Overall, these excavations verified the presence of the platform, but did not provide any additional information about the cobblestone staircase. In fact, no verifiable architecture was encountered beyond the fronting stones, although the roots of two large trees adjacent to the trench have disrupted several of the fronting stones, and others that may have occupied that area in the past would have had a similar impact (**Figure 51**). Additionally, investigations in Units 15 and 16 were severely hampered by torrential rains that led to their extensive erosion.

Unit 14. Unit 14 encompassed much of the Entrance Platform's northern retaining wall, and approximately half was situated on top of the wall, while the other was on the platform surface. Two cultural levels were encountered, the first consisted of collapse from the retaining wall, and the second is the actual platform surface. My goal for this unit was determining if the northern stone alignment represented a boundary of the Entrance Platform. Even though time did not permit deep excavations, part of the retaining wall as exposed, and extending its trajectory indicates that the north side of the platform intersects with the point of emergence of the cliff face into which Actun Lak penetrates (**Figure 52**).

Level 1 excavations removed the root cap and topsoil from the wall and platform, during which several medium-sized boulders were encountered near the surface. These

rocks likely represent a collapsed portion of the retaining wall because no artifacts were found above them, but cultural material appeared below them. The level was terminated 15 cm below surface after the root cap had been removed and the wall collapse was fully exposed.

Excavations in Level 2 removed the wall collapse and earthen platform surface, ultimately exposing the top of the rubble core found in Units 10 and 11. Finding the rubble core verified that the retaining wall and platform are part of the same architectural unit (**Figure 53**). Artifact densities and types similar to those found in Units 10 and 11 were encountered directly below the medium sized boulders of Level 1. Totals for these objects include 165 ceramic sherds, two grams of red slate, and 0.5 g of gray slate. Identifiable ceramic types correspond the Spanish Lookout phase and include: Alexander's Unslipped, Cayo Unslipped, and Mount Maloney Black. Sherds identifiable to Belize and Macaw Bank Groups were also identified. The level and unit were terminated once the top of the core fill was exposed at 71 cm below the surface because time did not allow for the deep excavations needed to further probe it.

Unit 15. Unit 15 is a 1 m by 2 m extension to the west, downhill side of Unit 14, and is the middle section of the Platform Trench. Its position intersected the northwest corner of the Entrance Platform, where the retaining wall and fronting stones come together, and a portion of the area in front of it (**Figure 54**). This placement allowed for uncovering any possible stairs leading up to the platform, although minimal evidence for them was found. Only two levels were excavated, with the first removing the topsoil and root cap, and uncovering the platform fronting stones. The portion of the platform face in

the unit is slightly slumped, and what appears to have been its top course of rocks has eroded slightly downhill. The slumping and concomitant erosion may be explained in part by a large root from a nearby Copal tree that runs through the architecture. The root visibly disturbed several of the platform's fronting stones, indicating that similar forest growth in the past may account for the missing rocks in the southern part of the platform. A small patch of construction ballast was uncovered beneath the root, although its function is unknown. It may be a small patio or receiving area for the platform, or, alternatively, a step. It was uncovered at a level below the platform's rubble floor indicating that it is not an extension of latter. The level was terminated when the interior and exterior ballast surfaces were fully uncovered at an average depth of 10 cm below the surface.

Most of the cultural material recovered from this unit came from the area inside of the platform. The artifact totals include 139 ceramic sherds, and 24 g of gray and 30 g of red slate. Identifiable ceramic types correspond to the Spanish Lookout complex including Cayo Unslipped and Mount Maloney Black, although Belize and Macaw Bank Groups were also represented. Some of the construction ballast was removed to begin Level 2 but multiple torrential rainstorms over several days that halted work washed away most of the unit. The severe erosion damage from the storms compromised the integrity of the unit and necessitated its abandonment in favor of more productive and stable units. No artifacts were collected in this level.

Unit 16. Unit 16 is a 1 m by 1 m excavation at the west (downhill) end of the Platform Trench. Several unforeseen problems befell the unit that resulted in its

abandonment after only a half-day of excavations. The first issue encountered was a large animal burrow that seems to have had disturbed the entire unit sometime in the past. Secondly, it was situated on the steep downhill slope, and was greatly impacted by the multiple rainstorms that wreaked havoc on Unit 15 mentioned above. In the end, it was abandoned in favor of more productive and secure excavation units. Nevertheless, artifacts were recovered, although no architecture was noted. The artifacts include 42 g of gray slate, and 91 unidentifiable ceramic sherds.

In sum, eight excavation units of varying sizes were placed on the hillside and the immediate entrance area outside of Actun Lak to determine if they had been modified and, if so, when. The results of these excavations were the identification of a roughly constructed cobble staircase connecting Actun Lak with Rocky Crab Cave below, and an earthen rubble platform at the entrance to the former cavern. The platform measures 5 m wide along its fronting stones and between 3 m to 5 m long on its northern and southern retaining walls respectively. All of the identifiable ceramics recovered from both the stairs and the platform correspond to the Spanish Lookout complex that dates to the final two centuries of the Late Classic period, suggesting that the constructions were made at that time. As discussed below, and elaborated in Chapter 8, excavations inside Actun Lak suggest a dramatic change in ritual practice during that time period, including heavily modifications to the Entrance Passage restricting access to the cave, and constructing a speleothem altar near its rear became a focus of intensive royal ritual activity.

Cave Entrance

Actun Lak's formal entrance sits at the foot of a west-facing 3 m high sheer wall rising up from the hillside, but the actual portal measures 0.75 m tall by 3.5 m wide (**Figure 55**). Access to the interior involves navigating down an alluvium-covered, 2 m-long slope extending from the Entrance Platform's backside. A cut slate block located approximately halfway down the slope and beneath a large limestone boulder, suggests either that a staircase maybe present, or that blocks made from the materials were used in the construction of the backside of the Entrance Platform (see **Figure 36**). Stalactite formation begins at the drip line and continues in abundance to the end of Chamber 1. All of those near the entrance had been snapped off in the past, with the exception of a large unmodified formation that divides the way in and gives the cave the appearance of an agape, fanged mouth (see **Figures 36, 55**).

Whether the stalactite breakage was the result of a conscious intent to create such a visage or if its appearance is happenstance may never be known; nevertheless, several lines of evidence suggest it was purposeful. The Maya who broke all of the other formations in Actun Lak's entrance would have had the ability to do so to the one at the entrance considering others of similar size inside of the cave had been broken, as discussed below. Furthermore, formation breakage is widely reported throughout the Maya area, and speleothems have been recovered in several surface contexts indicating that such practices occurred with some regularity (Aimers 1997; Brady et al. 2005; Brady et al. 1997; Peterson et al. 2005; Weber and Kieffer 2013). A particular striking case

comes from the site of Yaxchilan, Mexico where a speleothem over 2 m tall was carved and then erected in a plaza where it was used as a stela (**Figure 56**; Tate 1992:132). Additionally, the Maya regularly depicted caves as zoomorphic beings often with gaping mouths and "cluster of grapes" elements on them, which may be dripstone stalagmitic formations (Bassie-Sweet 1991:109; Stuart 1987; Taylor 1978). The North Wall mural from the site of San Bartolo, Guatemala provides one of the clearest iconographic examples of the gaping-mouth cave motif. There, a zoomorphic cave is depicted with a wide-open mouth that has a large stalagmitic fang hanging from its snout (see **Figure 33;** Saturno et al. 2005; Taube 2006). Lastly, several caves and rockshelters recorded in the Belize Valley contain both zoomorphic and anthropomorphic modifications on small and large scales (Griffith 1998, Griffith and Helmke 2000; Griffith et al. 2002, 2003; Griffith and Morehart 2001; Helmke and Awe 1998). Overall, while the intent of Maya who modified Actun Lak's entrance may never be fully known, several lines of evidence suggest that its overall configuration was intentional.

Entrance Passage

I refer to the first seven meters inside Actun Lak as the Entrance Passage, which begins at the sloped area behind the Entrance Platform and ends at a 3 m drop into Chamber 1. Immediately south of the entrance is a low-ceilinged chamber that was too small to explore, and a series of small flowstone shelves covered with ceramic sherds line the eastern wall of the main passage. The landowner reported that he placed many of the

ceramics on the shelves to protect them from being trampled on by the visitors he brings to the cave, an activity that he pursued for at least three months. In spite of these efforts, a visual estimate suggests that pottery continues constituting at least 50 percent of the surface matrix. The western wall is relatively straight with the exception of a small alcove adjacent to the drop into Chamber 1. The entire floor is steeply sloped and covered in mud, the only exception is a flat area just south of the drop into Chamber 1 where the Maya constructed a terrace.

One excavation unit, Unit 5, and multiple surface collections were made in the Entrance Passage. The excavation is discussed below, but I established it to understand the function and construction history of the terrace. A general surface collection was made of the entire Entrance Passage after which four others were made in specific areas: the eastern and western walls respectively, the terrace, and at the drop into Chamber 1. Most of the samples collected date to the Classic period, corresponding to the Hermitage, Tiger Run, and Spanish Lookout complexes, but a few specimens from both earlier and later times were recovered, all detailed below. Whether the sherds were gathered from where they were originally deposited in the cave is unlikely due in part to the misguided actions of the landowner described above. I witnessed him moving artifacts around on several occasions, although he never relocated them more than a meter from their original spot on the floor, suggesting that most of the ceramics in the cave are close to the spot of their original deposition. Animal disturbance is also a factor in sherd displacement as I witnessed first hand. Specifically one morning, a Tayra, commonly referred to as a "bush dog" in Belize, was in the Entrance Area. When it saw us, it began frantically pacing

along the eastern wall shelves all the while dislodging much of the pottery stacked on them. Given these disturbance forces, the ceramics recovered during surface collections are used primarily for establishing a site chronology, although other information such as vessel form and deposition location is considered in general discussions of regional cave use patterns.

The earliest ceramics collected in the Entrance Area date to the Late Preclassic, including Flor Cream and Sierra Red. Late Preclassic-to-Terminal Preclassic period Floral Park complex types were also recovered. Identified types from that time include Negroman Punctated-Incised and possibly Aguacate Orange. Aguila Orange, Dos Arroyos Orange-polychrome, Dos Hermanos Red, Minanha Red, and Santa Teresa Incised make up the Early Classic period Hermitage complex types recovered.

Spanish Lookout complex materials are the most abundant in quantity and types represented —including Alexanders Unslipped, Belize Red, Benque Viejo Polychrome, Cayo Unslipped, Chunhuitz Orange, Dolphin Head Red, Garbutt Creek Red, Joyac Cream-polychrome, Martin's Incised, McRae Impressed, Mount Maloney Black, Planton Punctated-Incised, Rubber Camp Brown, Saxche-Palmer Orange-polychrome, Silver Creek Impressed, Xunantunich Black-on-Orange, Yalbac Smudged Brown, and other untypeable specimens belonging to the Belize and Chunhuitz Groups. More Force Unslipped type and members of the Augustine Group are the latest types recovered, both belonging to the early facet of the New Town complex dating to the Early Postclassic period (Gifford 1976:291, 305).

Terrace 1. From the current ground surface, Terrace 1 appears to be a rather short and unassuming construction measuring approximately 1.5 m wide by 70 cm tall, and between four to six courses of dry laid boulders high (**Figure 57)**. It was constructed by stacking uncut stones between the eastern cave wall and a bedrock thumb jutting out of the cave floor, and was positioned so that a curtain formation above Chamber 1 restricts it from being viewed from anywhere inside of the cave save for the Entrance Passage and Ledge 4 (**Figure 58**). Nevertheless, individuals standing on it are easily viewable from outside the cave, particularly when standing on the Entrance Platform (**Figure 59**). This position of the feature was unusual because the pre-Hispanic Maya frequently constructed terraces in large, open chambers (Bassie and Casmir 2001; Brady 1989; Carot 1989; Ferguson 2000; Ishihara-Brito 2007; Peterson 2006; Prufer 2002; Woodfill 2007). A single excavation unit, Unit 5, was placed on the flat area created by the terrace to understand its construction history and why it was located in such an unlikely position, and determine what types of activities would have been performed on it.

The excavations revealed that the terrace was built during one construction phase during the last two centuries of the Late Classic period, indicated by the ubiquity of Spanish Lookout complex ceramics through all levels. The appearance of a cache that includes an Altar Orange type bowl nearly two meters below the surface indicates this event happened sometime after A.D. 820 (Adams 1971:27; Demarest 1997:215; Foias and Bishop 1997:278). Additionally, the terrace is part of larger construction effort that modified the entire Entrance Passage, including the Entrance Platform and hillside stairs (see **Figure 188)**. Excavations also revealed that the cave wall that the terrace abuts is

actually the top of a hollow curtain formation, and the actual wall is located approximately 1 m deeper than is currently visible. Overall, the extent of modifications in the Entrance Passage and those outside of the cave are monumental in nature.

Unit 5. Located in the middle of Terrace 1, Unit 5 is a 1 m by 1 m excavation dug in six artificial levels to a maximum depth of 180 cm (**Figure 60**). Overall, the matrix consists of large sherds mixed with construction ballast and soil mottled with charcoal flecks. The unit was terminated due to the instability of the construction ballast, although only a few artifacts were recovered from the bottom indicating that the excavations likely revealed the extent of the cultural modifications. Three natural stratigraphic lenses are present in the unit, with the first consisting of soil with high quantities of pottery and occasional rocks mixed in (**Figure 61**). This lens encompasses the first two levels of the unit and is 37 cm deep. The second lens encompasses Levels 3 through 5, and is the largest in the unit, consisting of ash and clay soil mixed with large quantities of charcoal and construction ballast. The charcoal, ash, and ballast appeared less frequently as the level was excavated deeper, and ended when a floor paved with modified slate blocks was uncovered at 125 cm below surface (**Figure 62**). Level 6, the third stratigraphic lens, consisted of the matrix below the slate pavement, which is sandy and loose, unlike the compacted clayey soil above. In this stratum, a complete prismatic obsidian blade and a shattered Altar Orange type bowl were recovered, although not in direct association with each other. The blade was encountered a few centimeters higher in the level than the bowl, but their occurrence beneath the slate pavement indicates that they were likely part of the same depositional event. Only a few pieces of nondiagnostic and heavily eroded

pottery sherds were recovered below the bowl, suggesting culturally sterile soil, but large boulders similar to those used for architectural fill in other contexts continued with the sandy soil. Unfortunately, additional excavations were impossible due to the instability of the fill mentioned above, but the lack of artifacts below the obsidian blade and bowl suggests those objects were used for a dedicatory bloodletting event initiating the construction of the terrace.

In total, Unit 5 reached a final depth of 180 cm below surface, recovering 2795 ceramic sherds, 3 modified sherds 73 g of charcoal, a conch shell fragment, 4416 g slate, 3 speleothem fragments, one calcite crystal, and 4 limestone pebbles. Ceramics, slate, and charcoal flecks were present throughout the unit. The conch shell fragment was collected in Level 4, and speleothems were recorded in Levels 1, 3, and 4. The ceramics recovered from this unit have a higher degree of variability by type than any other excavation made in the cave, although most correspond to the Spanish Lookout complex. Ceramics recovered from the top lens (Levels 1 and 2) date primarily to the Classic period and correspond to the Hermitage, Tiger Run, and Spanish Lookout complexes, although some Protoclassic period material was noted, specifically Aguacate Orange. Aguila Orange, Dos Hermanos Red, Lucha Incised, Pucte Brown, and Socotz Striated make up the Early Classic period Hermitage complex types, and Rosario Incised represents the only early Late Classic period Tiger Run complex type collected. Spanish Lookout complex materials are the best represented and most variable in terms of ceramic types—including Alexanders Unslipped, Benque Viejo Polychrome, Cayo Unslipped, Dolphin Head Red, Gallinero Fluted, Garbutt Creek Red, Macaw Bank Self-slipped, Mount Maloney Black,

Silver Creek Impressed, Tu-tu Camp Striated, Vaca Falls Red, Yalbac Smudged Brown, and other untypeable specimens belonging to the Belize and Chunhuitz Groups. No specimens belonging to the Early Postclassic period New Town complex were recovered in these top two strata, although they were in the deeper levels.

Ceramics recovered from the middle lens (Levels 3 through 5) correspond primarily the Spanish Lookout complex, although all other Classic period phases are represented. Hermitage complex types include, Dos Arroyos Orange Polychrome, Dos Hermanos Red, Santa Teresa Incised, and Socotz Striated, while Tiger Run materials are Macal Orange-red, Mountain Pine Red, Sibal Buff-polychrome, and Sotero Red-Brown. The Sibal buff-polychrome sherd contains a hieroglyphic text, suggesting an elite association with the terrace, the implications of which are discussed in Chapter 6. Spanish Lookout complex types include: Alexanders Unslipped, Belize Red, Benque Viejo Polychrome, Cayo Unslipped, Dolphin Head Red, Gallinero Fluted, Mount Maloney Black, Rubber Camp Brown, Silver Creek Impressed, Tu-tu Camp Striated, Tunich Red-on-orange, Yalbac Smudged Brown, Zacatel Cream polychrome, and other untypeable specimens belonging to the Belize, Chunhuitz, and Garbutt Creek Groups.

Ceramics recovered from the bottom lens (Level 6) date from the Late Preclassic through Early Postclassic periods, including specimens of the Barton Creek, Hermitage, Tiger Run, Spanish Lookout, and early facet New Town complexes. Sierra Red is the sole representative of the Late Preclassic period Barton Creek complex. Dos Hermanos Red and Hewlett Bank Unslipped are the only identified Hermitage complex types, although the latter has its origins in the Late Preclassic period, and Mountain Pine Red

and Sotero Red-brown make up the Tiger Run material. Spanish Lookout types include: Belize Red, Cayo Unslipped, Dolphin Head Red, Garbutt Creek Red, Macaw Bank Self-Slipped, and Meditation Black. Augustine Red Group (A.D. 900-1250) and Altar Fine Orange (A.D. 820-950) type dating to the late Late Classic-to-Early Postclassic periods respectively were also collected (Foias and Bishop 1997:278; Gifford 1976). The Altar Orange type is represented by the shattered cache bowl, while Augustine Red specimens were interspersed throughout the level.

Located at the foot of Terrace 1, a 3 m high cracked bedrock wall drops into Chamber 1 (**Figure 63**). It had been in filled with small limestone boulders similar to those used outside of the cave for the hillside modifications, and ceramics were sandwiched between the rocks and the hollow spaces separating them, indicating that the pre-Hispanic Maya were likely responsible. Furthermore, the top of the crack was capped with another small platform-like construction that intersects the base of the terrace. The purpose of this modification remains unknown because the space that it created is too small, too uneven, and too unstable for it to be of any obvious use. Nevertheless, ceramics were present on top of and directly below it in the rubble fill, and the proximity of the terrace to the bedrock crack suggests that the two were constructed at the same time. Overall, these modifications suggests that the that the changes made to the Entrance Area may be deeper and more extensive than the Unit 5 excavations were able to determine.

Large-scale horizontal and deep vertical excavations are necessary to determine the full extent of the entrance modifications. The culturally sterile soil in the bottom of

the Entrance Platform begins on nearly the same horizontal plane as the surface of Terrace 1, indicating that the spaces in between are at least partially artificial. The possible slate step on the backside of the Entrance Platform reinforces this possibility. Furthermore, the depth of Terrace 1's construction, the Entrance Platform, the presence of artifacts within the bedrock crack, and broken stalagmites in the ceiling above, all indicate that the current cave entrance is a product of pre-Hispanic Maya intention.

The Chambers

Three main chambers are present in Actun Lak, with Chamber 1 being the largest in the cave. Most of the ritual activity in that room was focused on a cluster of broken stalagmitic formations and a cobble pavement in its center, with its most intensive use dating to the Terminal Preclassic to Early Classic periods, followed by Terminal Classic activity. Chamber 2 is located deeper into the cave beyond Chamber 1, and is naturally split into higher and lower sections by a bedrock ridge running across the middle. Most of the activity here centered on an artificial stalagmitic altar constructed on the higher ridge. The ceramics recovered from excavations and surface collections generally correspond to the Spanish Lookout phase, although some Early Classic Hermitage material was present. Chamber 3 is the deepest in the cave but was the least investigated. Neither formal excavations nor systematic surface collections were made but visual inspection of the ceramics reaffirm the chronological patterns seen elsewhere in the cave; strong Early and late Late Classic period material with the latter the most represented.

Chamber 1

Chamber 1 is the largest in Actun Lak measuring 16 m long by 10 m wide by 11 m high, and two vertical divisions located at southwestern and northeastern ends bind it. The southwest division is the 3 m tall cracked bedrock exposure adjacent to Terrace 1, and the northeast division is a massive ancient ceiling collapse. A natural stepped area called Ledge 4 abuts the cracked wall beneath Terrace 1, providing accesses to Chamber 1 from the Entrance Passage. An alluvial dome composed of an approximately 70 percent ceramics to mud matrix is at the base of the cracked wall, most of which appears to have weathered down from the Entrance Passage above given the steepness of that area.

Moving further into the chamber, access is split in half by a centrally located cluster of broken stalagmitic formations, and a cobble and speleothem pavement (**Figure 64**). The cluster of formations contains four primary stalagmites, each of which had been broken in the past, and the pavement is a human-made feature that was constructed with river cobbles, limestone boulders, and speleothems. The cobbles and boulders have an average diameter range of 10 cm to 20 cm, although some larger ones measure up to 50 cm. The rocks have been cemented together by a thick film of calcite indicating constructed sometime in the distant past. Nevertheless, only a few of the ceramics on the pavement had any calcite growth indicating that most had been placed there at a later time, likely by the landowner.

The entire ceiling of the front half of Actun Lak including Chamber 1 and the Entrance Passage is covered densely in stalactites. The formations in those areas drip

voluminously during and after storms, and the action is regular enough that heavy rains appear to also fall inside the cave, which is the source of the calcium carbonate coating on the stalagmite pavement described above. I first recognized this effect in my second field season after the same week of heavy rains that ruined Units 15 and 16 outside had passed through the area. It also transformed the chamber's matrix from dry, somewhat densely compacted powdery soil to thick mud remaining wet weeks after the rains had passed and the ceiling formations dried up. Furthermore, several puddles and occasional flows developed on the floor during the peak time of falling water. My overall impression of this physical transformation from wet to dry is that caves are dynamic environments, and they should be visited under a variety of weather conditions to recognize how the pre-Hispanic Maya may have experienced and understood them and also to be aware of the range of taphonomic processes that may impact artifact distribution and condition.

The area immediately adjacent to the southern and eastern sides of the pavement contains a dense soil and pottery matrix. Excavation Units 4, 8, and 9 were placed in those areas to reveal the activities affiliated with the formation cluster and pavement. The bedrock floor rises up to approximately 1 m in height beyond the soil area to a culturally sterile section of the cave. The raised floor continues until it intersects with the natural path to Chamber 2. Approximately 7 m above these areas is Ledge 3, discussed in detail below.

The area west of the pavement is a mix of mud and bedrock, which transitions to a deep soil matrix. A single course construction, Terrace 2, stretches from the northern extent of the central formation cluster to the western cave wall, incorporating a series of

small boulders and a chunk of ceiling collapse in its construction (**Figure 65**). Together, the terrace and stalagmitic cluster divide the chamber in half. Ceramic density dropped significantly beyond the terrace, although they continued to appear in the soil. Piles of small boulders mixed with ceramics line the northern wall, which the landowner said originally covered the area behind the formation. He claimed to have moved them to their current position to facilitate foot traffic through the cave.

A massive ancient ceiling collapse block that settled several meters beyond the formation cluster defines the rear of the chamber. Its eastern side contains an up-sloping, stepped passage to Chamber 2, while the western side is a sheer wall about 2 m tall, encompassing a 4 m long by 1.5 m wide natural path leading to a small labyrinth-like area below the breakdown. The labyrinth contains multiple small sub-chambers containing ceramic sherds, although they were never collected, nor studied. A surface collection was made of the ceramics found within the pile of small boulders along the cave wall, and Unit 3 was placed at the head of the small of the path to the labyrinth.

Chamber 1 Surface Collections. Two surface collections were made in Chamber 1, the first from the pavement in front of the stalagmitic cluster, and the second from the landowner's "cleaning" piles along the northwest wall (**Figure 66**) The collection procedure for ceramics on the pavement consisted of sorting through the material, visually identifying common or irregular types, and then selecting representative samples of each that had the most diagnostic traits, but all supports, handles, and appliqué pieces were collected when encountered. For example, rims were preferred over body sherds, but samples that contained both were particularly sought out. Representative samples

were selected rather than collecting all of the sherds because of the need to consider Actun Lak's role as a tourist cave. I avoided collecting many coarse-tempered, unslipped jar sherds because they are difficult to classify outside of stratigraphic contexts, even though such forms are widely recognized as often being the most abundant vessel form found in caves (Brady 1989; Halperin 2002; Ishihara-Brito 2000, 2001b; Spenard 2006a; Thompson 1975:xv; Woodfill 2007).

Analysis of these materials suggests the area was used as early as the Late Preclassic period, and continued through the early Postclassic. The Late Preclassic is represented by Chan Pond Unslipped material, and use during the Early Classic is demonstrated by the presence of the Actuncan-Dos Arroyos and Balanza Groups, while Mountain Pine Red and Saturday Creek Polychrome make up the early Late Classic Tiger Run types. Spanish Lookout complex materials make up the largest variety of types for all time periods— including Alexanders Unslipped, Belize Red, Benque Viejo Polychrome, Cayo Unslipped, Dolphin Head Red, Garbutt Creek Red, Macaw Bank Self-slipped, McRae Impressed, Mount Maloney Black, and Rubber Camp Brown. Other untypeable Spanish Lookout specimens belonging to Belize, Chunhuitz, and Macaw Bank Groups were also identified. Lastly, specimens of the Augustine Group signify limited use during the Early Postclassic period.

Surface collections made in the boulder "cleaning" piles reflect the chronological patterns seen in other areas of the cave, and include specimens from the Late Preclassic through Early Postclassic periods. Late Preclassic period materials include Aguacate Orange and Sierra Red, and Aguila Orange, Dos Arroyos Orange-polychrome, and

Minanha Red comprised the Early Classic period specimens. Early Late Classic period ceramics included Mountain Pine Red, and Saturday Creek polychrome types. One of the Saturday Creek sherds mends with another collected from the formation pavement, indicating that the movement of some of the artifacts by the landowner in this area involved larger distances than observed in the Entrance Passage. Use of this area during the last two centuries of the Late Classic period is represented by Dolphin Head Red, Cayo Unslipped, Macaw Bank Self-slipped, Mount Maloney Black, and Palmar Orange polychrome types, while Augustine Red is the only representative of the Early Postclassic period.

Unit 3. Unit 3 was placed at the head off the small, natural path leading to the breakdown labyrinth, an area that resembles a shallow canyon (see **Figure 66**). The unit was placed at that location because it is at a point of drastic vertical change and the afternoon sunlight strikes that portion of the cave daily. Such solar hierophanies influenced pre-Hispanic practices, and Maya visitors to Actun Lak would have surely noted the one at the rear of Chamber 1. For example, the orientation of the Cross Group at Palenque was influenced by the setting and rising sun during the solstices and equinox (Carlson 1976). One of the Joljá caves in Chiapas, Mexico contain an Early Classic mural painting of two individuals standing above an altar performing a ritual, a scene onto which shone daily a ray of sunlight (Bassie 2002; Stone 1995:87-90; Thompson 1975:xxxvi). Their placement at that exact spot was surely influence in part by the occurrence of the sunbeam, when considering the rarity of Maya cave art (Stone 1995). More recently, Cave 1 at Ikil, Quintana Roo, Mexico offers another tantalizing account of

the influence of sunlight on pre-Hispanic Maya cave practices (Slater 2014b). The cave is located near the foot of Structure 1, a radial pyramid that is the only known monumental architecture at the site. There, the pre-Hispanic Maya constructed two staircases in the cave that lead to the only spot that offers a visage of the outside world, and, in particular, the pyramid. The archaeologist working at the site witnessed the solar zenith sunrise over the pyramid from that spot in the cave, indicating to him that Ikil's layout was arranged specifically to observe that astronomical event (Slater 2014b). Because of examples such as those just given, Unit 3 was placed near the spot where the afternoon sunbeam first appears in Actun Lak Chamber 1 to determine if the Maya had treated it as a special area.

The excavation proceeded in three levels to culturally sterile soil at 51 cm below surface. Level 1 was a mix of large quantities of ceramic sherds and occasional charcoal flecks mixed with mottled soil, while in Level 2, artifacts were only encountered in the first few centimeters, although charcoal flecks remained in the soil. Because of the paucity of artifacts in Level 2, the unit was reduced to a 50 cm by 50 cm square to determine if sterile soil had been reached, and to find any possible pre-Maya artifacts should any be present, although neither were encountered. The first few centimeters of the unit contained little artifactual material, but several bags of pottery were collected after that, suggesting high levels of ritual activity for the area. Artifact totals include 790 ceramic sherds, 1 modified sherd, 0.5 g charcoal, 72 g of modified and unmodified slate pieces, three beads, and several calcite crystals and limestone pebbles. One of the beads was shell and identical to those found in the Middle Preclassic period settlement in Pacbitun, suggesting it may be from then, while the other two were cut soda straw cave

formations (Hohmann and Powis 1996, 1997, 1999; Hohmann et al. 1999; Spenard et al. 2013). The calcite and limestone specimens were collected because they may have been imported to the area from elsewhere in the cave, although future geological studies of the cave are necessary to determine their origin.

The chronological distribution of the ceramics recovered from the unit mirror that of the surface collection of the "cleaning" boulder piles on the northeastern cave wall, the only difference being that Early Postclassic period material was absent in the excavation. Flor Cream makes up the only identified Late Preclassic period type identified, but this unit provided some of the best representation of the Early Classic period in the cave both in numbers of sherds as well as the variety of types represented, a pattern found throughout Chamber 1, discussed below. Identified Early Classic period types include Aguila Orange, Dos Arroyos Orange-polychrome, Lucha Incised, and Pucte Brown, and several untyped specimens belonging to the Actuncan-Dos Arroyos group were also recovered. Use during the Late Classic is represented by Alexanders Unslipped, Cayo Unslipped, Dolphin Head Red, Meditation Black, Mount Maloney Black, Mountain Pine red, Rubber Camp Brown, Tu-tu Camp Striated, Vaca Falls Red, and Yalbac Smudged Brown.

Overall, Unit 3 excavations reveal that the area was heavily used throughout the Classic period but no discernable activity areas were present. The number of ceramics recovered was surprising considering that sherd concentrations on the surface appeared to be less dense than other areas of the cave. Nevertheless, the lack of surface sherds is likely the result of the actions of the landowner moving them to "safe" spots.

Unit 4. Unit 4 was nestled between the pavement at the speleothem cluster and the cave's east wall in a small basin of soil containing high concentrations of ceramic sherds (**Figure 67**). Three levels were excavated to bedrock at 24 cm below surface, and the matrix of each consisted largely of sherds with only some soil mixed in (**Figure 68**). In fact, each bucket of excavated material dumped into the screens filled them up nearly completely with sherds. Recovered artifact totals include: 2628 ceramic sherds, 453 g of slate, 3 chert flakes, possible shell, 63 speleothem fragments, three of which may be beads, 4.4 g of charcoal, and burned resin were recovered from the unit.

The matrix of Level 1 consisted primarily of ceramic sherds mixed with soil and large quantities of charcoal. Changes in the matrix prompted the start of Level 2, in which ceramic density dropped significantly, the soil changed color, and bedrock and broken speleothems began appearing throughout the unit, eventually filling it up except for the southwest corner. There another change in soil consistency was encountered, but this continued for only 3 cm more, after which bedrock encompassed the entire floor of the unit, at a maximum depth of 41 cm below the surface.

Analysis of the sherds from this unit reveal they are unusually homogeneous suggesting intensive, repetitive, and private use of the speleothem cluster. Late Preclassic period use is suggested by the recovery of San Filepe Brown, and Sierra Red types. The Early Classic period is the best represented by quantity, including Aguila Orange, Balanza Black, Dos Arroyos Orange-polychrome, Dos Hermanos Red, and Hewlett Bank Unslipped types. That latter type accounts for nearly 40 percent of all of the sherds recovered from this unit. Materials dating to the final two centuries of the Late Classic

period include, Alexanders Unslipped, Cayo Unslipped, Dolphin Head Red, Garbutt Creek Red, Meditation Black, Mount Maloney Black, Rubber Camp Brown, and Tu-tu Camp Striated, and other specimens from Belize, Chunhuitz, and possible San Lorenzo Black Groups were also identified. Collectively, the pottery recovered from this unit demonstrates a strong Late Preclassic to Early Classic period use of the area with a renewed vigor in the final two centuries of the Late Classic.

Units 8 and 9. Units 8 and 9 are discussed together here because they form a continuous excavation trench, but dug separately. The units were in a small alcove in the cave wall to the southeast of the speleothem cluster (**Figure 69**). Unit 8 was a 1 m by 1 m square, and Unit 9 was a 1 m by 0.5 m extension of the east wall of the former. Both contain three levels, although only Unit 9 was excavated to bedrock at 30 cm below surface. I sank Unit 8 to elucidate how the Maya interacted with the speleothem cluster and cobble pavement. Furthermore, archaeologists have long recognized that the pre-Hispanic Maya swept ceremonial surfaces clean before using them again, a practice that regularly resulted in the piling of artifacts at the edges of the activity areas, and my hope was to encounter such a pile in the alcove (Parnell et al. 2002; Parnell et al. 2002). Although that goal was unsuccessful, part of a two-vessel cache was uncovered in the unit wall, prompting the establishment of Unit 9.

The matrix of Level 1 of both units consisted of a powdery soil mixed with charcoal flecks, while those of were similar except that they contained a high number of land snail shells and small rootlets, suggesting disturbance, or wash down from the Entrance Area above. Artifacts totals recovered from the two units include 261 ceramic

sherds, two partial bowls, and two complete bowls, a conch shell bead, and a possible speleothem bead, 145 g of modified and unmodified gray and red slate, manganese, 15.7 g of possible burned clay, 12 cave pearls, 54 g charcoal, calcite crystals, and an unidentified concretion.

The two-vessel cache was aligned roughly east to west and was found in the loose, charcoal-rich matrix described above, but sat on top of a cluster of small limestone boulders (**Figure 70**). Both vessels were identified as bowls belonging to the Hewlett Bank Unslipped, a diagnostic type of the Floral Park ceramic complex (A.D. 50 to A.D. 400) type, although one is more poorly executed than the other (Brady et al. 1998:note 9). The eastern vessel, Vessel 1, is the cruder of the two and it rested on the edge of the rim of Vessel 2, the western bowl. Their soil was excavated separately and floated for botanicals, determining that the vessels were the only components of the cache, although pine charcoal and resin from an unidentified species indicates the possible inclusion of organics or that incense was burned when they were buried (Parker 2014:Table 6.8). The other identified ceramics recovered from the two units reaffirm use beginning in the Late Preclassic period and continued at a high rate through the Early Classic. There was a lull during the 7th century, but ritual use intensified greatly during the late Late Classic period. Nevertheless, the artifact density was much lower in these two units compared to Unit 4, suggesting that the alcove was not a primary focus of ritual activity. Identified materials include Aguacate Orange and Hewlett Bank Unslipped from the Floral Park complex, and Aguila Orange from Hermitage. Spanish Lookout was represented by Alexanders Unslipped, Cayo Unslipped, Dolphin Head Red, Garbutt Creek Red, Macaw

Bank Self-slipped, McRae Impressed, Mount Maloney Black, and Rubber Camp Brown, as well as specimens from the Belize, Chunhuitz, and Macaw Bank Groups.

Chamber 2

Chamber 2 is accessed by a rising stepped slope on the massive ceiling collapse in the northeast of Chamber 1 guiding traffic to an elevated ridge terminating abruptly at a 1.5 m tall climb. Above that, a large column divides the way on to the actual chamber into western and eastern passages. The western passage is a tight squeeze that connects back to the main area of Chamber 2, while the eastern passage is the larger of the two, measuring approximately 1 m wide, and providing the main access to the remaining depths of the cave. A natural flowstone shelf divides the room vertically beyond the column (**Figure 71**). The higher area abuts the column, and the lower section is further into the cave, towards Chamber 3. Little soil is present in the higher area, but excavations and several looter's pits revealed a deep soil matrix filling the lower portion. Chamber 2's ceiling height varies greatly. Near the entrance, it is over 4 m tall, but curtain formations, most of which had been snapped off in the past plummet to within 1 m of the floor in its middle and eastern sections. The ceiling rises back up to over 7 m in height in the rear western section of the cave in an area that leads to Ledge 1. The low ceiling continues in the eastern rear of the chamber, leading to Chamber 3 and the known terminus of the cave.

Two alcoves are located on the east and west sides of the lower section of the chamber. The western alcove is a small hollow running beneath a bulbous formation in the cave wall, measuring 1.5 m east to west, 1 m north to south, and 1.5 m tall. Several boulders partially restrict the entrance, and a large limestone slab recently moved inside the hollow, indicate the alcove had been blocked off in the past and then subsequently reopened. Lastly, sooted sherds had been tucked into small niches and nooks within the alcove. The eastern alcove is the larger of the two, measuring 2 m north to south, 3 m east to west, and has a 1.5 m tall ceiling, but several curtain formations that would have restricted entrance to it were broken in the past (**Figure 72**). Two looter pits had been dug in front of it, and their back dirt thrown inside the small room. The looting activity uncovered an abundance of bone that was discarded with the back dirt that was later identified as the remains of an extinct species of giant ground sloth that showed no evidence of cultural modifications (De Iullis et al. 2014; Spenard 2012a; Stanchly et al. 2013). Because of these bones, the eastern alcove was name the Sloth Alcove.

Looting also occurred along the northeastern wall beyond just beyond the Sloth Alcove, uncovering several large diagnostic ceramic sherds. Due to a sacking event that had occurred in that area during the first week of June 2012, a surface collection of the more visible sherds was made in hopes of detracting further looting. Many of the ceramics were located near the entrance to Chamber 3, offering the opportunity to collect chronological data about that area of the cave. They all date to the Classic period and included types corresponding to the Hermitage, Tiger Run, and Spanish Lookout complexes. Actuncan-Dos Arroyos and Balanza Black Groups represent the Hermitage

phase, while Mountain Pine Red is the only Tiger Run type. Cayo Unslipped and Vaca Falls Red types and Macaw Bank Group represent the late Late Classic period Spanish Lookout complex.

The Maya constructed an altar in a large niche immediately to the west of the natural doorway into Chamber 2 (**Figure 73**). Multiple speleothems and *in situ*, but broken, stalagmites provide the supports the altar, and the table component was crafted from a trapezoid-shaped piece of curtain formation (**Figures 74**). All surfaces in the immediate area are black with soot from burning, and the tabletop portion is covered with large chunks of pine charcoal (Parker 2013). Even part of the columnar formation at the chamber entrance had spalled off, likely the result of intense heat from the fire.

Six excavation units were sunk in the chamber with Units 1, 13, and 19 being in the lower section below the speleothem altar. Unit 1 intersected the largest of the deep looter's pits in front of the Sloth Alcove, while Unit 13 was placed inside of it, and 19 was adjacent to its northern wall. The other three units, 2, 6, and 7, tested the area around the altar in the upper section of the chamber. An additional excavation was made in a filled in hole in the bedrock along the natural path between the lower and upper areas

Unit 1. Unit 1 is a 1 m by 1 m square excavated in four levels, ending at a calcium carbonate floor located 34 cm below surface (**Figure 75**). The purpose of this unit was determining behavioral differences between the higher and lower portions of the chamber, and to ascertain if materials were cleared from the altar area and dumped below. The location of this unit was chosen specifically to intersect with the largest of the looter's pits in, providing a preview of the stratigraphy of that area of the chamber.

Recovered artifacts include: 423 ceramic sherds, five modified sherds, a chert nodule and flake, a speleothem, calcite crystals, hematite, a jadeite bead, and 11.4 g of charcoal. The artifacts were evenly distributed throughout the first two levels of the unit indicating that little to no sweeping action from above pushed artifacts down, if they had been, then they should have been tightly clustered and in piles in the portion of the unit closest to the altar. Charcoal is expected because the intensive burning at the altar would have created convection currents that spread ash and other particles around the chamber.

The matrix of Level 1 consisted of soil with charcoal and large rocks mixed in, and, although no discernable activity areas were identified, artifact density remained high throughout the level. Charcoal density within the matrix did increase as the level progressed, and several stones began to appear near the bottom of it. Level 2 began with a matrix color change, but artifacts continued to appear including ceramic sherds, modified sherds, lithics, faunal remains, and charcoal. The artifact density dropped significantly near the bottom of the level, after which a thin calcium carbonate floor was reached at 20 cm below surface. The presence of the floor resulted in establishing Level 3, in which artifacts were absent, but several small animal bones were recovered. Another calcium carbonate floor, thicker than the one above it, was uncovered at 34 cm below the surface. The unit was terminated due to the lack of artifacts in Level 3, and after a probe beneath the second natural floor uncovered more culturally sterile soil. Identifiable ceramics suggest the area was used throughout the Classic period, but most activity occurred during the last two centuries of the Late Classic period as indicated by the larger quantity of ceramics from those times. Pucte Brown and Teakettle Bank Black were the only

Early Classic and early Late Classic period types identified, while the late Late Classic period is represented by Alexanders Unslipped, Cayo Unslipped, Macaw Bank Self-slipped, Mount Maloney Black, Rubber Camp Brown, and Yaha Creek Cream types.

Sloth Alcove Investigations

Back dirt screening. The back dirt tossed into the Sloth Alcove when Chamber 2 was looted was screened over those pits to fill them and return the floor to its previously undisturbed condition. This activity also served to search for more sloth bones and any cultural material that may have been associated with them. More bones were recovered, but the only artifacts were Maya in origin; nevertheless, they were coated in different colored soils, indicating they originated in from different strata and are thus unaffiliated. The bones were covered in soil similar to that in the bottom of the looter pits, and they are unburned suggesting that they came from a stratigraphic level that has yet to produce any evidence of human use of the cave, and that they were uncovered recently. Alternatively, the Maya artifacts are heavily burned and covered in soot, suggesting that the fire at the altar, which is discussed below, impacted them.

The cultural material from the back dirt screening activities included a wider range of artifact classes than those recovered from other contexts investigated in the cave, including chert flakes, speleothem imports, slate, calcite crystals, ceramic sherds, and conch, olivela, and unidentified species of shell beads. The ceramics all date to the Classic period and include types from the Hermitage, Tiger Run, and Spanish Lookout

complexes. Balanza Black and Teakettle Bank Black types are the only identified Early Classic and early Late Classic period types identified, and the late Late Classic period is represented by Alexanders Unslipped, Cayo Unslipped, and Mount Maloney Black types. Fragments of two different ceramic boxes were also recovered from the alcove, and although their types are indeterminate, they likely date to the Early Classic period.

Units 13 and 19. Units 13 and 19 were both excavated by Terry Powis and Norbert Stanchley during the 2012 and 2013 field seasons respectively to recover any more Pleistocene fauna and to find evidence of pre-Maya use of the cave. The results of their excavations have been reported elsewhere, but they are mentioned here because both units held Maya artifacts, although only the Unit 13 material has been analyzed at the time of writing (De Iuliis et al. 2014; Stanchly et al. 2013). As a result, Unit 19 is not discussed further in this dissertation.

Unit 13. Unit 13 is a 1 m by 1.75 m trench excavated in 10 cm arbitrary levels for to a thick calcium carbonate floor 63 cm below the current cave surface. Although several thin calcium carbonate floors were identified in the unit's stratigraphy, many had been broken sometime prior to the excavations. Cultural material was recovered in the first three levels but only the top two contained ceramics. A note should be made here regarding the stratigraphy of the Sloth Alcove. The looter pit infilling activities discussed above were terminated when the holes were completely filled in, and when the matrix of the back dirt pile transitioned from the bright orange found at the bottom of the pits to the darker burned layer seen in other areas in the chamber. Nevertheless, some mottling of the different matrix types was still present when those efforts ended. The decision was

made during the 2012 in-filling activities to leave the remaining mottled matrix in tact and hope that future excavations would be able to identify the original dirt floor if it were still present. Artifacts and sloth bones continued to be intermixed throughout Unit 13's matrix, and since most of the calcium carbonate floors had been broken prior to Stanchley and Powis' excavations, I presume that the entire alcove had been extensively disturbed prior to the looter pits being dug in front of it.

Although these illicit activities suggest a high level of disturbance in the Sloth Alcove, the relative lack of looting elsewhere in the chamber suggests that the remaining deposits are intact, and thus remain useful for understanding Maya use of the area. Artifact totals from the unit include: 548 ceramic sherds, 23 g of gray and red slate, 20 speleothems, including calcite crystals, other formations not native to the alcove, and several possible beads made from soda straw formations, three chert flakes, three shell beads from unidentified species, 0.8 g of charcoal, and faunal bones including more sloth remains and those from other unidentified animals. Identifiable ceramics include Balanza Group and Sotero Red-brown types representing the Early Classic and early Late Classic periods respectively, and Achote Black, Alexanders Unslipped, Cayo Unslipped, Dolphin Head Red, Meditation Black, and Rubber Camp Brown, dating to the last two centuries of the Late Classic.

Overall, Unit 13 excavations revealed that the entire Sloth Alcove had been disturbed recently, but prior to our investigations there. Most indicative of this disturbance was the presence of Maya artifacts and extinct Pleistocene megafauna recovered from the same levels that were coated in different colored soil residues.

Although the stratigraphic levels had been heavily disturbed, the lack of looting elsewhere in the cave indicates the materials were originally deposited there. Thus, the pre-Hispanic Maya certainly considered the alcove a special space in the cave when considering the entire artifact assemblage recovered from excavations, back dirt screening operations, and surface collections. Objects such as shell beads and chert flakes were rarely found in other areas of the cave, and the recovery of parts of two ceramic boxes suggests the possibility that screen fold books may have been stored for use during ceremonial events there (Anya et al. 2001; Coe 1974; Culbert 1993; Woodfill 2011; Woodfill et al. 2006; Woodfill et al. 2012).

Speleothem Altar Investigations

Units 2, 6, and 7 were placed adjacent to the speleothem altar in the upper area of Chamber 2 to determine the types of activities that were performed there (**Figure 76**). A major factor in their placement was the results of the excavations of an extensive hearth area in nearby Barton Creek Cave (Mirro and Mirro 2001; Morehart 2001; Morehart et al. 2004). Those excavations and subsequent analysis of that material by the archaeologists revealed exceptionally well-preserved organic materials that included textile fragments, miniature corncobs, and an abundance of pine charcoal, suggesting cloth-bundled offerings were made in the cave (Morehart 2001b, 2005; Morehart et al. 2004). Morehart (2001b:157) notes that paleoethnobotanical data has rarely been collected or analyzed from subterranean contexts, thus the presence of extensive quantities of burned material

at the Actun Lak altar provided a rare opportunity to document ancient Maya plant use in caves.

Unit 2. Unit 2 consisted of two natural strata excavated to bedrock at 14 cm below the surface. Level 1 was a mix of soot-covered ceramic sherds, charcoal, and some soil, while Level 2 was determined by a drastic change in soil color, although charcoal flecks and ceramics remained present. In total, 15 bead and three ear spool fragments all of jadeite, 482 ceramic sherds, a ceramic disc, a limestone bead and one of shell, a soda straw speleothem, 6.1 g of calcite crystals, 30 g of charcoal, a piece of burned pine wood, and a cohune nut (*Attalea cohune*) were recovered (Megan Parker, personal communication 2014). The ceramics indicate that the area was used primarily during the last two centuries of the Late Classic period, although some earlier material from the Late Preclassic and Early Classic were recovered. All of the later sherds collected from the unit were sooted, suggesting that at least some of the burning event or events occurred at that later time, but the materials were left unwashed to facilitate future residue analyses and C^{14} dating. Leaving these residues on the sherds hindered type identifications, and as such, the actual variety of ceramics is likely greater than reported here.

Negroman Punctated-Incised is the only Late Preclassic period type identified, while Aguila Orange and two untyped Peten Gloss ware forms make up the Early Classic specimens. Cayo Unslipped, Dolphin Head Red, Garbutt Creek Red, Macaw Bank Self-Slipped, Mount Maloney Black and Tu-tu Camp striated comprise the Late Classic types. Beta Analytic laboratories subjected a burned piece of wood from Level 1to C^{14} dating, finding 2 sigma range of Cal A.D. 770 to 900 and Cal A.D. 920 to 940 for it, meaning

that there is a 66% chance that it dates between A.D. 770 to 940. This range indicates at least some of the burning occurred in the late Late Classic period (A.D. 700-900), which matches well with that of the majority of ceramics recovered from the unit, and fits the temporal pattern of increased cave use at that time seen elsewhere in the Belize Valley (Awe et al. 2005; Awe and Helmke 2007; Moyes 2006a, 2006b; Moyes et al. 2009).

Units 6 and 7. Units 6 and 7 are 50 cm by 50 cm extensions of the eastern wall of Unit 2, prompted by the recovery of the jadeite artifacts and large quantity of charcoal there. Unit 6 extends from the southeast quadrant of Unit 2 and abuts the stalagmitic column that separates Chambers 1 and 2, and a stump of a broken stalagmitic formation punctuates its east wall. Unit 7 extends from the northeast quadrant of Unit 2, and its north and east walls encompass the base of the altar, ensuring the recovery of any material that may have been swept or accidentally kicked beneath it. The matrices of these smaller excavations is identical to those of Unit 2, with the exception of a third level in Unit 7, composed of a darker orange soil than is found above it. Excavations included collecting the entire matrix from both units in levels matching those from Unit 2, which was then water screened. These collections were made to protect the archaeological materials from potential looting and to obtain more samples for paleoethnobotanical analysis.

All soil samples collected from Units 2, 6, and 7 were floated and processed during the 2011 and 2012 field seasons, and the procedure is discussed here because it provides further information for understanding the burning activities at the altar (Parker 2013; Spenard 2012a). The process used two buckets, the first of which was filled with

water and the second was covered with a sheet of the cheesecloth. The soil sample was dropped into the first bucket, stirred, and then poured over the cheesecloth into the second bucket until all light fraction was removed. The remaining water was poured into a layered series of screens to size sort the heavy fraction. Each of the buckets was then washed out in preparation of a new sample. Our initial attempt at following this procedure was thwarted by the large quantities of charcoal present in the samples, specifically because its abundance prevented the water from passing through the cloth. As a result, charcoal was first skimmed by hand from the first bucket, and placed into separate cheesecloth bundles before the water could be poured over the fabric into the second bucket. In total, over 800 g of charcoal was collected, demonstrating the considerable quantity of fuel used in the fires, and the intensity of the burning activities at the altar.

Additional evidence for intensive fire came during the actual processing of the flotation samples. The water instantly boiled each time a sample was introduced into the bucket, an event that also occurred during sample processing in 2012 (Parker 2013:114). Linda Howie, Laminai project ceramicist, noted that the boiling was likely a result of quicklime in the samples, which was probably an accidental byproduct of the burning at the altar (Linda Howie, personal communication 2012). Quicklime can only be produced by heating limestone to temperatures between 980 to 1,320ºC, although others report the process can happen beginning around 850ºC (Ford and Lucero 2000:65; Miller 2013; Rice 2005:98). Thus, the appearance of the chemical in the flotation samples would have necessitated burning events to have reached that temperature minimally. Nine hundred

degrees is the upper sustained possible temperature for open-air fires, while some flares may peak at 1015ºC in that condition. These temperature ranges indicate that the altar area had been subjected to unusually intense fire or fires sometime in the Terminal Classic period, resulting in the accidental production of quicklime. The sooting encountered throughout the chamber and analysis of the charcoal indicates that it was a pine bonfire (see **Figure 73**; Parker 2014).

Artifacts recovered from the units include over 800 g of pine charcoal, 218 ceramic sherds, 108 jadeite beads and bead fragments, one that was carved, 61 speleothems, four of which are soda straw beads, 9 unidentified worked jadeite object, 7 limestone bead and bead fragments, 2 drilled sherds made from unidentified pottery types, and one unidentified worked limestone object. Many of the ceramics were difficult to identify because they were heavily sooted and left unwashed to facilitate residue analysis and C^{14} dating. Identified Early Classic period types include Aguila Orange and Lucha Incised, as well as material from Actuncan-Dos Arroyos and Balanza Groups, although identifying them further was impossible due to their small size. Cayo Unslipped, Dolphin Head Red, Garbutt Creek Red, Macaw Bank Self-slipped, Meditation Black, Mount Maloney Black, Rubber Camp Brown, Tu-tu Camp Striated, Yalbac Smudged-brown, and Zibal Unslipped are the late Late Classic period types identified, but specimens from the Belize, Garbutt Creek, Macaw Bank, and Saxche-Palmar Groups were also noted. The Early Postclassic period is also represented with Augustine Red and Daylight Orange types.

Bedrock Cupule 1 Excavations

Located on the northeast rim of the elevated area of Chamber 2, and along the natural path between the upper and lower sections, this geological feature is a roughly circular hole in the bedrock that the Maya had choked up with small rocks, speleothems, and some soil, but that opens in a hollow space below the floor (**Figure 76**). The excavations were prompted by a comment James Brady (personal communication, 2011) made to me while visiting the cave in 2011, specifically that he encountered many such features while working at Naj Tunich cave and the caverns in the Petexbatun region, Guatemala, and that they typically contained artifacts. My purpose for this excavation was testing Brady's observations, and determine what types of activities may have involved the natural feature.

Excavations revealed that the feature had a false bottom constructed from tightly compacted rocks held in place by a central speleothem plug. All matrix was collected for paleoethnobotanical analysis, and a few Cayo Unslipped, Dolphin Head Red, and Mount Maloney Black sherds were recovered indicating the hole was clogged in the later portion of the Late Classic period. Removing the speleothem plug revealed a small, natural shelf beneath the false bottom in which more charcoal was present, although in lesser quantities than above, but some of which resembled branches. The shelf continued towards the eastern edge of the elevated area but was plugged with more rocks, which, when removed, revealed that the shelf was originally exposed in the sidewall of the elevated ledge and then purposefully filled by the Maya. Similar modifications have been

reported in nearby Barton Creek Cave, and other Belize caves, and although their function remains elusive, this excavation reveals that the Pacbitun Maya did use circular bedrock holes, as Brady suggested to me (Austin 2000; Brady 1989, 1997a; Brady et al. 1997; Kenward 2005; Mirro 2007; James Brady, personal communication 2011).

Chamber 3

Chamber 3 is the furthest known part of the cave from the entrance, and it is entered through a large bedrock window in the northeast corner of Chamber 2 providing access to a sheer wall approximately 1.5 m high. Ceiling height ranges up to 9 m where it intersects with Ledge 1, and the floor of the entrance area slopes steeply to the west for 6 m, then turns to the south continuing to trend downwards for another 5 m. The chamber ends at a small, low pinch, which was intensively dug either by human or animal activity. Definitive spots of looting are located along the cave walls, although they are minimally invasive, and large quantities of ceramic sherds remain on the floor. Producing a map of the chamber was the only archaeological attention given to this section of the cave, but a rapid inspection of the ceramic material identified Alexanders Unslipped and Cayo Unslipped jar fragments indicating that the area was used minimally in the late Late Classic period.

The Ledges

For the four known ledges identified in Actun Lak, each was given a numerical designation based on the order it was found, begin at the rear of the cave and continuing to the entrance. Except for Ledge 1, all have bedrock surfaces with minimal soil accumulation. Additionally, they all contain cultural remains, most of which are ceramic sherd scatters, some charcoal, and imported stones.

Ledge 1. Located above Chambers 2 and 3, Ledge 1 has a primary axis running north to south, and measures 5 m long by 2.5 m wide. It is accessed by climbing a steep set of natural flowstone stairs beginning just beyond the western alcove in Chamber 2, and emerging at the southern end of the ledge. The ledge's northern section abuts the cave wall, taking a gentle turn to the east. The floor is a mix of bedrock to the south and mud in the northern area.

Although no archaeological data was collected from the ledge, three to four large mammal bones covered in calcium carbonate are naturally cemented to the bedrock floor at the southern edge where the natural stairs emerge from below. Visual inspection suggests that they belong to a deer-sized animal, and the cave growth over them indicates that they were deposited in deep antiquity. Additionally, all of the formations in the area are extinct suggesting that water has not flowed there recently, but the muddy floor offers a possible explanation for the presence of the bones. There the matrix originates from an inclined, muddy tube in the ceiling that was too small and slick to enter. Mike Mirro, one of the cave archaeologists on my team, suggested that it might be the remnants of an

ancient sinkhole entrance that has since collapsed (Mike Mirro, personal communication 2011). Such a proposed entrance would account for the calcified bones found on the ledge, and also provide an explanation for the appearance of the sloth bones in Chamber 2 below.

Ledge 2. Ledge 2 is the smallest yet recorded in the cave, covering an area of approximately 1 m^2. It is located 3 m above the speleothem altar in Chamber 2, and accessed by vertical climb at the intersection of the column and cave wall behind it (**Figure 77**). It is little more than a flat spot behind a bulging formation on the cave wall that has a thin lens of soil accumulation. A few ceramics were noted there when mapping, although they were too small to be identified.

Ledge 3. Ledge 3 is the largest yet discovered in the cave and the most difficult to access. It is located along the eastern wall of Chamber 1, approximately 7 m above excavation Units 4, 8, and 9 (**Figure 78**). It is accessed by scaling up the nearly vertical cave wall above the massive ceiling collapse at the juncture of Chambers 1 and 2. The climbing path to the ledge continues south from that point to a small cluster of stalagmitic formations near the ceiling. The way forward is reached by navigating around the cluster and beneath other formations hanging from the ceiling. From there, series of flowstone curtains emerge from the cave wall, the tops providing a thin walking path to the ledge. The ledge itself measures 8 m northeast to southwest by 3 m east to west, and has a nearly complete bedrock surface. Ceramic scatters, burn pits, and imported rock and speleothem clusters abound (**Figure 79**). A surface collection made on the ledge recovered ceramics sherds and a pottery disk, charcoal, chert flakes, and an unidentified

volcanic rock. The pottery indicates that the ledge was used from the Early Classic period through the Late to Terminal Classic —including Aguila Orange, Alexanders Unslipped, Balanza Black, Cayo Unslipped, Dolphin Head Red, and Mount Maloney Black types, as well as specimens from the Belize Group.

Ledge 4. Located at the juncture of the Entrance Passage and Chamber 1, Ledge 4 is accessed by the stepped drop below Terrace 1. It composed of three areas with little soil accumulation —an elevated main ledge, a deep, modified crack that abuts the western cave wall, and a lower ridge that juts out above the stalagmite cluster in Chamber 1. Overall, it is slightly smaller than Ledge 3, measuring 6 m long, and 3 m wide, but is much less navigable because the main ledge and lower ridge are riddled with stalagmite formations creating uneven surfaces. The modified crack runs the length of the ledge and its width varies between a few centimeters to about a meter thick. The lower ridge contains a variety of breakdown boulders, cached limestone, and slate rocks and ceramics sherds. Although many of the sherds on the entire ledge were untypeable due to severe erosion, a few identifiable specimens were collected including, Belize Red, Mount Maloney Black, and Rosario Incised, all dating to the Late Classic period.

Rocky Crab Cave

Previously mapped by the Mendip Caving group, Rocky Crab Cave was originally published in as Crab (Rocky) Cave, but its name is changed here for ease of discussion (**Figure 80**; Francis et al. 1995; Flavell et al. 1994; Hollings 1996). The name comes from the large crabs seen inhabiting several pools during Mendip's visit, whose report includes a physical description of the main passage and other smaller side branches, but if cultural remains were encountered is unclear (Francis et al. 1995:12). Nevertheless, their descriptions suggest that the cave floods regularly, which would wash away any artifacts in low-lying areas (Francis et al. 1995:12). Although this cave has yet to be a focus of archaeological investigations, I provide a brief description of it because of the pre-Hispanic cobble staircase connecting it to Actun Lak. The following discussion is derived from my visit to the cave in 2010, and another by my team in 2011, and supplemented by the Mendip Group's reports (Francis et al. 1995; Flavell et al. 1994; Hollings 1996; Spenard 2011a).

Measuring 10 m tall by 12 m high, Rocky Crab Cave's entrance faces south, and its main passage is 325 m long, gently sloping downward with an occasional vertical drop no more than 3 m tall (**Figure 81**; Francis et al. 1995:12). The ceiling height varies throughout the cave, although it reaches its maximum height of approximately 30 m just after the leaving the daylight region (Francis et al. 1995:12). One elevated ledge with a few interconnected chambers was located high up on the eastern wall near the entrance

on which low-density, nondiagnostic ceramic sherd scatters were noted, as well as a series of slate and imported limestone boulders lining areas of the chambers (**Figure 82**). No cultural remains were noted beyond the entrance ledges, although the Mendip Group reported an unreachable high ledge about 150 m into the cave that neither of the PRAP visits was successful in locating (Flavell et al. 1994:6). The Mendip Group's description of the ledge suggests that it is located well above the flood zone and thus holds the promise of intact cultural remains.

This cave unusual in the greater Pacbitun region because it is located at the end of a seasonally active creek, taking in massive quantities of water rather than discharging it, a feature defined as a swallet (Miller 1996:109). When flowing, the creek enters the cave via a 10 m high waterfall, cascading over massive boulders, and forming a cloud of mist at its entrance. The Maya understood such phenomena as zoomorphic caves exhaling rainclouds (Taube 2001). After a period of heavy rains, the sound of the waterfall is easily heard near the crest of the hill, well above Actun Lak. Actun Mai is the only other known swallet cave in the greater Pacbitun region, although the Mendip reports suggest that others may be present (see http://youtu.be/65_Op8BxBfc for video I made of water flowing into cave after three days of heavy rains; Francis et al. 1995; Flavell et al. 1994; Hollings 1996; Spenard 2011a:34). Other better-known large, wet caves such as Barton Creek Cave, Actun Tunichil Muknal, and Actun Yaxteel Ahaw are all discharge features (Awe et al. 1998; Miller 1989, 1990; Mirro 2007). That Rocky Crab Cave took in water rather than dispensed it may have played into the Pacbitun Maya understanding the entire hill as a ritually significant water-engorged place, as discussed more fully in Chapter 8.

Nohoch Tunich (Great Wall) Bedrock Outcrop Complex

The Nohoch Tunich Bedrock Outcrop Complex (NTC) is an approximately 0.25-km^2 cluster of limestone karst features capping the hill that Actun Lak and Rocky Crab Cave penetrate (**Figure 83,** see also **Figures 34**). It is due east of them and can best be described as a complex mosaic of boulders, chasms, cracks, rockshelters, small caves, collapsed karst bridges, and other types of karst features for which satisfactory names do not exist, but most of which were ritually used and extensively modified by the pre-Hispanic Maya. The karst features in the NTC make up the second major focus of my dissertation, and I selected it for the ubiquity of surface artifacts, number of visible modifications present in it, and diversity of karst features, each of which was named when selected for investigation. Furthermore, its geologic complexity and extensive evidence of pre-Hispanic Maya ceremonial use make it an ideal candidate for understanding from an archaeological perspective the newly identified hieroglyph, *tzit* or *titz*, meaning "rock outcrop," or "hilltop," (Houston and Taube 2012:44). The name of the NTC comes from a rough translation of a hand-painted wooden sign within the main rockshelter that reads, "Great Wall," although it actually means, "Big Rock" in Yucatec Mayan.

My investigations in the NTC indicate that the pre-Hispanic Maya who used it understood it as a multivocal place. I follow Colwell-Chanthaphonh and Ferguson (2006), and Rodman (1992) by defining multivocal places as locales having a variety of meanings defined by the interactions between them and the people who use them. For the

NTC, the close proximity of the features to one another, use of the entire hilltop, and chronological overlap of the ceramic assemblages from each suggest that the complex was understood as a place, as defined in Chapter 1, and which I suggest in Chapter 8 to have been a pleasure garden park. On the other hand, many modifications created small, intimate ceremonial spaces accessible to a limited number of people at any time, indicating small-scale rituals were performed in them.

Most of the archaeological study of the NTC focused on its namesake, the Nohoch Tunich rockshelter, and the karst features in its immediate vicinity (**Table 5.3**). Although those investigations extensively probed each feature, only a small sample of the entire NTC was studied as new features and modifications were continually discovered throughout the duration of my investigations there. Collectively, the pottery suggest that the NTC was used from the Late Preclassic through Early Postclassic periods with the most intensive used occurring during the final two centuries of the Late Classic period. My investigations here involved making surface collections of diagnostic artifacts, photographing modifications, stratigraphic excavations, and detailed mapping. Actun Nohoch Tunich (Great Wall), Actun Subuul (Spanish Bay Cedar Cave), Actun Xtuyul (Termite Cave), Actun Ha'ale (Gibnut Cave), and Actun Ch'e'ehem Zotz (Squeaky Bat Cave) were surface collected, and all but the latter two were excavated. Time did not permit mapping the entire complex; instead, energies were focused on the clusters of karst features that held the most obvious evidence of pre-Hispanic use. These other features that were only mapped include: Javier's Cave, Actun Ak Ha, Actun Chechem, Actun Ok Ak Ha, and the Crevasse. In the following sections, I describe the above

Table 5.3. Names of karst features in the Nohoch Tunich Bedrock Outcrop Complex. "Original publication" is the reference to the first publication of the feature.

Cave Name	Translation	Original Publication
Actun Ak Ha	Water Vine Cave	N/A
Actun Chechem	Poisonwood Cave	Spenard 2012a
Actun Ha'ale	Gibnut Cave	Spenard 2012a
Actun Ch'e'ehem Zotz	Squeaky Bat Cave	Spenard 2012a
Actun Ku'uk	Squirrel Cave	Spenard 2012a
Actun Nohoch Tunich	Big Rock	Spenard 2012a
Actun Ok Ak Ha	Foot of Water Vine Cave	N/A
Actun Subuul	Wild Bay Cedar Cave	Spenard 2012a
Actun Xtuyul	Termite Cave	Spenard 2012a
Javier's Cave		Flavell et al. 1994
Kajaw Tunich	Split Rock	Spenard 2012a
The Crevasse		N/A

mentioned karst features in detail, including natural and cultural aspects of each, then present the archaeological investigations, including preliminary overviews of the artifacts and other cultural materials recovered, and conclude concludes with general overviews of the findings.

Actun Nohoch Tunich (Great Wall Cave)

Situated at the foot of a small hill, opening to the east, measuring 53 m long by 13 m tall, and with a meandering drip line that divides it into South, Middle, and North sections is Actun Nohoch Tunich (**Figure 84**). The South section is the largest of the three, and is the main activity area (**Figure 85**). The Middle section is composed of breakdown and alluvial deposits eroding from the hilltop, and a shallow drip line is

present over most of it, but disappears for several meters at its northern extent. No evidence of cultural activity was seen throughout this entire section, although heavy vegetation growing over collapse boulders may be obscuring it. The North section is at the northern corner of the small hill and is defined by the reemergence of the drip line, and contains a possible constructed limestone pavement.

The South section measures 22 m long, 8 m at its deepest, and low-density ceramic concentrations cover the entire floor surface (**Figure 86**). Its southern end is delineated by the emergence of the shelter's rear wall from the steep, eastern sloping hillside, and its northern end by the disappearance of the drip line. The area inside of the drip line is relatively flat, while sections outside slope to the east. The only uneven surface in the section is at the southern end where the bedrock face emerges from the hillside. A few small stalactites are present, all of which are intact and show no evidence of modification, but most rainwater free falls from the lip above. Nevertheless, two karst elements dominate the southern section, these being an alcove, and a limestone bench abutting the center rear wall.

Located near the southern end of the section, the alcove measures 3 m long by 1 m wide, and its floor had likely been artificially flattened in the past using small limestone boulder ballast covered with dirt (**Figure 87**). Unfortunately, the feature had been extensively looted to prior to my investigations, with the boulders being placed in a pile just outside of the alcove. Artifacts were seen mixed in the pile, suggesting that the pre-Hispanic Maya had used the small room. Regrettably, the looting had reached to near bedrock in most places in the alcove, making any scientific investigations there

impossible; however, a collection of the diagnostic pottery from the boulder pile indicates it was used throughout the Classic period and into the Early Postclassic. Early Classic period ceramics include specimens from the Actuncan-Dos Arroyos and Balanza Group, while late Late Classic period types include Benque Viejo Polychrome, Cayo Unslipped, Dolphin Head Red, and Mount Maloney Black. Augustine Red is the only Early Postclassic period material identified. The limestone bench emerges from the rear wall of the rockshelter approximately 5 m to the north of the alcove, just off center of the Southern section. Likely originating as a large spall from the ceiling above, the bench measures approximately 4.5 m long, 0.5 m high, and gently slopes toward the west (see **Figure 86**). Stratigraphic excavations at its base revealed that it was one of the main foci of ritual activity in Actun Nohoch Tunich.

The Middle section of the shelter is defined by a large alluvial mound that is an erosion product from above, an organic debris covered slope, and an alcove full of rotting cut logs. The geologic character of the limestone in this section is different from that of the South area, being flaky and soft, suggesting that it is decaying more rapidly than the other. Neither cultural materials nor modifications were noted here, although they may be buried under the thick erosional rubble. The section measures 18 m long, has a variable depth due to the meandering, and at times absent drip line. The alluvial mound and slope are located outside of the drip line, but the shelter has an average depth of 1.5 m, with the deepest part being the log-filled alcove at just over 3 m.

The North Section is separated from the Middle by a 3.5 m long vegetation-covered area where the drip line is absent, and beginning where the overhang reappears.

It runs for approximately 12 m, has a maximum depth of 2.5 m, and a geologic character identical to the Middle section being relatively soft, flakey limestone. A small rockshelter component sits on top of a 1 m tall, gently sloping incline emerges from flat ground below (**Figure 88**). A limestone rock pavement covers the entire floor, although whether it is the result of sheeting action from the wall, a cultural construction, or some combination of the two was unclear even after excavations.

Seven units were excavated in the entire rockshelter, making it is the most intensively excavated feature in the NTC. Units 1 through 4 and 6 measure 1 m by 1 m, and Units 5 and 7 are 50 cm by 1 m extensions of Units 3 and 6 respectively. All excavations were located in the South section, except for Unit 4, which was established to understand the possible pavement in the North area.

Unit 1. Archaeological investigations throughout the Maya region have demonstrated that falling water in cave environments tend to be the foci of ritual activity (Brady 1989:415; Halperin et al. 2003; Thompson 1959, 1975). Considering this, I placed Unit 1 at the southern end of the limestone bench in the center of the South Area adjacent to a small stalagmitic formation growing from the floor. Overall, excavations revealed a buried, structured cache that is likely part of the Feature 2 uncovered in Units 3 and 5. A more complete discussion of the nature of the cache is presented with those units because it is better preserved there. Suffice it to say for now that the pre-Hispanic Maya constructed the cache by excavating to near bedrock, then depositing *jute* snail shells and chert flakes into the hole, which were then capped with limestone boulders of varying sizes. More of the shells and other stone artifacts were placed on top of the rocks, and

scattered charcoal flecks surrounding this part of the feature suggest a burning event took place. These layers were then buried with a mixture of dirt and late Late Classic period ceramic sherds until the remaining pit was completely filled. Six levels of natural and arbitrary stratigraphy were excavated to 73 cm below ground surface, and artifacts recovered from the unit include 725 ceramic sherds, 377 *jute* snail shells, 196 g of red and gray slate, 42 chert flakes, 24.4 g of charcoal including an unidentified resin ball, 19 g of burned clay, 3 quartz flakes, 3 modified sherds, a granite flake, and a hematite nodule.

Reaching 10 cm deep, excavations in Level 1 recovered ceramic sherds, *jute* snail shells, chert flakes, burned clay, and red and gray slate pieces were recovered. All of the identifiable ceramic material corresponds to the Spanish Lookout complex —including Cayo Unslipped, Macaw Bank Unslipped, and Mount Maloney Black types and a specimen from the Garbutt Creek Group. The base of the stalagmite was also uncovered, revealing that it was growing in the soil rather than from bedrock below, possibly having been move there in the past to catch the seasonally dripping water. It was removed during excavations to prevent its destruction, but replaced when the unit was backfilled. The level was terminated when the matrix darkened noticeably, an effect likely resulting from dampening by the active formation.

The pattern of artifact distribution from Level 1 continued in Level 2, although with additional materials, including possible copal residue and an ashy charcoal lens approximately 15 cm below surface. Typable ceramics from this level include material from the Classic period and include specimens from the Hermitage, Tiger Run, and

Spanish Lookout complexes. The Hermitage and Tiger Run pottery types are Santa Teresa Incised, and Mountain Pine Red respectively, while Spanish Lookout material includes Cayo Unslipped, Macaw Bank Self-slipped, Meditation Black, Mount Maloney Black, Rubber Camp Brown, and Vaca Falls Red. Chert, and red and gray slate flakes, *jute* snail shells, charcoal, and an unidentified ball of resin were also recovered, and the level was terminated when a soil color change was encountered 20 cm below surface and the ashy lens disappeared.

The artifact assemblage in Level 3 remained the same as the two above — including ceramic sherds, chert flakes, red and gray slate pieces, burned clay, and *jute* snail shells. A concentration of charcoal was encountered in the northeast corner of the unit, but the material was relatively absent from other areas of the level, indicating a localized burning event. All of the identifiable ceramics recovered in Level 3 date to the late Late Classic period, and thus the presence of earlier material in Level 2, is likely the result of matrix mixing when the cache was buried. Identified ceramics from the level include Cayo Unslipped, Dolphin Head Red, Macaw Bank Self-slipped, Meditation Black, and Mount Maloney Black types, and material from the Belize Group.

Level 4 uncovered an increased amount of burned material, and the concentrations of *jute* snail shells and chert flakes increased while the ceramic sherd density began to wane. A possible ash area was uncovered in the southwest corner of the unit, the material from which is awaiting analysis. Other artifacts recovered include granite and quartz flakes, and hematite and red and gray slate pieces. Excavations in Level 5 suggested that the unit was reaching culturally sterile soil, until a series of large

rocks were uncovered, below which several *jute* shells were encountered. A soil color change was noted around this depth, and the level reaching a maximum thickness of 12 cm. Level 6 represents the final level of Unit 1 in which small artifacts reappeared, although most immediately below the large rocks at the bottom of Level 5. The recovered material includes: an Early Classic period Hermitage complex ceramic sherd belonging to the Balanza Group, *jute* snail shells, and charcoal. Excavations proceeded for another 10 cm to bedrock, although no other artifacts were encountered.

Overall, Unit 1 contained three distinct strata, two cultural on the top of the unit and one unmodified at the bottom. Encompassing levels one through four and consisting of artifact-rich soil, the Pacbitun Maya created the top stratum in the late Late Classic period by burying a structured deposit there. The middle stratum, Level 5, consisted of limestone boulders that were capped by a burning event, and the unmodified level was the foundation upon which the structured deposit was laid. Creating the deposit had required excavating down to near bedrock, then layering *jute* snail shells, chert flakes, and other lithics in and around a limestone boulder level, followed by a burning event followed, after which the ceramic-filled matrix was redeposited. The end result was the creation of a seemingly unmodified space within in the rockshelter.

Unit 2. Unit 2 was at the intersection of multiple natural transitions, and excavated to bedrock in four levels reaching 45 cm below the surface. It was set up adjacent to the alluvial cone separating the South and Central areas, at a point directly beneath a dramatic drop-off of the upper lip of the karst feature where the dripline nearly disappears into the bedrock face, and at a significant matrix change from sand to dirt.

Overall, these investigations suggested that some activity had taken place there, primarily in the late Late Classic period, but it was relatively minor compared to the area of the limestone bench. Artifacts recovered include 119 *jute* snail shells, 36 g of red and gray slate, 23 ceramic sherds, 4 chert flakes, 2.2 g of burned clay, 2 *Nephronaias* spp. mussel shells, and a calcite crystal, and their vertical distributions mimicked those from Units 1, 3, and 5. Specifically, ceramics began as the most prolific artifact class, but their density dropped as the unit went deeper. *Jute* snail shells were encountered throughout the unit, remaining the only artifacts at the bottom except for a piece of slate, and most of the chert was recovered in Level 3. Furthermore, clusters of rocks were encountered throughout excavations, suggesting that the upper lip was continually eroding during the time that the pre-Hispanic Maya used the rockshelter.

Excavations in Level 1 consisted of flattening out the alluvium in the northern portion of the unit and proceeding to 10 cm below the lowest starting surface. Artifacts were absent in the alluvium, although they began to appear in low densities after recent portions of the collapse cone were removed. Cayo Unslipped and Palmar Orange polychrome were the only identifiable ceramic types recovered, while the remainder was either too badly eroded for identification or the pieces were nondiagnostic body sherds. Limestone rocks were present throughout the level, although they were more densely clustered in the northwest corner, which is where the unit most overlapped with the alluvial cone.

The limestone rock clustering encountered in Level 1 continued and spread throughout the unit in Level 2, and although artifact density increased slightly, it

remained low. Recovered objects include *jute* snail shells, burned clay, gray slate and calcite chunks, a chert flake, and ceramic sherds, the only identifiable type being Cayo Unslipped. The artifacts were clustered in the southern portion of the unit, suggesting that the Maya may have considered the dripline to be the boundary of the feature. Due to the low density of artifacts recovered and the relative lack of horizontal stratigraphy, the level was excavated to 30 cm below surface, and terminating below a rocky concentration.

Level 3 was the most artifactually diverse in the unit, including ceramic sherds, *jute* snail shells, *Nephronaias* spp. mussel shells, chert flakes, and a gray slate fragment. Identifiable ceramics include Dos Hermanos Red and Macaw Bank Self-slipped, dating to the Early and Late classic periods respectively. The *Nephronaias* spp. shells were unexpected as no others were encountered in the karstscape, although they are found at Pacbitun, making up five percent of the Late Classic period shell assemblage there (Wagner 2009:70). Powis (2004:133-134) notes that *Nephronaias* shells are regularly found in both elite and commoner residential trash middens, and also appear in construction fill, while their presence in the rockshelter indicates that they also had some ritual function. The level was terminated after a soil change was encountered and bedrock began to appear in the southern portion of the unit. Excavations in Level 4 continued to bedrock but the stratum was practically culturally sterile with only a few artifacts recovered including *jute* snail shells, and a red slate fragment.

Overall, Unit 2 was mildly productive, but the results of the excavations and overall scarcity of artifacts suggests that the Maya may have considered the dripline to be

a boundary of ritual and profane space for the rockshelter. Areas inside of it contained higher concentrations of artifacts than those outside of it. Furthermore, the lack of artifacts mixed into the top of the alluvial cone, beneath which artifacts were found indicates that Actun Nohoch Tunich is a living geological feature subject to continual erosion processes.

Units 3 and 5. Discussed together here, Units 3 and 5 comprise an excavation trench investigating the area in front of the limestone bench in the center of the South section (**Figure 89**). Furthermore, these excavations pair with Unit 1 creating bracketing the area in front of the limestone bench. Unit 3 measures 1 m by 1 m, and Unit 5 extends 0.5 m from its western wall, intersecting with the base of the limestone bench. My purpose for Unit 3 was determining if the bench was the focus of ritual activity, while Feature 1, a sherd cache beneath a large rock near the surface, continued in the wall prompted the opening of Unit 5. Unit 3 was excavated using a mixture of five natural and cultural levels continuing to culturally sterile soil at 84 cm below the surface, while Unit 5 reached it at a depth of 63 cm. The excavation results from Unit 3 guided the investigations in Unit 5, but only the first four levels containing cultural material were removed.

The two units uncovered a relatively complex stratigraphy, including two buried deposits–Features 1 and 2–and a wide range of artifactual material, suggesting intensive ritual use occurred there. The recovered artifacts include 2032 *jute* snail shells, 553 ceramic sherds, 393 g gray and red slate, some of which had been modified, 87.4 g of charcoal and burned wood, 84 chert flakes, 4 chert flake cores, 3 heat spalled chert biface

fragments, two quartz flakes, a complete, shattered Aguila Orange bowl, a conch (*Strobus* spp.) shell fragment, a coatimundi (*Nasua* spp.*)* tooth, and limestone and speleothem manuports, as well as some possible burned clay pieces were noted but not collected. Furthermore, several pockets of charcoal and ash were regularly encountered throughout the units suggesting multiple burning events took place there. The ceramics date primarily to the late Late Classic period, but Early Classic material was also recovered.

Although artifact density was high, excavations in Level 1 revealed no discernable deposition patterns, and changes in the matrix resulted in terminating it at 15 cm below surface. Recovered cultural materials include ceramics, chert flakes, gray slate, *jute* snail shells, and a coatimundi tooth. The identifiable ceramics correspond primarily to the Spanish Lookout complex, although two Early Classic period Hermitage specimens were recovered. The later material includes Cayo Unslipped, Dolphin Head Red, Garbutt Creek Red, Macaw Bank Unslipped, and Tu-tu Camp striated. The Early Classic materials include a miniature Pucte Brown jar containing unknown visible residue, and the other is a nearly complete hemispherical-shaped Aguila Orange bowl with an inverted, button-like base. Another piece of that orange-slipped vessel was recovered in Level 2, suggesting that the matrix of those two levels had been disturbed in the past. These two Early Classic vessels stand out because they are the only material identified in the units dating to that time, with the exception of another two sherds belonging to the Pucte Group recovered in Level 3, and their forms are otherwise unknown in the Pacbitun karstscape ceramic assemblage.

Excavations in Level 2 revealed a similar artifact assemblage as the strata above, with the addition of charcoal and burned wood. Furthermore, the density of this burned material increased as excavations proceeded, but formal deposition patterns remained elusive. The artifacts from this level include *jute* snail shells, burned wood, charcoal, chert flakes, red and gray slate pieces, and ceramic sherds all dating to the late Late Classic period, except for the single Early Classic period Aguila Orange sherd mentioned above. The other identified types include Cayo Unslipped and Dolphin Head Red types as well as specimens from the Belize, Chunhuitz, and Macaw Bank Groups. The charcoal and wood are from a mature pine (*Pinus* sp.), a dicot, and an indeterminate plant, and resin from an unknown species was also recovered (Parker 2014:Table 6.1). A soil color change after 9 cm resulted terminating the level.

Level 3 excavations revealed the presence of the first of two features in the unit, with Feature 1 being a dense sherd concentration and pottery stack directly beneath a small boulder, but continuing into the wall. Feature 2 is the flat limestone boulder capped *jute* and chert flake matrix mentioned above with the Unit 1 excavations and described in detail below. The Feature 1 sherd concentration began at about 25 cm below surface, although the boulder was encountered within the first few cm of excavations. The soil surrounding the rock is a different consistency than the matrix elsewhere in the unit, suggesting that the sherds below were cached in a shallow pit. A single chert flake, a possible limestone import, and ceramics corresponding to the Spanish Lookout complex —including Cayo Unslipped, Dolphin Head Red, Rubber Camp Brown, and Tu-tu Camp striated types, and specimens from Macaw Bank group– were the only artifacts

recovered. The continuance of the feature into the unit wall prompted opening Unit 5, that excavation revealing the density of ceramics remained high close to the limestone bench.

Excavations elsewhere in Level 3 revealed the density of burned material, *jute* snail shells, and chert flakes increased with depth, while the ceramics became less frequent. Concentrations of burned material were regularly associated with heavier densities of *jute* and chert, although a variety of artifact classes were found including ceramics, burned clay, and limestone, calcite, and red and gray slate fragments. The *jute* shells and chert flakes were recovered in an area of loose matrix mixed with ash, and ceramic material dates primarily to the late Late Classic period, while Early Classic and early Late Classic period sherds were present in limited quantities. All of the identified Early Classic period material belongs to the Pucte Group, and Mountain Pine Red type represents the only early Late Classic period specimen. Identifiable Spanish Lookout types include Benque Viejo Polychrome, Dolphin Head Red, Joyac Cream polychrome, Meditation Black, and Tu-tu Camp striated, and untypeable specimens belonging to the Belize, Chunhuitz, and Macaw Bank Groups were also identified. Excavations proceeded to a thickness of 18 cm, terminating the level when uncovering an alignment of large flat limestone rocks (**Figure 90)**.

Beginning approximately 56 cm below the surface, the alignment, consisting of at least three flat limestone boulders running northeast to southwest through Unit 3, capped a denser concentration of the ashy, *jute* snail shell, and chert flake rich matrix, collectively called, Feature 2 (**Figure 91**). Few artifacts were present away from this

concentration, indicating the assemblage was a pit cache, and as such it was called Feature 2. Several of the shells and the matrix were stuck to the bottoms of the aligned boulders, indicating that the rocks had been deposited directly on them. Identification of paleoethnobotanical samples collected from this material revealed primarily mature pine (*Pinus* sp.) being burned as part of the caching ritual (Parker 2014:Table 6.1). The quantity of *jute* shells and chert began to lessen beginning around 66 cm below the surface, and culturally sterile soil was reached after another 9 cm in depth. Gray, red, and grey-red mottled slate pieces, burned clay, and Dolphin Head Red and Mount Maloney Black ceramics represent the only other artifacts recovered from Level 4 in both Units 3 and 5. Nevertheless, a fifth level was excavated for another 9 cm in Unit 3, ensuring the strata above reached culturally sterile soil, and reaching a final depth of 100 cm below the surface, while Unit 5 was ended at 80 cm below the surface. Overall, the entire deposit investigated in Units 3 and 5 closely resembles that encountered in Unit 1, suggesting that the entire area in front of the natural bench formation was modified, creating a specific type of ritual space there. The evidence for the creation of a specific type of space comes from the layering of the artifacts recovered from within the excavation units. They appear in more or less well-sorted strata suggesting that they were laid down in organized stages, perhaps to represent a cosmological model commonly encountered in caches that represent the Primordial Sea and the earth that floats on it (Taube 1988, 2010).

Excavating the previously unmodified rockshelter floor would have been the first stage in the modification. The recovery of late Late Classic period ceramics in the bottom

levels indicates that the construction happened during that time. Those excavations would have disturbed any earlier material that was present, which wound up intermixed with the other matrix when the cache was reburied. Next, *jute* snail shells and chert flakes were deposited, and a pine-fed fire was burned. Such an event may have functioned similar to the "fire-entering" rights that ritually infuse architecture with vital essence (Stuart 1998:384). Once the deposit had been ritually vitalized, or perhaps during the event, the shell and chert flake bottom layer was capped by the flat limestone blocks. Pottery-filled soil was then used to refill the pit, during which other burning events took place until the hole was refilled, and the flat space in front of the bench was created. Infilling the pit may have be done while the fire was still smoldering as indicated by the appearance of some of the burned matrix above and to the side of the boulders. The feature may have collapsed as the fuel was consumed, which could have dropped the rocks below the top level of the cache.

Similar deposits of *jute* and chert flakes have been reported in multiple contexts throughout the southern Maya Lowlands, with several containing spire-lopped shells, suggesting that the animals were consumed during ritual feasts (Halperin et al. 2003). Nonetheless, most of those recovered from the Nohoch Tunich units are not snapped suggesting they may have been harvested specifically as offerings for the cache. A similar collection pattern occurrs at the site of Minanha on the northern Vaca Plateau where the shells were gathered *en mass* from nearby waterways, but used as architectural fill (Solis 2011).

Unit 4. Unit 4 represents the only excavation made in the North Section of Actun Nohoch Tunich, being placed on top of the limestone pavement adjacent to the west wall of the rockshelter (**Figure 92**). Its location was selected to determine whether the pre-Hispanic Maya used that portion of the rockshelter, and if the pavement is the result of human action or sheeting breakdown from the wall face. Two levels were excavated to culturally sterile soil at a depth of 45 cm below the surface, and few artifacts were recovered, all from near the surface of Level 1. Excavations in Level 1 removed the surface rocks, below which more were encountered mixed with soil. The recovered artifacts include only one ceramic sherd, typed as Cayo Unslipped, a gray slate piece, a calcite crystal, and a sandstone cobble. The level was terminated at 34 cm below the surface when a soil color change was noted. In Level 2 the limestone rocks continued to be present, although the matrix color changed substantially. The level was devoid of all cultural material, and the unit was terminated at 45 cm below the surface a result. Overall, the investigation in the North Section of Actun Nohoch Tunich indicates only sporadic use, and the surface rocks are most likely the result of sheeting from the wall.

Unit 6. Unit 6 was sunk at the entrance to the looted alcove in the Southern Section of Actun Nohoch Tunich, placed there to understand the relationship between that small room and the rituals performed elsewhere in the rockshelter. It measures 1 m by 1 m and was excavated to bedrock in three levels to a variable depth of 16 to 38 cm below the surface. The matrix of all of the levels remained the same throughout the excavations until just above bedrock in the deepest corners. This looseness of the soil paired with shallowness of bedrock and looting activities only a few meters away

suggests the area had been disturbed by foot traffic into the alcove, or it was also rummaged through. Recovered artifacts include: 174 ceramic sherds, 88.7 g of worked and unworked gray and red slate, 42.7 g of carbonized botanical material, 28 *jute* snail shells, 8 chert flakes, and 2 limestone imports.

Level 1 was excavated to a maximum depth of 17 cm below surface, although a bedrock boulder appeared in the northwest corner and center of the unit preventing any further digging in those spots. Artifacts recovered from the level include ceramic sherds, *jute* snail shells, charcoal, a burned seed, chert flakes, limestone and gray slate imports, and a possible gray slate worked object. Identifiable ceramics date to the Classic period, with the largest quantity belong to the Spanish Lookout complex of the final two centuries of the Late Classic. All of the identifiable Early Classic period material belongs to the Balanza Group, Zibal Unslipped is the only early Late Classic period type identified, while late Late Classic period types include Cayo Unslipped, Dolphin Head Red, Garbutt Creek Red, and Tu-tu Camp Striated, as well as specimens from the Belize, Macaw Bank, and Saxche-Palmar Groups was also identified.

Excavations in Level 2 recovered a similar artifact assemblage as the stratum above, including ceramic sherds, *jute* snail shells, a chert flake, a red slate chunk, and charcoal. They also revealed the bedrock boulder expanding towards the south, further restricting areas available for digging. Identifiable ceramics date from the Late Classic through Early Postclassic periods including Cayo Unslipped, Meditation Black, and Macaw Bank group for the former, and Augustine Red for the latter. The level was terminated at an artificial 10 cm stratum to maintain control over the data. Level 3

investigations continued until bedrock was exposed in the entire unit, during which only limestone and gray slate imports, a piece of chert shatter, and single *jute* snail shell were recovered.

Unit 7. Unit 7, a 0.5 m x 1 m extension of the eastern wall of Unit 6, was excavated to bedrock in three levels to 44 cm below the surface. It was established because unusual ceramics were noted in that area, including a modified ring base of an Aguila Orange vessel, and several Lucha Incised sherds, one of which was believed to have a hieroglyph on it. Considering its size, this unit was especially productive, with excavations recovering 138 ceramic sherds, 136 g of red and gray slate, 54.6 g of charcoal, 17 *jute* snail shells, 12 chert flakes, including a massive one, three speleothem fragments, one modified sherd, and a limestone spindle whorl. Although present throughout the unit, boulders too large to remove finally halted excavations at 44 cm below the surface.

Level 1 was the most productive in the unit, recovering ceramic sherds, chert flakes, gray slate pieces, soda straw formations, charcoal, and *jute* snail shells. The identifiable ceramics include materials from the Hermitage, Spanish Lookout, and early facet New Town complexes. Hermitage complex sherds include the Aguila Orange and Lucha Incised specimens discussed above, as well as one sherd belonging to the Actuncan-Dos Arroyos Group. Spanish Lookout ceramics are the most abundant, including Cayo Unslipped, Tu-tu Camp Striated, and Yalbac Smudged Brown types, and specimens from the Macaw Bank Group. Only Augustine Red represents the Early Postclassic period New Town complex material. A formation that only drips during the

rainy season is present above the unit, and is the most likely source of the soda straw formations. Additionally, most of the charcoal in the unit came from a gray-colored matrix near the south wall where a large boulder was located, indicating a burning event there. The presence of this burned area suggests that the looting in the alcove only disturbed the surface, and the remainder of the matrices in both Units 6 and 7 are intact.

Excavations in Level 2 proceeded until the large boulder near the gray matrix was removed at 31 cm below the surface, during which artifacts similar to those in the stratum above were recovered. Those objects include ceramic sherds, speleothems, red and gray slate pieces, charcoal, and *jute* snail shells. The ceramics in particular were notable because many of them were larger than encountered elsewhere in the unit, and identifiable specimens dated from the Early Classic through late Late Classic periods. Only Lucha Incised and Daylight Orange represented the Hermitage and New Town complexes respectively, while Spanish Lookout was the most represented, including sherds of Cayo Unslipped, Dolphin Head Red, Garbutt Creek Red, Meditation Black, and Mount Maloney Black types.

Level 3 excavations proceeded until the entirety of the unit was choked up with rocks too large to be removed at 44 cm below the surface, although they may have been bedrock. Time did not permit further testing to determine their exact nature, and the unit reached a final depth of 60 cm below the surface, The artifact assemblage remained diverse, including, *jute* snail shells, charcoal, chert flakes and a flake tool, limestone, and gray and red slate fragments, a limestone spindle whorl, and ceramics corresponding to the Spanish Lookout and early facet New Town complexes. The Spanish Lookout

material includes Cayo Unslipped and Garbutt Creek Red types, and Augustine Red is the sole representative of the New Town complex. Lute Mai, one of PRAP's local collaborators, revealed that the spindle whorl was made from a particularly hard type of desirable limestone called "Yalbac," and I believe that the selection of this particular material for the object was intentional. Recent investigations at the site of Sayil in the Puuc region of Mexico, demonstrate the Classic period Maya had extensive knowledge of the properties of different types of limestone, and used each for particular construction projects such as wall constructions and carved facades (Carmean et al. 2011). Certainly, such knowledge and selection criteria would have extended to portable artifacts made from the material, although why *Yalbac* limestone was chosen over another remains unknown.

Overall, Units 6 and 7 demonstrated that the suspected disturbance from looting activity in the alcove area of Actun Nohoch Tunich was restricted to the surface of the rockshelter and the alcove. The excavations were surprisingly productive given their relatively shallow depth, with the density of artifacts indicating the alcove had been a focus of intensive ritual activity, sometime during the final two centuries of the Late Classic period, although a relatively strong Early Classic component was also observed. Unfortunately, the extensive looting has hampered understanding fully what happened in that small chamber.

Actun Xtuyul (Termite Cave)

Located directly above Actun Nohoch Tunich, Actun Xtuyul is a small northwest to southeast aligned rockshelter opening to the east, and measuring 13 m long, 2 m tall, and up to 3 m deep (see **Figure 83**). Its name translates to "Termite Cave," a moniker given to it for a massive termite nest covering its northern area. The surface matrix is speckled with large pebbles, with a series of aligned, single course, uncut limestone rock clusters located just outside of the dripline in front of the main area, creating a bounded space in the feature presumably for ritual performances. This karst feature is the product of natural sheeting erosion that undercut the exposed bedrock face above Actun Nohoch Tunich, and several smaller-scale active instances of it were observed during my investigations. Nevertheless, the presence of artifacts on the rockshelter surface suggests the process is slow and intermittent. Ceramic sherds, a ground quartz object, and a modified ceramic mold discussed in more detail below were all recovered during surface collections, and their presence prompted the placement of two excavation units.

Actun Xtuyul is located just behind the 13 m tall upper lip of Actun Nohoch Tunich, and is only accessible by one of three access routes (**Figure 93)** One begins by climbing the steep hill located adjacent to the south end of Actun Nohoch Tunich, and then following that rockshelter's 13 m tall, narrow upper lip around several small bedrock outcrops. The other two access routes share an initial path, beginning at the top of a hill behind the northern end of Actun Nohoch Tunich, and then proceeding up a shallow, inclining chasm that runs behind the larger rockshelter, and the two paths split at where

the chasm reaches the hilltop. The more direct route involves navigating over a series of small outcrops and large boulders that abut Actun Xtuyul's parent rock, leading to the northern area of the shelter. The less direct route continues to follow the remnants of the chasm, passes in front of Actun Ha'ale, through Actun Ku'uk, both of which are described below, and then finally reaches the same upper lip of Actun Nohoch Tunich as the first path. Overall, the difficulty of access indicates the recovered artifacts were deposited intentionally, rather than lost while passing through the area.

Two 1 m by 1 m units were excavated in Actun Xtuyul, with Unit 1 located against the rear wall where the modified ceramic mold was recovered, sunk in hopes of recovering more of it if present (**Figure 94**). Artifact totals recovered from the unit include: 94 ceramic sherds, 29.5 g of carbonized botanicals, 2.6 g of gray slate, a chert flake, and the ceramic mold. Unit 2 is located off the southeast corner of Unit 1, and its purpose was sampling a larger portion of the rockshelter to understand how the karst feature was used, but only 13 ceramic sherds were encountered. Overall, the data collected from these two units revealed that rituals performed at Actun Xtuyul were significantly different from other investigated karst features in the region. While the investigations turned up low quantities of traditional artifacts such as ceramics, lithics, and shell, they provided a botanical assemblage more diverse than any of the karst features investigated in the Pacbitun region.

Unit 1. Cast-side up and wedged between the rear wall and rockshelter floor, the Maya placed the modified ceramic mold that prompted the placement of Unit 1 (see **Figure 164**). More specifically, this unit was placed to find more pieces of the mold, and

understand how the feature was used. It was excavated in two levels to bedrock at a maximum depth of 45 cm below the surface, with Level 1 reaching up to 24 cm below surface. Most of the Unit's artifacts came from here including ceramic sherds, the modified ceramic mold, a gray slate slab imported into the rockshelter, and carbonized botanicals remains. These botanicals include charcoal from immature specimens of *Allophylus* sp., *Pinus* sp. (pine), *Bertiera guianensis*, *Alvaradoa amorphoides, Ficus* sp., and two unidentified dicots, mature chunks of pine and an indeterminate species, and four burned seeds, one of which is *Oxalis* sp. (wood sorrel), while the others are indeterminate (Parker 2014:Table 6.2). Excavations in Level 2 proceeded to bedrock at a maximum depth of 45 cm below surface, with the only artifacts being three ceramic sherds and a chert flake. All of the identified ceramics from this unit date to the final two centuries of the Late Classic period, except for one untyped Early Classic form —including Cayo Unslipped, Macaw Bank Self-slipped, Mount Maloney Black, and Yaha Creek Cream. The ceramic mold appears to have had a complex life history beginning as a production cast for Ahk'utu' Molded-carved vessels, afterwards, someone subjected it to a series of reductive modifications, and finally it was placed carefully in Actun Xtuyul, as detailed in Chapter 7 (Helmke and Reents-Budet 2008). Unfortunately, no other pieces of the mold were recovered during excavations in either unit, and considering this, in conjunction with the modifications made to the object and its careful placement in an isolated rockshelter, indicate the piece was a curated heirloom.

Unit 2. Unit 2 was set up crosswise to the southeast of Unit 1 to get a larger sample of artifacts from the shelter, given that so few were recovered in the previous

investigation. Three levels were excavated to bedrock at 32 cm below surface, but only ceramics were recoverd, most appearing in Level 1. Due to a lack of natural stratigraphy and paucity of artifacts, the levels were excavated using arbitrary strata with Level 1 reaching a maximum depth of 10 cm below the surface, Level 2, 23 cm deep, and Level 3 hitting bedrock after 32 cm. Identifiable ceramics primarily date to the Early Classic period, although some Late to Terminal Classic material was present. Typable ceramics recovered from Level 1 include Balanza Black from the Early Classic period, and Cayo Unslipped and Macaw Bank Self-slipped from the Late Classic to Terminal Classic. Only two types were identified in Level 2, Hewlett Bank Unslipped, a Protoclassic to Early Classic period type, and Macaw Bank Self-slipped, which dates to the Late Classic. The appeareance of the former type was unexpected since it had only been recovered from the stalagmitic cluster in Chamber 1 of Actun Lak.

Overall, the Actun Xtuyul excavations produced many unexpected results, and although they failed to uncover many artifacts, the ones that were are atypical for the Pacbitun region, particularly the ceramic mold and botanical remains. Ceramic molds for Molded-carved type pottery are scarce in the archaeological record, and only three others have been found (Adams 1971:51; Willey 1978:49). The careful placement of Actun Xtuyul specimen suggests that it was a special object considered a curated heirloom, and that it had some yet unidentified secondary function. Furthermore, the variety of botanicals present in the soil samples is greater than any of the other karst features investigated, which also attests to the uniqueness of the space (Megan Parker, personal communication 2013). As discussed more fully in Chapter 7, the seeds from Unit 1 may

have been used for divination. Lastly, Actun Xtuyul contains the largest known concentration of Hewlett Bank Unslipped bowls outside of Actun Lak, and their highly restricted distribution to those two karst features suggests that had specific ritual functions.

Actun Subuul (Spanish Bay Cedar Cave)

Approximately 40 m southeast of Actun Nohoch Tunich, from which it likely eroded in the deep past, sits the large boulder named Actun Subuul (**Figure 95**). It is named after the presence of a nearby large Spanish Bay Cedar called *subuul* in Yucatec Mayan. The boulder sits on the side of the current trail to the main area of the NTC, and to Actun Lak and Rocky Crab Cave (**Figure 96**). I chose it for investigations because it has a rockshelter-like component defined by a dripline in which several ceramic sherds were noted during preliminary reconnaissance of the area, and the presence of the artifacts demonstrates that it was another type of karst feature used by the pre-Hispanic Maya. The boulder itself is roughly diamond shaped, and measures 10 m at its widest and longest, and nearly. Nearly half of the feature consists of an undercut rockshelter opening to the north, created by a gentle slope in the rear wall. Water from light rains gently cascade down this sloped rear wall, although heavy storms cause the feature to drip. Nonetheless, a natural cave-like matrix consisting of light brown, relatively dry soil mixed with small limestone pebbles that is relatively free of organic debris is present on the rockshelter floor. Two 1 m by 1 m units were excavated, with Unit 1 located in the

approximate center of the rockshelter component, and Unit 2 at the eastern end of the undercut where nearly half of it is located outside of the dripline. This placement allowed for a test of whether or not activities were restricted to the cave-like matrix or if they extended beyond it.

Unit 1. Excavations in Unit 1 proceeded in two levels to culturally sterile, decomposing bedrock at a depth of 22 cm below the surface. Overall, these investigations indicate that Actun Subuul was the focus of ritual action during the late Late Classic period, similar to the other karst features in the NTC. Recovered artifact totals include 70 ceramic sherds, 42 g of gray slate, and 41 *jute* snail shells. Evidence of past ritual use was uncovered at the onset of Level 1 excavations, and this finding, in conjunction with the presence of surface ceramics, indicates little disturbance and negligible soil accumulation since the pre-Hispanic Maya used the feature, even though it has been widely exposed to the elements. Several buried concentrations of rocks were encountered as excavations proceeded, but whether they were naturefacts, or a product of human action remains unclear. Additionally, excavations uncovered a small pit filled in by burned, ashy dirt, and a dense concentration of ceramic sherds and *jute* shells at its bottom. Unstructured natural fill produced the remaining artifacts in the level, including gray slate chunks, and more *jute* snail shells, and Cayo Unslipped and Dolphin Head Red ceramic types, corresponding to the Spanish Lookout complex including.

The appearance of a dense stratum of limestone pebbles throughout the unit at 12 cm below the surface resulted in transitioning to Level 2. Here, excavations proceeded to culturally sterile at 22 cm below surface, where the stratum of limestone pebbles

transitioned to a chalky, grayish yellow powder. Artifact density was significantly less dense than in the stratum above with the top of the level producing only a small handful of ceramics and *jute* snail shells. The identifiable ceramics date to the late Late Classic period and included Cayo Unslipped and Macaw Bank Self-Slipped types.

Unit 2. Positioning of Unit 2 allowed for testing whether sweeping activities had occurred in Actun Subuul, and determining if the dripline restricted ritual activities to beneath the boulder's overhang. Excavations proceeded in four levels to culturally sterile soil at a depth of 34 cm below the surface. Although artifacts were relatively scarce in Level 1, they began to appear in higher concentrations in Level 2. In Level 3, decomposing limestone indicated excavations were nearing bedrock, although artifacts continued to be uncovered in large quantities. Excavations in Level 4 uncovered bedrock throughout the unit, as well as small quantities of artifacts. In total, artifacts recovered from Unit 2 include: 177 ceramic sherds, 91 *jute* snail shells, 1.5 g of charcoal, 10 chert flakes, one chert flake core and one chert flake core tool, a granite mano, two limestone clasts, and 368 g of gray, red, and white slate.

Artifacts were absent from the surface and first several centimeters of Level 1, although continued excavations uncovered increasingly higher concentrations as the unit became deeper. This lack of surface artifacts indicates more rapid soil accumulation outside the dripline of the rockshelter than inside of it. Cultural materials recovered from the level include *jute* snail shells, charcoal, gray slate pieces, and ceramics of which Macaw Bank Self-slipped of the late Late Classic period is the only identifiable type (LeCount 1996:381). The level was terminated after a 10 cm depth was reached. Despite

its relative shallowness, excavations in Level 2 were more productive than the stratum above. Decomposing limestone, indicating Level 3, started to appear as high as 15 cm below the surface, but averaged 18 cm in depth. Nevertheless, Level 2 artifacts, particularly ceramics, clustered in the area outside of the dripline indicating that ritual performances were not restricted to interior spaces of Actun Subuul. However, the level also contained several roots and a small termite nest suggesting that bioturbation is a factor in the artifact distributions. Pockets of charcoal concentrations were noted throughout the level and a burned piece of wood was recovered. In total, Level 2 artifacts include: ceramic sherds, *jute* snail shells, gray slate chunks, and charcoal. All identifiable ceramics date to the late Late Classic period, with Cayo Unslipped, Dolphin Head Red, Macaw Bank Self-slip types, and specimens from the Belize Groups noted. Uncovering the presumed decomposing limestone throughout the unit prompted terminating the level.

Even though excavations revealed a substantial matrix change, the artifact density of Level 3 remained high. In fact, this stratum contained the widest diversity of artifact classes in the unit. In particular, my investigations revealed a granite mano set on a concentration of limestone rocks, all surrounded by a matrix interspersed with small pebbles indicating the grinding stone was cached in a pit. Furthermore, the dense concentrations of ceramics encountered in the stratum above continued to appear in sections of the unit, particularly in the northeast corner, the area furthest outside of the dripline. *Jute* snail shells and a variety of lithics including limestone, and gray, red, and mottled white to gray, and gray to red slate imports, and chert flakes, shatter, and flake cores, were also present in the concentrations. As discussed above, rockshelter contexts

commonly include *jute* shell and chert flake concentrations, and their presence in Actun Subuul suggests that the Maya understood the feature as rockshelter-like location. The ceramics all date to the late Late Classic period, including Cayo Unslipped, Dolphin Head Red, and Macaw Bank Self-slipped types. A transition to the same culturally sterile matrix observed in Unit 1 at 25 cm below the surface indicated the end of Level 3. Level 4 continued for only 3 cm when large, eroding limestone rocks covered the entire bottom of the unit. Although the stratum was shallow, it produced artifacts including ceramic sherds, chert flakes, and gray slate fragments. None of ceramics were identifiable save for one Early Classic period Aguila Orange basal flanged piece, an unusual discovery because it represents the only specimen found in Actun Subuul dating to that time.

Mitigation activities. Actun Subuul's landowner heavily damaged the archaeological remains when widening the trail passing through the NTC with a bulldozer sometime between the 2011 and 2012 field seasons, then paving it with cobbles between the 2012 and 2013 field seasons (**Figures 97 and 98**). These actions skimmed the northern wall of Unit 2, and removed the entire area around Unit 1 (see **Figure 95**). I devoted a day to rummaging through the push piles to salvage whatever artifacts and data possible, recovering ceramic sherds, *jute* snail shells, and gray slate imports. All of the typable ceramics dated to the late Late Classic period and included Cayo Unslipped, Dolphin Head Red, Gallinero Fluted types, and specimens from the Chunhuitz and Macaw Bank Groups, which reflects the assemblage recovered during excavations.

Overall, the artifact assemblage recovered from Actun Subuul excavations and mitigation activities is similar to those found in the other rockshelter contexts in the area. This overlap implies that the Maya understood the boulder to be a "cave," and used it as such. However, the artifacts recovered from it indicate it was used primarily during the late Late Classic period, although the recovery of an Early Classic type suggests the possibility of a wider temporal range.

Non-invasive Investigations in the NTC

Investigations in the NTC documented several karst features containing evidence of pre-Hispanic Maya activity, in addition to those that were excavated. Those features include, Actun Ch'e'ehem Zotz, Javier's Cave, Actun Ha'ale, Actun Ku'uk, Actun Ak Ha, Actun Chechem, Actun Ok Ak Ha, and the Crevasse. Although time did not allow for excavations, preliminary investigations noted use patterns similar to those dug features in the NTC, specifically that they have architectural modifications, and the ceramics indicate use in the late Late Classic period, although further investigations are necessary to determine their full chronological span. Even though these features received less archaeological attention than those discussed above, information about them is presented here because they demonstrate the variety of karst landmarks used by the Pacbitun Maya.

Actun Ch'e'ehem Zotz (Squeaky Bat Cave)

Penetrating the eastern wall of a circular sink depression in the western portion of the NTC is Actun Ch'e'ehem Zotz (previously Jcheehem), a small fossil phreatic cave named after a particularly noisy bat living there (**Figure 99;** see also **Figure 34**). A small crack in the bedrock face measuring 0.5 m tall and wide provides access to the cave; however, the pre-Hispanic Maya created that restriction by filling in the portion below the exterior ground surface (**Figures 100 and 101**). Upon entering the cave, a short passage slopes sharply downwards, intersecting the approximate middle of a northeast to southwest oriented, rectangular-shaped room, that is bell shaped in profile. This chamber has a maximum height of 2 m and measures 4.5 m north to south by 2.5 m east to west. Archaeological investigations included mapping, surface collecting diagnostic pottery, and screening an alluvial cone located just below the sloped entrance passage. Identified pottery dates to the late Late Classic period, including Cayo Unslipped, Dolphin Head Red, Mount Maloney Black, and Palmar Orange-polychrome types. Two other constructions are present in the cave in addition to the filled crack at the entrance. The first is located in the southwest corner of the chamber, consisting of three imported rocks stacked against an extinct dripstone formation. The second is a terrace platform in the northeastern corner of the cave, made from uncut limestone blocks (**Figure 102**). Several unidentified ceramic sherds were noted on both of these constructions, and a modified piece of slate was recovered just the east of the platform.

Javier's Cave

Situated on the crest of the hilltop at the northern most extent of the NTC is Javier's Cave, named in honor of the person who discovered it, Javier Mai of San Antonio village, Cayo, Belize (**Figure 103;** see also **Figure 34**). The Mendip Expedition originally described this feature, although they provided no map with their report (Francis et al. 1995). We first documented it in 2011 and mapped it in 2012, revealing it to be a heavily modified isolated fossil phreatic cave (Spenard 2012a, 2013c). The entrance is a 1.5 m tall drop that immediately slopes downward 45 degrees to the east, while the interior of the cave measures 24 m long, has a maximum ceiling height of 7 m near the entrance, and averages 2 m wide (**Figure 104**). Two main areas are present in the cave, with the first encompassing the sloped entrance area and the tall chamber beyond it, and ending at a 2 m drop in the floor. The second area is shorter than the first, with an average ceiling height of 2.5 m, but it is contains the widest section, measuring roughly 3 m. The cave ends at a chimney from which the Mendip group reported seeing light filtering through (Francis et al. 1995:11). Although no light was visible during our visits, the heavy rains experienced throughout the 2012 field season may have clogged any holes with mud and debris.

Because little soil accumulation exists anywhere in the cave, excavations were unnecessary; therefore, archaeological investigations were limited to mapping and describing artifacts and features (**Figure 105**). The Mendip Group reported several pottery fragments and other objects thought to be grinding stones (Francis et al. 1995:11).

My team's investigations verified the large quantities of pottery, particularly jar forms, but others are present, although the grinding stones were not relocated. Ceramic clusters were photographed from which I made type identifications. I used this non-invasive technique because all of the pottery types in cave are common in the karstscape, and little data could be gained by removing them. Of those photographed, all date to the late Late Classic period, including Alexander's Unslipped, Cayo Unslipped, Dolphin Head Red, Mount Maloney Black, and Rubber Camp Brown. Our investigations in Javier's Cave also revealed that, although it is a small feature, the Pacbitun Maya made extensive modifications to it, including constructing at least eight artificial walls, stacking and piling rocks , and breaking most of the small dripstone formations. Nevertheless, understanding why this feature was so heavily modified remains elusive.

Actun Ha'ale (Squirrel Cave)

Actun Ha'ale is a small, low ceilinged rockshelter with an attached chamber in a shallow chasm in the central, upper area of the NTC (see **Figure 83**). The chasm is a geologic joint fracture in the bedrock outcrop, creating the overall appearance of a narrow cave passage, although lacking a ceiling. Actun Ha'ale is located above Actun Nohoch Tunich, but in the interior of the bedrock outcrop. The rockshelter runs north to south for 7 m, opens to the west, and its ceiling is approximately 1 m high. The attached chamber runs northeast to southwest for 2 m and has a variable ceiling height between 10 cm and 60 cm. A few pieces of nondiagnostic pottery on the surface of the rockshelter

component are the only portable artifacts noted in Actun Ha'ale. However, two crude, single course rock alignments joining at a right angle at the southern end of the rockshelter demarcate the feature as a distinct, separate space from the area outside of it (**Figure 106**). Archaeological investigations included mapping and making a surface collection of the pottery.

Actun Ku'uk (Gibnut Cave)

Located in the center of the NTC, and named for a large cave rodent called a gibnut living in it, Actun Ku'uk is a ground level talus shelter (see **Figure 83**). This feature had been a natural bridge sometime before the Maya began using it, but its current structural configuration is the result of a massive V-shaped boulder breaking away from the bridge and becoming lodged between the two walls below (**Figure 107**). Four entrances provide access to the feature. Located at the southern end of Actun Ha'ale, Entrance 1, is a narrow, steeply sloping, north to south running passage filled with humic debris. Entrance 2 is due west from there, and is little more than a north to south running squeeze choked up with ceiling breakdown, and these two access ways intersect midway through the shelter. Entrances 3 and 4 are Actun Ku'uk's main ingresses, and make up part of the trail from the North section of Actun Nohoch Tunich to Actun Xtuyul discussed earlier. Entrance 3 is located at the terminus of the interior trail through the NTC, while Entrance 4 provides access to the upper rim of Actun Nohoch Tunich, and a series of three, low ceilinged, shallow rockshelters lining the eastern wall. The shelter

furthest from the entrance contains a small, tightly restricted cave at its rear, nicknamed "Kieffer Hole." Both Entrances 3 and 4 are over 4 m tall, but are relatively narrow due to the massive boulder collapse, a geologic event responsible for created the two chambers in Actun Ku'uk. Chamber 1 is located on its eastern side and is the smaller of the two, with the floor measuring 1 m by 1 m; however, the actual space is more restricted due to a large wall spall at the intersection of the Entrance 1 and 2 passages, and the contours of the V-shaped boulder. Located on the western side of the boulder collapse, measuring 5.5 m long, and running northwest to southeast, Chamber 2 is Actun Ku'uk's main area. The ceiling varies due to the contours of the V-shaped boulder, but reaches over 4 m in some places, and the chamber is no more than 1.5 m wide at shoulder height, but widens closer to the ground. Even though no portable artifacts were visible on the floor, the pre-Hispanic Maya heavily modified the chamber with a 1.5 m tall wall of uncut, dry-laid boulders, bounding the southeastern corner of the chamber (see **Figure 3**). The area beyond the construction slopes sharply upward, suggesting that the terrace may have been built as a retaining wall, but it simultaneously creates a well-delineated, flat space within. Another possible stone alignment occurring along the southern cave wall, and a gentle slope in Entrance 3 indicates that another wall may remain buried there.

Overall, two possibilities exist for understanding how the Maya used this feature, although they are not necessarily mutually exclusive. The first is that the constructions directed foot traffic through the system, similar to the constructions recorded in the Sibun-Manatee karst in eastern Belize (Kenward 2005:254). Such a use is possible when considering the feature is centrally located and at a natural crossroads leading to all other

areas in the NTC. The second possibility is that the constructions established a relatively flat, definitive space for ritual performance. Although no datable artifacts were recovered, the ubiquity of late Late Classic period constructions in other areas of the NTC suggests that the architecture in Actun Ku'uk was also built at that time.

Actun Ak Ha (Water Vine Cave)

Actun Ak Ha is a talus shelter feature in the southwestern corner of the NTC, just above the ridge to Actun Lak, and named for a web of water vines covered its entrance (**Figure 108**). This karst feature is part of one of many clusters of small outcrops jutting straight up from the ground reaching heights of up to 5 m, lining the western extent of the NTC, but separate from it. Actun Ak Ha is at the southeastern corner of one of these small outcrop, which it shares with two other karst features, Actun Chechem, and Actun Ok Ak Ha, discussed below. The collapse of a small boulder onto a larger one created Actun Ak Ha, a feature measuring east to west for 8 m, reaching 3 m in height, and having a maximum width of 4 m. Portable artifacts are absent from the surface, including datable pottery, although architecture is present, including a possible limestone pavement on the floor against the smaller, collapsed boulder. Additionally, either a terrace or a low bench altar modifies the floor of the western entrance, which I assign a tentative late Late Classic period date based on the other architectural features in the NTC (**Figure 109**).

The area immediately outside of the western end of Actun Ak Ha is a flat, open space bounded to the north by the large outcrop boulder, and to the west by a cliff and a

jutting wall of bedrock. A natural path between the large boulder and other outcrop leads down a 12 m long steeply sloping path to Actun Chechem discussed below. Running between the two outcrops is a low wall that has been severely disrupted by tree growth (**Figure 110**). The jutting wall of bedrock has a large, exposed face that is cracked at the bottom, resembling a miniature cave too small for a person to enter. Directly in front of, and framing the crack is the remnants of a small platform, indicating the feature had been the focus of ritual activity in the past (**Figure 111**). Even though these architectural features were not excavated and artifacts were absent from their surfaces, they resemble ceramically-dated constructions seen elsewhere in the NTC, and Actun Naj Che, discussed below, suggest they were made during the final two centuries of the Late Classic period.

Actun Chechem (Poisonwood Tree Cave)

Consisting of a series of three small, interconnected components, Actun Chechem is the westernmost karst feature in the NTC containing cultural material (see **Figure 108**). It is located on a secondary ledge behind Actun Ak Ha, and just above the crest of the steep slope that heads down to Actun Lak. The entrance runs northeast to southwest for 10.5 m, opening to the north-northwest, and its name comes from the presence of several *Metopium brownei (*Chechem) trees growing in front of it. The feature is structurally complex given its diminutive size, having two proper entrances measuring 4 m wide, providing access to three chambers. Its northern entrance opens on two large chambers

containing nondiagnostic ceramics, slate, and several possible artificial rock alignments (**Figure 112**). The southern entrance opens to a small chamber, but constricts rapidly to a 0.5 m wide passage, penetrating into the parent bedrock where no artifacts were observed. The three rooms are all connected by a sloping tubular ledge beginning near the floor of the southern chamber, and slanting upwards until reemerging on the upper lip of the northern entrance.

Actun Ok Ak Ha (Foot of Water Vine Cave)

Located on the northern side of the large boulder into which Actun Ak Ha and Actun Chechem penetrate, Actun Ok Ak Ha is a smallest of the three karst features (see **Figure 108**). However, it was the most intensively used as indicated by the presence of several ceramic sherds, and clusters of non-native rocks strewn about its surface (**Figure 113**). Its name means "Foot of Water Vine Cave," indicating its location on steeply sloping trail beginning at the eastern mouth of Actun Ak' Ha'. It is aligned northwest to southeast, opens to the northeast, and measures 9 m long by 4 m at its deepest, and has a variable ceiling height between 0.3 m and 1.5 m. The low ceiling covers above approximately half of the feature and little cultural evidence was noted beneath it, with the only exception being a rock cluster in front of a small chamber in the rear wall. The remaining cultural materials were in the more accessible areas, including nondiagnostic ceramic sherds, slate and other non-native rock imports littering the ground, and a cluster of piled limestone and slate rocks on a ledge along the rear wall. Overall, the cultural

material in Actun Ok Ak' Ha resembles that found elsewhere in the Pacbitun karstscape, although the density of stone imports here is higher. Whether these patterns reflect past ritual practices or the relative lack of disturbance by the landowner needs to be determined by future investigations.

The Crevasse

The Crevasses is a narrow canyon-like bedrock joint feature that runs east to west over the primary outcrop of the NTC (See **Figure 34,** and http://youtu.be/RSWKlWKMxJc for a first-person-view video I recorded navigating the feature**)**. It begins near Actun Ak Ha and proceeds to slope steeply upwards, intersecting Actuns Ku'uk and Ha'ale (**Figure 114**). Nevertheless, it continues beyond those two rockshelters, intersecting the first part of the natural northern path between Actun Nohoch Tunich and Actun Xtuyul. Overall, its trajectory runs perpendicular to the face of Actun Nohoch Tunich, indicating a possible geologic relationship between the two. Neither artifacts nor modifications were noted within the canyon-like component but it connects nearly all of the features in the main area of the NTC, suggesting it may have been considered a significant landmark. Research in Guatemala has shown that the pre-Hispanic Maya did use similar features for ritual practices, indicating the Crevasse has archaeological potential (Ishihara-Brito 2007, 2008; Spenard 2006a:72-74).

Actun Naj Che (Home Stake Cave)

Actun Naj Che is an isolated rockshelter penetrating an exposed cliff face at the foot of a hill, approximately 150 m from NTC. Its name is a rough translation into Yucatec Mayan of a painted wood sign in it reading, "Home Stake," although it actually means "Home Wood" (**Figure 115**). Measuring 30 m long east to west, and opening to the south, Actun Naj Che was chosen for investigations because its comparable size, character, and proximity to Actun Nohoch Tunich offers the chance for understanding these types of geologic features from a regional perspective. Three main areas, the Upper, Middle, and Lower Levels, are defined by its topography (**Figure 116**). The Upper Level contains the least evidence of past cultural activity, with artifacts being absent from the surface and only one or two small architectural modifications noted. The Middle and Lower Levels both contained a variety of cultural material, including ceramic sherds, architectural constructions, and modifications of cave formations. Beyond the rockshelter, a few scattered, low mounds, and a small dam were noted on a flat spot in the area, although time did not allow their in depth documentation. Nevertheless, the dam consists of two to three dry-laid courses of small boulders, spanning a shallow seasonally active drainage channel measuring up to 2.5 m wide, and coming downhill from the NTC.

Archaeological investigations made in the rockshelter include a general surface collection, three excavation units, and a detailed map. Surface collecting activities

included sorting piles of "protected" pottery, and walking linear survey transects through the feature. Excavations involved placing Unit 1 in the Middle Level, and Units 2 and 3 in the Lower Level, recovering ceramics similar to those found in the NTC and Actun Lak. These findings indicate ritual use of Actun Naj Che beginning in the Early Classic period, and ending with the Late Classic. Although sharing many cultural patterns with the NTC, including use dates and modifications, Actun Naj Che's artifact assemblage contains the only human remains excavated during my karstscape investigations, even though they have been reported in other caverns in the region, including in Actun Pech and Actun Xux (Healy et al. 1996; Spenard 2012a).

Upper Level

The highest section in Actun Naj Che, named the Upper Level, is the furthest east and the least clearly delineated of the three areas. Complicating delineation of the Upper Level is the ceiling slowly transitioning to a cliff face at the eastern extent of the outcrop, and a sloping floor overgrown with scrub bush becoming forested hillside beyond the dripline (**Figure 117)**. Nevertheless, this section of Actun Naj Che measures approximately 7 m long and up to 5 m deep. No archaeological investigations beyond mapping were conducted there because it lacked portable artifacts on its surface. However, we identified one, possibly two, single course stone terraces intersecting with another series of them near the junction with the Middle level, collectively resembling a

staircase, and a possible formal entrance into the rockshelter, although this observation needs to be tested further with excavations.

Middle Level

The Middle Level is a relatively flat area measuring 7 m long and up to 10 m deep, delineated to the east by the bottom two terraces at the foot of the Upper Level, and to the west by a downward sloping bedrock outcrop. One excavation unit, Unit 1, was placed near the bottom terraces, and beneath the juncture of two alcoves and a broken cave formation. Overall, this excavation revealed the Maya used the area for a cremation burial in the late Late Classic period.

Unit 1. Unit 1 is due slightly north of the center of the Middle Level, and its placement was chosen because it is near the junction of two low-ceilinged alcoves, a broken cave formation above, and was close enough to the rear wall to recover any remains that may have been swept away from the more central and accessible portions of the area. The goal of the unit was determining if the flatness of the Middle Level was a natural feature of the cave or if it resulted from a construction similar to those found outside of Actun Lak and inside of Actun Nohoch Tunich. The unit measured 1 m by 1 m, and consisted of three levels excavated to culturally sterile soil at a depth of approximately 1 m. Artifact totals include 58 ceramic sherds, 58 g of charcoal, 32 g of red and gray slate, 13 chert flakes, 2 *jute* snail shells, several small animal bones and a tooth (not tabulated), one chert flake core, a massive marl concretion, a medial prismatic

obsidian blade fragment, and a limestone celt. Levels 2 and 3 also contained disarticulated human remains.

Excavations in Level 1 recovered few artifacts, although several large charcoal chunks were collected. No significant natural or cultural features were encountered and the level was terminated after 17 cm. Artifacts recovered include ceramic sherds, bones of a small, unidentified animal, and charcoal. The only identifiable ceramics belong to Mount Maloney Black type and Macaw Bank Group, both of which date to the late Late Classic period. A need to maintain control over the data prompted Level 2, resulting in the recover of a variety of artifact classes, most associated with a dense limestone boulder concentration. The rocks were heavily burned to the point of turning gray and were powdery to the touch. A second possible rock alignment was encountered at the bottom of the level, averaging 30 cm below the surface, spurring the start of Level 3. Excavations in Level 2 recovered ceramic sherds, *jute* snail shells, an unidentified mammal tooth, an indeterminate limestone marl concretion, gray and red slate fragments, a limestone celt, an obsidian blade, chert flakes, charcoal, and human bone. The only identifiable ceramics belong to Mount Maloney Black type and Macaw Bank Group, both of which date to the late Late Classic period. The human remains consist of proximal and distal pedal phalanxes (Spenard 2013c:71).

Level 3 began by removing the rocks of the suspected second alignment, although expanded excavations are necessary to determine whether it is natural or a cultural feature buried by pre-Hispanic Maya. Nevertheless, few artifacts were found below the alignment, and excavations continued for 5 cm, verifying culturally sterile matrix, and, as

a result, both the level and unit were terminated. The level averaged 50 cm in thickness, most of which was from removing the boulders, and the final depth of the unit was 100 cm below the surface. Artifacts recovered from Level 3 include ceramic sherds, chert objects, and disarticulated human remains. The only identifiable ceramics belong to Tu-tu Camp Striated type, and Macaw Bank Group, both late Late Classic period types. The chert objects include debitage and an indeterminate object, while most of the identifiable human remains are foot bones, although a canine tooth, part of a long bone, and several other unidentified fragments were recovered (Spenard 2013c:71).

Overall, the excavations in Actun Naj Che, Unit 1 uncovered part of a late Late Classic period burial. The density of charcoal recovered in Level 2, the charred condition of the small limestone boulders, and disarticulated human remains found interspersed with them suggest a cremation burial. Furthermore, the associated obsidian blade suggests a blood offering accompanied the interment ritual.

Lower Level

The Lower Level is the largest section of Actun Naj Che, accounting for roughly half of the feature's total area (**Figure 118**). A stone alignment at the foot of the sloped bedrock outcrop bordering the Middle Level delineates its eastern extent, whereas a large flowstone formation dominates its southern boundary, and a slight rise above the ground outside the dripline defines its western border. Two distinct matrix types further divide this section of the rockshelter. One abuts the rear wall, consisting of a gray, dry, powdery,

limestone pebble rich soil. The other is closer to the drip line and is moist dark brown, loosely compacted fine silty matrix with very few natural rock inclusions of any sort.

Excavation Units 2 and 3 were dug in the Lower Level to test the two matrix types for different use patterns. I sank Unit 2 in the dry matrix near the cave wall, and Unit 3 in a spot in the darker matrix, in the approximate center of the Lower Level. Although the units are in different parts of the rockshelter, several of the ceramics from lower excavation strata are mendable, suggesting that the different soil types did not have a significant impact on the ceremonial practices there. Identifiable ceramics indicate use from the Early Classic through Terminal Classic periods, with material dating to the late Late Classic period the most abundant.

Unit 2. Unit 2, a 1 m by 1 m square, was in the Lower Level in a small alcove approximately 50 cm from the southern wall in the dry matrix area, and abutting the rear rockshelter wall. Excavations proceeded in four levels to bedrock at 90 cm below the surface; however, a large animal burrow uncovered in the first level had disturbed the first 20 cm of matrix. Artifact totals for the unit include, 325 ceramic sherds, 120 g of red and gray slate, 68 chert flakes, 40 *jute* snail shells, 7 g of calcite crystals, four hematite pieces, 3.4 g of charcoal, three quartz flakes, two chert biface fragments, a chert flake core, a granite fragment, an unidentified and unmodified volcanic rock, a prismatic obsidian blade, one quartz flake core, and one crab claw fragment.

Several artifact classes were uncovered in Level 1, including late Late Classic period ceramic sherds, *jute* snail shells, gray slate chunks, quartz and chert debitage, a chert biface fragment, and charcoal. Sotero Red-Brown type is the only early Late Classic

period pottery identified, while Cayo Unslipped, Garbutt Creek Red, Mount Maloney Black, and Tu-tu Camp Striated types, and Belize Group make up the identifiable late Late Classic period ceramics. The chert biface was the tip of a larger tool, more of which was recovered in Level 2, suggesting that the matrix disturbance suspected in this stratum goes deeper than the animal burrow mentioned above.

Artifact diversity remained high Level 2 —included ceramic sherds, *jute* snail shells, chert objects, slate imports, and charcoal. The ceramic assemblage from this level differed from that above being only represented by the late Late Classic period types Alexanders Unslipped, Cayo Unslipped, Mount Maloney Black, and Rubber Camp Brown, as well as Dolphin Head and Macaw Bank Groups. The Dolphin Head specimen likely comes from the same vessel as another similar sherd from Unit 3 Level 3. The chert objects include flakes, a flake core, and the other piece of the biface recovered in Level 1.

In Level 3, artifact density began dropping as excavations went deeper, dropping to almost zero when reaching bedrock at 53 cm below the surface. Recovered artifacts include ceramic sherds, *jute* snail shells, a crab claw, stone imports, chert and quartz flakes, and an obsidian blade. The ceramics recovered from this level date from the Early Classic period through the end of the Late Classic, with material corresponding to the Spanish Lookout phase being the best represented. Early Classic period materials include Aguila Orange, and Dos Hermanos Red types, as well as sherds from the Balanza Group, while Sotero Red-brown type is the sole representative of the early Late Classic period. Alexanders Unslipped, Cayo Unslipped, Dolphin Head Red, and Mount Maloney Black

types and Saxche-Palmar group represents the late Late Classic period. Stone artifacts include gray and red slate, chert flakes, a quartz flake core, hematite, granite, and another unidentified volcanic rock imports. Many of the chert flakes and *jute* shells appeared lower in the level as the ceramic density dropped, a pattern reminiscent of the structured cache uncovered in Actun Nohoch Tunich Units 1, 3, and 5.

Unit 3. Unit 3 is a 1 m by 1 m square excavated in a combination of five artificial and natural strata to sterile at 120 cm below the surface. This digging revealed several rock alignments and burn pockets near the bottom of the unit, suggesting the contemporary surface is partially the result of pre-Hispanic construction activity similar to the area in front of the natural bench in Actun Nohoch Tunich discussed above. Artifact totals for this unit include: 441 ceramic sherds, 208 g of gray and red slate, 49 *jute* snail shells, 27 chert flakes, two crab claw fragments, two river pebbles, a granite mano, one soda straw stalagmite, and 0.6 g of charcoal.

Several ceramic sherds were uncovered immediately at the commencement of excavations in Level 1, after which the density dropped to nearly zero for several centimeters. Artifact began reappearing near the bottom of the level, which was terminated at 20 cm below the surface. The artifacts include *jute* snail shells, red to gray slate chunks, a large chert flake, and ceramics all dating to the late Late Classic period — including Cayo Unslipped, Mount Maloney Black, and Tu-tu Camp striated types, as well as Belize and Macaw Bank Groups.

In Level 2, artifact density increased as excavations continued, revealing a north to south running limestone rock alignment on top of which had been placed a well-worn

granite mano (**Figure 119**). Removing these features prompted terminating the level at 32 cm below the surface, and recovered artifacts include ceramic sherds, *jute* snail shells, crab claws, chert flakes and shatter, gray slate, river pebble imports, and the granite mano. The identifiable ceramics date throughout the Classic period and correspond to the Hermitage and Spanish Lookout complexes. Chorro Fluted is the only Early Classic period type identified, while the late Late Classic period materials include, Alexanders Unslipped, Cayo Unslipped, Mount Maloney Black, Rubber Camp Brown, and Tu-tu Camp striated types and Belize, Chunhuitz, and Macaw Bank Groups. One of the Alexanders Unslipped jars likely mends with another piece from Level 4, suggesting disturbance of this entire area. Additionally, calcium carbonate covers one of the Mount Maloney Black sherds, but the mineral is absent on all other pottery recovered from the unit, suggesting its secondary deposition. If the mineral grew on the sherd *in situ*, then others around and above it would have also been covered. Furthermore, the mineral's presence indicates that the bowl had spent a considerable amount of time under an active formation prior to its deposition in Actun Naj Che; nevertheless, where that was is difficult to say. The only active flowstone areas in the rockshelter are in the Lower Level and near Unit 1, but there are no indications that any artifacts had been associated with either formation. On the other hand, the surrounding area is rich with caves such as those in the NTC, as well as Actun Lak and Rocky Crab Cave, suggesting it may have spent time in one of them.

Level 3 began below after the rock alignment and mano were removed, underneath which the Maya had placed several large sherds. The matrix below this linear

feature transitioned to having more large rocks, although whether they are cultural, or possibly architectural fill needs to be examined in future investigations. Additionally, charcoal began to appear here, although it was too sparse to collect. The level was terminated at 52 cm below the surface, when excavations revealed another possible wall or alignment. Unlike the one that began the level, the new alignment ran east-west (**Figure 120**). Artifact density and diversity in Level 3 remained similar to the strata above, including ceramic sherds, *jute* snail shells, gray and red slate fragments, and chert flakes. The identifiable ceramics date throughout the Classic period and correspond to the Hermitage and Spanish Lookout complexes. Material of the Pucte group represents all Early Classic period Hermitage complex, although the only identifiable type is Chorro Fluted. Identified late Late Classic period Spanish Lookout complex types include, Alexanders Unslipped, Cayo Unslipped, Dolphin Head Red, Garbutt Creek Red, Mount Maloney Black, Rubber Camp Brown, and Tu-tu Camp striated, as well as Belize, Dolphin Head, and Macaw Bank Groups.

Two demonstrable connections to other contexts appear in the ceramic assemblage from this level. Several of the Chorro Fluted specimens share similarities with those recovered in Level 2, suggesting that they are from the same parent vessel. Additionally, several of the untyped Dolphin Head group sherds share wall thickness, curvature, paste composition, and display similar slip erosion with another sherd collected in Unit 2 Level 2, both of which likely belonged to a drum. These mendable pieces found deep within units separated by several meters suggests some unknown taphonomic processes have disturbed the entire matrix of the Lower Level.

Level 4 began at the top of the east-west running rock alignment encountered at the bottom of Level 3, underneath which excavations revealed many more rocks and large jar sherds. These investigations revealed other large sherds throughout the level, including those from jars and a partial Achote Black type dish with double-vented hollow oven feet, suggesting that they have been little disturbed since their deposition. A charcoal pit surrounded by several extensively burned limestone boulders appeared in the level at the first significant soil color transition encountered in the unit. The burning of the boulders turned them gray and they felt powdery to the touch. The remainder of the unit was excavated to the same depth as the bottom of the burn pit at 87 cm below the surface, and then terminated. Artifacts recovered from Level 4 include ceramic sherds, *jute* snail shells, gray slate, a soda straw cave formation, chert flakes, a possible shattered river pebble, and charcoal. The identifiable ceramics include materials from Hermitage, Tiger Run, and Spanish Lookout complexes, indicating use throughout the Classic period. Hermitage and Tiger Run types only include Dos Arroyos Orange-polychrome and Orange Walk incised respectively, while the Spanish Lookout complex was the best represented —including Alexanders Unslipped, Cayo Unslipped, Mount Maloney Black, Rubber Camp Brown, and Tu-tu Camp striated types as well as materials from the Belize and Macaw Bank Groups.

The first true soil color change in the unit prompted Level 5, which proceeded to culturally sterile soil, reaching a final depth of 117 cm below the surface. A large, flat limestone rock appeared to cap the most pronounced portion of the soil change. Artifacts and other burned pockets appeared above the capping stone, although the matrix below it

was sterile, thus the presence of this rock cap suggests that the entire dark soil above it may be a cultural feature. The only artifacts recovered were untypeable ceramics, one *jute* snail shell, and gray slate chunks.

Other Karst Features

Other karst features have been identified elsewhere in the Pacbitun region, both by me and previous archaeologists, who have performed excavations in some, but most have simply been described, and only a few mapped. I briefly discuss several of them below because they add to the variety of use patterns already noted and reinforce many of those seen in the Actun Lak-NTC-Actun Naj Che area. The features discussed include: Actun Pe'ech, Actun K'oxol, Stone Cache, Crystal Palace, Chaan Hol Rockshelter, Actun Yax Tunich, Slate Cave, Tzul's Cave, Actun Merech, Actun Pech, Actun Sinan, Actun Kacha Shana, Actun Hayach Naj, and the Solbetunich Formation. Actun Pe'ech lies to the northwest of the NTC and Actun Naj Che, while Actun Koxol, and the Stone Cache are on the eastern side of a gently sloping hill across the Rocky Crab Cave creek. Crystal Palace and Chaan Hol Rockshelter penetrate the same hill, but the former is on top of it and the latter is on its western face. Actun Yax Tunich is located on top of a steep, isolated hill due north of Crystal Palace and Chaan Hol Rockshelter.

Slate Cave and Tzul's Cave are 2.5 km to the southwest of Pacbitun in the front range of hills leading to the Mountain Pine Ridge. Tzul's Cave, named after its landowner, Joe Tzul of San Antonio, is connected to that settlement by an ancient road (Weber 2011b). Actun Merech is 0.5 km southeast of Tzul's cave, just north of the secondary center, Sak Pol Pak. Actun Pech penetrates a small hillside, in between Tzul's Cave and Crystal Palace. Actun Sinan and Actun Kacha Shana are adjacent to one another deep within the rolling hills at the foot of the Mountain Pine Ridge, 7 km southwest of Pacbitun, but only 3.5 km southeast of the unstudied settlement of Guacamayo. Actun Hayach Naj and the Solbetunich formation are due south of Pacbitun and just under 1.5 km distant from each other on the northwest border of the Mountain Pine Ridge proper. The first of these karst features penetrates a narrow lowland forest valley 0.5 km to the north of Privación Creek, while the other is a complex karst system surrounded by pine savannah in the Mountain Pine Ridge.

Actun Pe'ech (Smashed Cave)

Actun Pe'ech is a small, isolated phreatic fossil cave measuring 17 m long, with a maximum width of 6 m, penetrating a shallow depression in the side of a hill (see **Figure 34**). Entering the cave requires belly-crawling for 4 m, after which the cave opens up to 2 m in height; nevertheless, a short stone terrace partially blocks this passage, indicating that the restriction is partially artificial (**Figure 121**). My local collaborators suggested the name because they said that it looks smashed due to its low ceilings. Once inside, the

cave floor is primarily bedrock, although a thin layer of alluvium is present, and natural shelves located approximately 1 m high line most of the walls. A stalagmitic column creates two oval-shaped chambers, the first of which, Chamber 1 includes the constricted entrance construction and the central column. Chamber 2 is more open than the other, with a ceiling averaging 2 m high, containing several stalactite clusters broken in the past (**Figure 122**). The Maya placed a stack of small breakdown boulders mixed with ceramics in a niche undercutting the north cave wall in the approximate center of the chamber. Ceramic sherds litter the cave floor and ledges in low densities, although no whole vessels are present. The sherds are a mix of undecorated jars, and other decorated wares, particularly basal flange bowls and dishes from the Early Classic period. The artifacts were not collected; rather, identifications were made in the field and later from photographs taken of diagnostic pieces. As such, these data represent a nonsystematic sample of material, but notably absent is any Spanish Lookout material suggesting a temporal use pattern yet unseen in other karst features in the Pacbitun region.

Actun K'oxol (Mosquito Cave)

Located on the corner of a small bedrock outcrop above the western bank of the Rocky Crab Cave creek bed is Actun K'oxol, a diminutive rockshelter named for the large swarms of mosquitoes infesting the forest around it (**Figure 123**). The feature has two main areas measuring a total of approximately 4 m long by 1 m deep. The first area measures 2.5 m long and is aligned north to south, after which the feature turns to the

west, resulting in another 1.5 m long alcove. A gentle sloping rear wall of the bedrock outcrop creates the shallow open niche of the larger area, whereas a straight undercut forms the 0.25 m-tall ceiling in the highly restricted smaller area. The floor of the larger section is covered in ceramics and two possible rock alignments are present on either end, while few artifacts were noted in the smaller area. A crack in the ceiling at the junction of the two sections filled with drip water a rock with a natural basin in its top, behind which was another concentration of pottery, partially calcified. A surface collection of diagnostic ceramic sherds revealed the Maya used Actun K'oxol throughout the Classic period. I include this diminutive rockshelter in this discussion because the artifact assemblage and architectural modifications reify the pattern of karst use seen throughout the Pacbitun region. Additionally, it is one of the smallest karst features in this study holding evidence of ritual use, and its discovery demonstrates the wide range of landmarks the pre-Hispanic Maya considered *ch'een*, and that size played a secondary role determining a sacred site.

Stone Cache

The Stone Cache is an undercut bedrock niche, measuring approximately 1.5 m tall by 2 m wide and 1 m deep, in an otherwise vegetated, shallow northeast sloping hillside (**Figure 124**). Its opening faces downhill, and the feature has smooth walls and ceiling, and a natural shelf 0.5 m high located in the rear of the feature. Over 20 fist-sized limestone boulders sit on the natural ledge, and its position beneath a relatively deep

undercut, the feature's opening downhill, and smooth walls, collectively indicate the rocks on it arrived there by human agency rather than resulting from ceiling collapse or tumbling. Nevertheless, no other cultural remains were noted, although thick leaf litter covers the floor of the feature, indicating that future investigations may reveal dateable remains in front of the shelf. This unusual feature is included in this dissertation because it broadens understanding of how the pre-Hispanic Maya in the greater Pacbitun region interacted with various karstscape landmarks. Additionally, no other karst features of this kind have been documented being used anywhere the Maya area, making it unique.

Crystal Palace

Crystal Palace is an unmapped, large isolated phreatic fossil cave located halfway up the hill into which Actun Koxol, the Stone Cache, and Chaan Hol rockshelter penetrate. It is by far the largest of the known features in the hillside, although bigger ones in the area, such as Rocky Crab Cave and Actun Lak, suggest others may yet be found. PRAP co-director Jennifer Weber first investigated Crystal Palace as part of her Master's thesis research, although her work has focused on a mound in front of the cave, and Megan Parker excavated limited sample columns from inside for her paleoethnobotanical project (Parker 2013, 2014; Weber 2011b, Weber and Powis 2011). The following description is summarized from Weber's (2011a, 2011b; Weber and Powis 2011) reports and thesis on the cave, and supplemented by my observations. I include this cave in my dissertation because it contains similar artifacts and architectural

modifications that reflect the overall pattern of cave and karst use seen throughout the Pacbitun region.

A sinkhole entrance opening above a sloped passage covered in ceiling breakdown provides access to the cave. This entrance hole measures approximately 4 m by 2 m, and the sloped passage is 2 m wide. The way forward widens greatly, continuing down a less steep decline, punctuated by several terraces and other architectural features constructed by the pre-Hispanic Maya along the natural path to the cave floor. Their location on the sloped path suggest that they were intended to direct entering traffic rather than act as ritual stages (Kenward 2005; Peterson 2006). The main chamber is roughly "V" shaped, measuring 55 m long, 17 m at its widest, and up to 4.5 m tall. Dense, linear clusters of stalactites contrast with the otherwise smooth ceiling, indicating several large structural cracks in the bedrock above (**Figure 125**). Archaeologists working in the cave noted an erect, snapped stalagmite surrounded by speleothem fragments in a small chamber behind a large column at the rear of the cave that they propose the Maya used as an altar (**Figure 126**; Parker 2013:109). Another possibility for the arrangement is that it was a cave stela, of which several are known throughout the Belize Valley, including at Actun Tunichil Muknal, Laberinto de las Tarántulas, and Chechem Ha Cave (Awe et al. 2005).

Several classes of portable artifacts have been recorded in the cave, with ceramic sherds being the most abundant. Most of this pottery dates to the late Late Classic period, although one Early Classic specimen appears in a photograph in the PRAP digital library (Weber 2011a, 2011b; Weber and Powis 2011). Alexanders Unslipped, Cayo Unslipped,

and Mount Maloney Black jars, all dating to the Late Classic period, make up the majority of the identified assemblage, although the previous studies have reported several untyped plates and bowls (Weber 2011b; Weber and Powis 2011). Other documented artifacts include an obsidian blade cached in a small niche, a metate fragment, and large quantities of wood charcoal (Parker 2013:109; 2014). Overall, the limited research at Crystal Palace indicates the Maya used it in a similar fashion as other caves in the Pacbitun region. Specifically, they made intensive architectural modifications to it, likely during the final two centuries of the Late Classic period, although for directing traffic rather than ritual performance. Furthermore, the erection of a possible speleothem stela at the rear of the cave suggests behavioral ties to Actun Lak and other caves in the Belize Valley. Lastly, the ceramic assemblage suggests most intensive use during the late Late Classic period, with an earlier, more ephemeral use.

Chaan Hol Rockshelter (Small Hole Rockshelter)

PRAP archaeologists Jason B. Lee and Stephany L. Valdez investigated Chaan Hol, and its name translates to "Small Hole" in reference to a natural window penetrating the outer wall of the rockshelter (**Figure 127**; Lee and Valdez 2012). Although the archaeologists investigating this feature were interested in the Paleoindian and Archaic periods, all of the artifacts that they recovered dated to Maya habitation of the region. Their work is included here because the feature closely resembles Actun Ak Ha, although they are located 1 km apart, demonstrating the use patterns recorded in the NTC are

regional rather than local. The information about the rockshelter presented below was obtained from the original field report of the archaeological investigations, and a short visit that I made there (Lee and Valdez 2012).

Chaan Hol is a talus shelter created when a bedrock face collapsed on top of another outcrop, resulting in a triangle-shaped chamber in profile, although only a small portion of the rock is touching in the 4 m tall ceiling (**Figure 128**). Only one chamber is present in the feature, measuring up to 3 m wide, and running northwest to southeast for 12 m. The window giving the feature its name is in the approximate center of the rockshelter, and the presence of several stacked small boulders nearby suggest that it had been modified, if not completely filled in, previously (**Figure 129)**. Located 3 m to the west of the window, a small terrace marks the transition between level floor, and a steeply sloping path downhill. The archaeologists proposed that area immediately east of the terrace was artificially raised, helping create relatively flat space in front of the window (Lee and Valdez 2012:190).

The archaeologists excavated two adjacent 1 m by 1 m units in the proposed artificially flattened area in front of the window, proceeding until rocks too large to remove filled the floors of both, at an average depth of 1.5 m below the surface (Lee and Valdez 2012:196). These investigations uncovered artifacts until terminating the unit, including ceramic sherds, a ceramic "roller stamp," (possibly a figurine fragment), *jute* snail shells, chert flakes, a formal lithic tool, slate imports, burned clay, calcite crystals, speleothems, and faunal remains (Lee and Valdez 2012:Table 1). Although the artifacts are awaiting full laboratory analysis, a cursory examination of the pottery reveals a strong

late Late Classic period component, similar to other karst features in the Pacbitun region, including Cayo Unslipped, Planton Punctated-Incised, and Tu-tu Camp Striated.

Lee and Valdez (2012:200) note that no stratigraphy was present in the units, indicating to them active sedimentation processes in the rockshelter throughout its time of use. Instead, I suggest here the presence of artifacts on the surface of the feature attest to little sedimentation occurring since the Maya last used the rockshelter, and the lack of stratigraphy in the excavation units indicates the level floor resulted from a single construction event. Furthermore, I believe the construction adjacent to the steep slope is better understood as a retaining wall for the leveling, rather than an actual terrace, and the massive boulders encountered in the excavations are architectural fill similar to those used to construct the Entrance Platform in Actun Lak. The relative lack of ceiling further attests to the boulders being architectural fill rather than breakdown, because there is insufficient parent material above the area to have created the volume of fill noted. Overall, the artifactual data and the revised interpretation of the stratigraphy presented above demonstrates the patterns of karstscape use and modification seen in Actun Lak, the NTC, and Actun Naj Che included Chaan Hol, and are thus regional. Specifically this pattern is increased use intensity at the end of the Late Classic period as indicated by large quantities of Spanish Lookout complex ceramics, and heavily, yet subtly modifying spaces by partially-buried architectural constructions.

Actun Yax Tunich (Green Rock Cave)

Actun Yax Tunich is on the northeastern side of a steep hilltop due north of the Crystal Palace hill, and just over one km southwest of Pacbitun. Its name means "Green Rock Cave," referring to the green-colored algae coving the rocks at its entrance. The cave begins a double barrel stepped sinkhole 7 m tall, and opening onto an "8" shaped horizontal main area, similar to the karst features on the Vaca Plateau (Reeder et al. 1998; Reeder et al. 1996). The two horizontal chambers are aligned roughly north to south, with Chamber 1 measuring 2.5 m by 1.5 m, but divided by an east-west aligned terrace (**Figure 130**). Uncut boulders, stacked five courses tall comprise this dry laid construction, creating high and low spaces in the chamber; however, no artifacts were visible on the surface due to a dense layer of alluvium and vegetation debris regularly falling in from the unobstructed entrance. Chamber 2 is roughly circular measuring 1.5 m in diameter, and rotting vegetation, alluvium, and a massive, decomposing termite nest covers the floor. An undercut in the cave wall created a small alcove inside which the Maya laid on its side a complete Cayo Unslipped jar, still partially exposed. Removing the alluvium for determining if the vessel remained intact uncovered the rim of another similar jar, but standing upright (**Figure 131**). No other artifacts were noted in the cave, but the presence of the thick alluvium and terrace indicates it was a ritually significant karst feature. I include Actun Yax Tunich in this disseration because it is similar to Actun Ch'e'ehem Zotz, a small cave modified with a terrace or platform that resulted in the creation of high and low spaces. Although the artifact assemblage is scarce, the presence

of the Cayo Unslipped jars indicates that it was used at least during the late Late Classic period.

Slate Cave

Slate Cave is an isolated phreatic fossil cave located uphill from the western bank of Tutu Creek, a seasonally active waterway, while Tzul's Cave, discussed below, is above the waterway's eastern bank. Both are 2.5 km southwest of Pacbitun, penetrating the foot of the hill holding the minor center of Sak Pol Pak (Conlon 1999; Reece 2012; Spenard et al. 2012). Slate Cave's name comes from the ubiquity of slate fragments found throughout its 55 m of passages, with the front half being aligned east-west, turning to the southwest for 10 m, and ending in a south-running passage over the last 20 m (**Figure 132**). The cave has a bell-shaped entrance facing east, measuring 4 m tall, and 5 m wide. Although its ceiling rapidly descends to an average of 1.5 m, it undulates greatly throughout with several taller domes in the passages. Two main areas are identified, separated by a tight squeeze where the cave turns to the south. Cultural remains are in both areas, although most are found in front of the squeeze. Investigations identified only one architectural modification, but concentrations of worked and unworked slate and limestone imports are ubiquitous. The architecture is just inside the cave's entrance where one to two large boulders outline a curve in the cave wall, creating a small, enclosed semi-circular space (**Figure 133**). The largest concentration of imported

stone carpets the entire floor of the area nicknamed "The Crawl," where the ceiling measures less than 0.5 m high (**Figure 134**).

The remaining cultural material consists primarily of gray slate and pottery, the latter being undecorated nondiagnostic sherds. Much of the slate appears to be unmodified, although the mapping team documented a broken, biconically-drilled piece in The Crawl. A surface collection of the few diagnostic sherds encountered indicates the Maya used the cave throughout Classic period, with the highest intensity occurring in the late Late Classic. Material from the Actuncan-Dos Arroyos group represents the Early Classic period, while Cayo Unslipped, Dolphin Head Red, Macaw Bank Self-Slipped, Rubber Camp Brown types and the Saxche-Palmar group comprise the Late Classic assemblage. In addition to slate and ceramics, *jute* snail shells are in the entrance area, and a metate fragment made from unidentified stone was noted at the entrance to the Crawl.

Slate Cave's most distinct feature is a petroglyph panel carved into a flowstone formation 2.5 m above the ground in its entrance, a panel representing the only known parietal art in the Pacbitun region (**Figure 135**). It contains at least five faces, and several other poorly preserved carvings, all located on the northeast face of the formation, with the exception of a few possible etchings on its east exposure. Their elevated location suggests the Maya carved them with the assistance of scaffolding (**Figure 136**). Simple carved faces have been recorded on cave walls throughout the Maya area, and they appear on stela in the Belize Valley in both settlements and cave settings (Awe et al. 2005; Awe and Helmke 1998:Figure 6; Bonor 1989a; Helmke and Awe 1998; Rissolo

2003a; Slater 2014a; Stone 1995). I discuss the significance of this panel in Chapter 8, but suffice it to say for now such images are often associated with the rain god, Chahk, suggesting the Maya used Slate Cave for rain rituals.

Tzul's Cave

Named after its landowner, Joe Tzul of San Antonio village, Tzul's Cave penetrates a hillside100 m east of Slate Cave, although these features are of a significantly different character. It is partly an isolated phreatic fossil cave, but it is also composed of a series of vertically separated horizontal passages connected by sinkholes (**Figure 137**). Furthermore, whereas Slate Cave contained little evidence of architecture or other changes, the Maya extensively altered Tzul's Cave's appearance with blocked entrances, walls, artificially leveled floors, and modified passages. This cave was originally investigated by PRAP director, Terry Powis, and then by co-director, Jennifer Weber who recorded a *sacbe*, or Maya road, running from Pacbitun to just below its entrance (Powis 2010a, 2010b; Weber 2011a, 2011b; Weber and Powis 2011). The following descriptions are summarized from their reports, supplemented by my personal observations during reconnaissance and mapping (Powis 2010a, 2010b; Spenard 2011a, 2013c; Weber 2011a, 2011b; Weber and Powis 2011).

Tzul's Cave's current entrance is just inside the dripline of a small alcove in a bedrock outcrop, opening immediately to a hole providing access to the actual cave. This drop is 4 m deep, and only navigable using holds and small ledges on either side of the

wall. It opens into the ceiling of Room A, the largest known chamber in the cave, oriented roughly north to south, measuring 10 m long, and with an average ceiling height of 4 m. Although some pockets of alluvial fill are present, the floor is primarily bedrock, perhaps explained by large volumes of water, falling from the entire ceiling, and cascading in sheets down the cave walls during rainstorms. It collects in shallow pools on the floor, eventually flooding, and creating small streams that flow towards Rooms B and C, but where it drains beyond those chambers is unknown. No artifacts were noted in Room A, although several speleothems have been broken off in the past.

Room B is beneath the small alcove in the cave entrance, and is little more than a muddy crawl connecting Rooms A and C, aligned roughly north to south, measuring 4 m long by 2 m wide. An artificial wall destroyed in the past delineates the room's north end. A few nondiagnostic ceramic sherds and an oblong cobble with some battering ware were noted in a niche along the western wall (**Figure 138**). Although broken, the cobble may be a scribal tool similar to those found in burials of scribes at Aguateca, Guatemala (Inomata and Nakamura 2003:Figure 41; Karl Taube, personal communication 2012). Stone (2005) has recently reported on the strong connection between scribes and caves during the Classic and Postclassic periods in the southern Maya Lowlands, finding that those people affirmed their divinely sanctioned status through subterranean ritual performance (Stone 2005:136). The possible scribal tool in Tzul's Cave suggests that the connection between scribes and cave may have also existed in the greater Pacbitun region. This connection between the cave and an elite population is further strengthened by the presence of the sacbe that connects the cavern to Pacbitun's epicenter, which

PRAP co-director, Jennifer Weber is investigating for her dissertation project (Weber 2011b, 2012, 2013, 2014).

Room C is relatively small, but contains many alcoves full of broken Mount Maloney Black globular jars and Cayo Unslipped jars dating its primary use to the last two centuries of the Late Classic period. The largest alcove is on the eastern side of the chamber, just past the breached wall in Room B, and its eastern wall is an artificial construction made from limestone boulders and speleothems (**Figure 139**). This construction obscures a previously unknown entrance to the cave, which it has completely blocked. The presence of filtered sunlight and small roots intertwined with the boulders indicate its proximity to the surface. The western side of the chamber contains another alcove filled with pottery, worked slate fragments, and a slate plug that covered a hole descending into another set of chambers below (**Figure 140**). The slate plug was flaked into a roughly circular shape and is covered in plaster, indicating that the chamber below had been sealed sometime in the past (Powis 2010a, 2010b). A small ledge approximately one m below the plug facilitates the drop into the chambers below, and the space between the two was filled with a dry laid wall modifying the original shape of the hole. Its presence suggesting at least part of Room C's floor is artificial.

The slate plugged drop provides access to Rooms D, E, and F, located another 3 m below the entrance alcove. Room D is the largest in the lower level of the cave, and is aligned north to south, while Room E, is a small alcove at its northern end. Together, they measure 6.5 m long and average 1.5 m wide. Few artifacts are present directly below the drop and in the main access ways of the chamber, but an alcove beneath the entrance

ledge connecting with Room E contains several whole and partial vessels, including jars, and dishes (**Figure 141**). Powis and Weber (Powis 2010a, 2010b; Weber 2011b; Weber and Powis 2011) suggest a Late Classic period date for the ceramics based on form, although they refrained from offering type designations due to the difficulty of accessing the chamber. Nevertheless, I made several type identifications while mapping the cave, although a complete inventory remains unfinished. Identified types include: Alexanders Unslipped and Cayo Unslipped, Dolphin Head Red, Garbutt Creek Red, Mount Maloney Black, and Puhui-zibal Composite (Gifford 1976:266). One of the Mount Maloney Black specimens is a bowl that had been inverted on an Alexanders Unslipped rim, reminiscent of a pattern recorded at Chechem Ha Cave in the Vaca Plateau, indicating some behavioral connections to the west of Pacbitun (**Figure 142**; Moyes 2003, 2004, 2006a, 2006b). Another vessel, a Belize Red Incised tripod dish, had its hollow-oven feet removed, but no supports were noted in the cave suggesting that the feet had been removed prior to its deposition in the chamber. Overall, the presence of those ceramic types reaffirm the earlier dates attributed to the cave, although they suggest more specifically use occurring during the final two centuries of the Late Classic period.

Room F is a finger-like passage extending from the southwest corner of Room D, measuring 4 m long, and 0.5 m wide and tall. The Maya had blocked it with a triangular-shaped slate plug that had been plastered into place similar to other found in Room C, although it was removed prior to PRAP's investigations (**Figure 143**). In addition, a wall as high as Room D's floor in the entrance to the passage suggests part of that larger chamber's is artificial (**Figure 144**). Ledges are present on either side of the narrow

passage and are filled with large Cayo Unslipped, Dolphin Head Red, and Mount Maloney Black ceramic sherds. Several small boulders covered in dirt are located at the very back of the passage, which a close inspection revealed a slight breeze, indicating a yet undisturbed area in the cave.

Overall, Tzul's Cave is a highly significant feature in the Pacbitun karstscape. The presence of the *sacbe* connecting it to Pacbitun's epicenter suggests the elite of that site controlled it, at least during the final two centuries of the Late Classic period. These proposed ties to the Pacbitun royal court are further indicated by the potential scribal tool found within. This cave is included in the present discussion because it expands on the modification patterns seen elsewhere in the Pacbitun karstscape. The constructions were used to create artificial floors, block access to certain areas, and ultimately create a more "cave-like" stage for the ceremonial practices, a feat accomplished by blocking off at least one entrance.

Actun Merech (Lizard Cave)

Originally described by the Mendip Caving Group, Actun Merech is a 53 m-long fossil phreatic cave with one elevated passage and a double-barreled drop at its rear (Flavell et al. 1994; Francis et al. 1995; Hollings 1996; Powis 2009:155; Spenard 2012a). It is located on the hillside above Actun Mai Cave, the other massive trunk conduit cave in the Pacbitun region in addition to Rocky Crab Cave. With a round, 2.5 m diameter entrance facing southwest, and an elevated position on a hillside adjacent to Sak Pol Pak,

Actun Merech affords commanding views of that secondary center. This cave has yet to be the focus of systematic investigations by PRAP, although some archaeological testing has been done there prior to my joining the project. The following description is based on the previous PRAP reports of this feature, augmented by my observations during two day-long visits there (Powis 2009; Weber 2011a; Weber and Powis 2011; Spenard 2012a; Valdez et al. 2011). Overall, the scant data recovered from this cave suggests it was used continually throughout the Classic period (A.D. 250-900).

The majority of the cave is a single, winding passage with occasional drops in the floor of up to two meters, and the ceiling height varies from 1 m to 6 m. Overall, the cave is narrow, with its greatest width measuring approximately 4 m. Together, these changes in height and width define the nine "rooms" previously identified by PRAP, called Rooms A-I (Powis 2010b). The cave is easily navigable for the first 30 m (Rooms A through G), only requiring the aid of light; although, beyond that is the elevated passage (Rooms H and I) and the double-barreled chute penetrating the floor of Room G. The elevated passage is currently reached by use of a ladder construction by local PRAP collaborators to facilitate exploration, but access previously required scaling a 6 m-tall wall. Although the chutes are able to be partially free climbed, their bottoms can only be reached with rigging due to undercutting.

Because PRAP had been unable to document the chutes completely due to equipment failures, I provide the following detailed described from my brief work there as a supplement to the cave's previously published description (Powis 2010b). The chutes begin as a single hole that drops 5.5 m below the floor of Room G, after which a column-

like ledge splits it into eastern and western halves. The eastern half continues down for an additional 17.5 meters to an oval-shaped room that is roughly 4 m north to south by 2 m east to west, and in which two constructions were recorded. The first consists of three rocks partially concealing a 60 cm wide by 30 cm high alcove. The second completely conceals a small, dead-end passage using six stacked rocks in a space measuring 40 cm high by 60 cm wide. The western chute drops for an additional 12 m below the split to a narrow room measuring 4.5 m north to south by 1.5 m east to west. The floor slopes downwards to the south into a dome-shaped niche 1 m wide by 30 cm tall. Ceramic sherds were present there, including Balanza Black, Cayo Unslipped, and Dolphin Head Red, and a rock placed under a small ledge was noted. Another larger ledge splits to the east, 4 m above the bottom of the pit, and a short passage continues for an additional 3.5 m beyond it, but no artifacts were recorded in there.

PRAP made small-scale test excavations in Actun Merech prior to my joining the project, but the materials remain under analysis. The excavations include two 50 cm x 50 cm units, one each placed in the cave entrance (Unit 1) and in the elevated passage at the rear of the cave (Unit 2; Valdez et al. 2011). Excavations in Unit 1, placed just inside the dripline of the cave, uncovered ceramic sherds, *jute* shells, and chert flakes up to a depth of 50 cm, after which sterile soil was reached (Valdez et al. 2011:27). Unit 2 excavations were conducted in Room I, where a local PRAP collaborator reported three whole vessels had been removed sometime in the late 1960s (Powis 2010:155). These vessels include a cylindrical jar and deep bowl, both red slipped, and a polychrome dish that Powis (2010:155) identifies as Late Classic period forms. The excavation in that chamber

recovered more ceramic sherds, a possible cultural speleothem, and a shovel-shaped human incisor. This tooth represents the only human remains yet encountered in the cave.

Actun Pech (Tick Cave)

Originally documented by the Belize Valley Preclassic Maya Project (BVPMP), Actun Pech is a small cave, but it is one of the few in the Pacbitun region known to contain human remains (Healy et al. 1996). My experience with this cave is limited to a single short visit of less than an hour; therefore, the discussion below is drawn largely from the description published by the BVPMP, and supplemented with a later PRAP report of it (Healy et al. 1996; Powis 2010b). The cave, originally named Actun Petz, was first brought to the attention of the BVPMP by its landowners who constructed an iron-bar gate over it to prevent looting and vandalism (Healy et al. 1996). BVPMP's research goals were determining when the cave was used, why it was, and what was its relationship to Pacbitun (Healy et al. 1996:139). Their investigations involved only mapping the cave and performing field analyses of archaeological materials encountered. PRAP's goals were determining if any looting had occurred in the then 15 years since BVPMP first documented it, and identifying any pre-Maya use (Powis 2010b; Valdez et al. 2011). These latter activities were constrained to a 50 cm by 50 cm excavation unit and an adjacent 15 cm by 15 cm test column, although they failed to recover any artifacts (Valdez et al. 2011:25).

Located on a steep hill between Crystal Palace and Tzul's Caves, Actun Pech is an isolated fossil phreatic cave accessed via a small sinkhole less 1 m in diameter penetrating the hillside. I noted during my visit that this restriction may be the result the Maya having completely blocked off this entrance, but further investigations are necessary for verifying this observation. Actun Pech is approximately 25 m long and 14 m at its widest, and is composed of four main rooms, labeled Rooms A through D from front to rear (Healy et al. 1996:143). The Maya made extensive modifications to it, particularly in the entrance area (Room A) where they constructed four terraces, giving it a stepped appearance.

Twenty-three whole or partial vessels were recorded, and ceramic sherds are scattered throughout the cave, but no lithics, bone, or shell artifacts have been noted (Healy et al. 1996:144). Sixteen of the vessels are undecorated jars placed in clusters in hidden alcoves or wall niches, but the overall assemblage includes materials from the Late Preclassic period (ca. 100 B.C.) through the end of the Late Classic (ca. A.D. 900; Healy et al. 1996:Table 2). The remaining vessels, identified as Alexansers Unslipped, Garbutt Creek Red, Mount Maloney Black, Roaring Creek Red, and Zubin Red, all date to the late Late Classic period (A.D. 700-900) and were adjacent to six sets of human remains encountered in Room D (Healy et al. 1996; Powis 2010:156). The remains include four adults (2 male and 2 female), one sub-adult, and one child, all lacking noticeable evidence of pathology indicating they were healthy in life (Healy et al. 1996:145-150). When encountered by BVPMP, the remains were mostly in correct anatomical positing, suggesting they were burials; however, when PRAP returned in

2009, many had been disturbed from the *in situ* positions, and fewer pottery vessels were present (Healy et al. 1996; Powis 2010:156).

Actun Sinan (Scorpion Cave)

Actun Sinan is a dry cave located 7 km to the southwest of Pacbitun, just over 3.5 km southeast of the uninvestigated major center of Guacamayo, and 2 km east the Macal River. Javier Mai, one of the PRAP's foremen, discovered it while he was hunting in 2008. At that time, he watched as his prey ran into a nearby cave, after which he began to search for other exits so that the animal could not escape. He encountered a human-sized termite's nest brimming with scorpions on the hillside during his search, and, found the small cave entrance upon peeling it away. In addition to accidentally discovering the cave, Javier also encountered a large Alexanders Unslipped: Beaverdam variety olla just inside the dripline nearly filling the cave's entrance (**Figure 145**). The vessel stands just over 80 cm tall and is 2 m in circumference, is oval in shape and has an out curving neck. With a base shaped like a rounded cone the Maya likely designed the vessel to be partially buried, facilitating it ability to remain standing, the condition in which it was found. Some unidentified agent broke off sections of the rim prior to my investigations, but were laying adjacent to the vessel.

Although time did not permit mapping this cave, it consists of a passage and small chamber, measuring a total of 10 m deep. The entrance faces north and is 0.8 m wide by 0.9 m, but some alluvial build up and remnant termite nest is present suggesting that it is

somewhat larger. The passage runs due south for 4 m, then turning southwest for another 2 m. Beyond the bend, the passage dead ends into the only chamber, measuring 2 m east to west by 1.5 m north to south, holding several undecorated ceramic body sherds. Nevertheless, the large jar in the entrance is the only diagnostic sherd encountered in the cave, indicating the Maya used the feature minimally late Late Classic period, although evidence from other caves in the region indicates that future investigations will likely find a wider range of use dates. I include this cave in the dissertation because of its distance from Pacbitun, proximity to Guacamayo, and the discovery of Actun Kacha Shana nearby, discussed below. Although scant, the chronological data indicate that the use of the cave falls within the norms of the region. Additionally, its relatively small size compared to others nearby demonstrates the range of variability of karst features that the Maya used, and the presence of the jar inside of the dripline of a dry cave suggests that such vessels were used for more than collecting drip water, as suggested by Thompson (1959, 1975).

Actun Kacha Shana (Broken Shoe Cave)

Located 4 m south of Actun Sinan, is Actun Kacha Shana, or "Broken Shoe Cave," named when the sole of one of the team member's boots broke in half when investigating it. This feature is an elevated karst sheet covering the actual bedrock below with two entrances separated by 80 cm providing access to the feature, although both are too small for a person to enter (**Figure 146**). Entrance 1 measures 40 cm in diameter, and

is just large enough to fit a human head, while Entrance 2 is a bit larger, but is roughly triangular shaped and is inaccessible due to a tree growing out of it. The interior floor is roughly 50 cm below the surface from Entrance 1, and all told, the feature covers 3 m^2, consisting of one chamber. The Maya placed two stacks of Cayo Unslipped small olla sherds within arm's reach of that entrance, indicating use during the late Late Classic period (**Figure 147**). The functions of Actun Kacha Shana and Actun Sinan and who used them are unknown, but the landowner reported encountering some settlement nearby, uncovered when preparing an agricultural plot. Actun Kacha Shana is included in this dissertation because it is an unique feature of the Pacbitun karstscape, and the presence of the broken ceramic sherds indicates that it held some poorly understood ritual significance.

Actun Hayach Naj (Small House Cave)

Located in a lowland-forested valley, Actun Hayach Naj is at the edge of the Mountain Pine Ridge approximately 6 km due south of Pacbitun, although less than 200 m from the previously unrecorded minor centers of La Caoba Higo (Mahogany Tree Village) and Cahal Higo (Fig Village), the latter discussed in Chapter 3 (Spenard 2012a; Spenard et al. 2012). One of my local PRAP collaborators, Oscar Mai, remarked that the cave looked like a "small house" inside, giving the cave its name. The entrance is a wide, shallow sinkhole at the bottom of a cliff face opening onto a steeply declining breakdown and alluvium covered slope (**Figure 148**). Overall, the cave is structurally similar to

Crystal Palace, but less massive. A calcite-covered glass bottle is near the entrance suggesting modern water collecting activities may take place inside, or it may be an historic artifact from chiclero activity in the area. Time and equipment failures did not allow for in depth archaeological investigations in this cave. Instead, it was described using size estimates, and was extensively photographed for planning future research. I include it in this dissertation because it contains an unusual artifact assemblage, and its distance from Pacbitun helps establish a regional pattern for the PRAP study area. Additionally, we recovered a miniature vessel in the cave, sparking a comment from one of the local PRAP members that may be useful for understanding archaeological caches.

Actun Hayach Naj is comprised of one large chamber reaching a maximum length of approximately 25 m, is ovular shaped, and artifacts including ceramic sherds and granite mano fragments abound on the cave floor. In its center is a massive stalagmitic column from which hang other smaller broken formations, a pattern of breakage seen with dripstone throughout the cave. Small ledges, a few low crawls, and short passages extending from the outer bounds of the chamber quickly lead to dead ends. Pottery collected in the cave all dates to the late Late Classic period, including, Benque Viejo Polychrome, Cayo Unslipped, Dolphin Head Red, Macaw Bank Self-Slipped, Paixban Buff-polychrome, and Palmar Orange-polychrome types. Additionally, the Maya cached a complete Aguila Orange miniature tripod dish dating to the Early Classic period and several chert flakes in a breakdown-filled niche in the cave floor, adjacent to the center column. Prior to caching, portions of the vessel's long feet, as well as sections of its rim and sidewall had been broken off (**Figure 149**). The two local PRAP project members

who guided me to the cave remarked after finding the vessel that a single pot is an insufficient offering because a spouse is always necessary, therefore, another should remain. Such an understanding about the gendered vital nature of such deposits is highlighted here because that is useful for understanding the pairs of vessels found in Actun Lak and Actun Yax Tunich, and perhaps other two-vessel caches throughout the Maya area (Cheong 2013).

Although ceramics are the most abundant artifact class in Actun Hayach Naj, a surprising number of granite mano fragments ranging in size from approximately 5 cm to 15 cm in diameter litter the cave floor, especially around the central formation (see **Figure 18**). Manos have been recovered in other karst features in the Pacbitun region, but the quantity encountered in this cave is unusually high. In those other features only one or two at most were recovered during excavations, while the Maya left at least 50 in Actun Hayach Naj. The only other known dense concentration of mano fragments anywhere in the region is the Tzib Group, a recently investigated granite workshop located to the northeast of Pacbitun (Ward 2013; Ward and Micheletti 2013). Another site, Cahal Higo, found while reconnoitering Actun Hayach Naj, consists of five structures forming a single plazuela group with a possible pyramidal temple on its southern side (see **Figure 17**). There, five mano fragments similar in size and shape as those found within Actun Hayach Naj were noted while sketch mapping the site (Spenard et al. 2012). On a broader scale, a pile of 232 miniature manos and metates were found at the base of the central stalagmitic column of Balankanche cave in central Yucatan (Andrews 1970:32).

Solbetunich Formation (Stone Wall)

The Solbetunich formation is a massive limestone outcrop measuring over 150 m long but regularly disrupted by breakdown, forest growth, and uneven topography. Overall, it is similar in character to the NTC, containing many of the same types of karst features, including talus shelters, rockshelters, and caves. It was the subject of brief reconnaissance in 2010 and is included here because it contains a modification so far unique in the Pacbitun karstscape (Spenard 2011a). The primary foci of reconnaissance consisted of two sizeable rockshelters and a large cave named Solbetunich 1 and Solbetunich 2, and Actun Solbetunich respectively, although other smaller features were noted. Nevertheless, time, weather conditions, and lack of proper caving gear did not allow the feature to be fully explored or mapped. The entire formation was named after a curving retaining wall located in Solbetunich 2 described in further detail below. Only Solbetunich 2 and Actun Solbetunich are discussed here because they both contained cultural features visible on the surface, while Solbetunich 1 appeared to be sterile.

Solbetunich 2. Solbetunich 2 is a small rockshelter located at the bottom of a massive natural basin at the foot of the Solbetunich outcrop, measuring approximately 7 m long and up to 3 m deep. It only visible cultural feature is a dry laid retaining wall reaching 1 m in height, consisting of five to six courses of uncut limestone boulders (**Figure 150**). The construction is semi-circular in shape, extending from the rear of the rockshelter, arcing out beyond the drip line, reaching a distance of approximately 3 m, and then curving back around towards a massive boulder spall adjacent to the rear wall.

Its function is uncertain because no other artifacts were noted in the area, and its position at the bottom of a basin and partially inside of a dripline indicates that it was not an agricultural terrace. Two sections of the wall collapsed sometime in the past and those areas have eroded extensively, thus the may have served to prevent erosion but why the Maya may have found reason to do so remain unknown.

Actun Solbetunich. Actun Solbetunich is a large fossil cave located at the western end of the Solbetunich outcrop. It is a deep, complex cave accessed via a 2 m high by 4 m wide entrance at the bottom of a small basin facing south. A lack of time and proper equipment prohibited its complete exploration, but reconnaissance revealed at least four main areas, one requiring climbing gear to reach. The three accessible areas include a massive oval-shaped chamber, a small passage branching off it, and a diminutive rockshelter in the cave's exterior bedrock face. The other area of the cave is accessed via a small hole in the floor. The main chamber of the cave is relatively flat and oval shaped in its center, but several massive breakdown boulders partition the remainder. Partial jars, and rims of the same form are common to the flat area, many being Cayo Unslipped type with punctation decorations, but one Aguila Orange jar rim is also present, together indicating use throughout the Classic period. The second accessible area is a small passage branching off the northeast corner of the main chamber measuring on average 1.5 m tall, 2 m wide, and 7 m long. Several stalagmitic formations lining the ceiling on its exterior have been snapped, and a series of large, roughly rectangular, limestone slabs blocked the passage in the past, but others are on the ground inside, indicating the area

beyond had been disturbed (**Figure 151**). Nevertheless, the area beyond is now completely devoid of cultural remains.

The third area inside of the cave is accessed via a narrow chute I was unable to explore due to a lack of proper climbing gear. Nevertheless, my guides told me a short local legend about the area providing some description about that section of the cave. The story says that some years ago a villager entered the cave and went down the chute. He followed a passage there eventually leading to a stream. Preparing to cross, he heard voices of the people who live down there. Fearing the voices, the man ran away from the cave. The presence of an underground stream running beneath the Solbetunich formation is likely because the feature is just downhill from a granitic outcrop, plausibly directing rain runoff to the feature. Furthermore, the karst features of the Solbetunich formation are in basin-like areas indicating the limestone has been subject to long-term erosion. Lastly, the outcrop is at the head of an alluvial valley and near a stream, both of which drain into Privación Creek, 2 km to the southwest. The final area of Actun Solbetunich is a small open rockshelter immediately adjacent to the cave entrance. Its floor is primarily bedrock and several nondiagnostic sherds sit on its surface, clustered around a globular formation on the cave wall. Although little archaeological information was gathered about this particular feature, it provides further evidence of the pre-Hispanic Maya including exterior spaces in their cave rituals.

CHAPTER 6

CERAMIC ANALYSIS

Ceramics are the most abundant artifact class recovered from the karstscape, and I use them as one of the primary sources of evidence for the discussions in this dissertation. I analyzed the material using the Type:variety:mode (TVM) system commonly employed in the Maya Lowlands for pottery analysis, and selected a subset of the material for instrumental neutron activation analysis (INAA). These analytical procedures examine different attributes of the ceramic assemblages, thus complimenting one another. TVM is based on characteristics of surface finish and decoration and is used for establishing site chronologies and intersite comparisons. INAA is an analytical technique that measures constituent elements present within individual ceramic sherds; the resulting compositional data is then submitted to various means of multivariate statistical analyses to infer manufacturing sources for local and non-local pottery. I use this data for probing aspects of the local ceramic economy, and determining if the inhabitants of the Pacbitun polity were primarily responsible for using the investigated karst features (Arnold et al. 1991; Bishop and Blackman 2002; Bishop et al. 1982; Neff 2000; Rands and Bishop 1980). I completed the TVM analysis from July to August of 2012, and Ronald Bishop of the Smithsonian Institution's National Museum of Natural History, carried out the neutron activation of the samples and provided the compositional patterns during August 2013 to April 2014.

TVM Analysis

The TVM method commonly employed in the Maya Lowlands is the principal procedure that I used for my ceramic analysis, and this section defines its primary terms, offers an overview of the results, and discusses specific findings that warrant particular attention (Gifford 1960, 1976; Smith et al. 1960). The detailed report can be found in **Appendix C**, where specific information regarding the types, their charted variables, and rim profiles and other images is presented. Furthermore, I treat all of the karstscape material as a single assemblage for understanding the features from a regional perspective. Nevertheless, I acknowledge that the karst features are unique sites with their own distinct use histories, some of which I detail in Chapter 8. Additionally, I made little effort to classify unslipped pottery jar sherds even though they are typically the most common form encountered. Such undecorated wares tend to be conservative through time, and distinguishing between those from different periods is difficult without good stratigraphic contexts, which the karst features lack overall. As such, common unslipped types that are found at surface sites in the Belize Valley are underreported here, even though some are undoubtedly better represented in the assemblage than suggested herein.

For my analysis, I adhere to the definitions of type, variety, and group provided by Gifford (1976:9-10, 17-18; see also Smith and Gifford 1965:f-3). A type is a recognizable aggregate of ceramic attributes that is indicative of production during a particular time at a particular place. A variety of a type shares an overall aggregate of major traits but differs in one or a relatively small number of minor attributes. A group is

an aggregate of closely related types and all of their varieties. The ceramic group and types discussed below have already described elsewhere, and no new ones are defined herein. Relevant citation information for each is provided in **Appendix C**—including to original definitions, and significant updates. I have largely avoided assigning varieties because intact vessels are too few, numbers of diagnostic sherds of each are insufficiently represent in the assemblage to satisfactorily identify them, and a lack of formal ceramic studies at Pacbitun inhibit intraregional comparisons to verify my observations. Nevertheless, some material does strongly resemble established varieties from other sites, and I list them using the formula, "*Type*:*variety*" when they do. In those cases, if other material from the same type is present but lacks the attributes of the specific, previously defined variety, I classify it as a separate "unspecified" category.

The close relationship between ceramic types in a group posed a difficulty for analysis particularly because sherds account for nearly all of the assemblage. In most cases, differences within a group are based on the presence or absence of particular decorative motifs that may only appear on part of a vessel. Securely distinguishing between them is thus only possible if a pot is nearly complete, or if all of the traits for the most complex type within the group are present on a sherd. This issue hinders analysis because the different types within a group can vary chronologically. An example from the nearby site of Xunantunich will help illustrate this point. Chunhuitz Group is composed of three types, Chunhuitz Orange, Xunantunich Black-on-orange, and Benque Viejo-polychrome (**Figure 152**). Chunhuitz Orange has the simplest decoration of all three types in the group, being an orange-slipped volcanic ash ware typically manufactured in

tetrapodal dish and shallow bowl forms (**Figure 152a**; Gifford 1976:268). Xunantunich Black-on-orange type is identical to Chunhuitz Orange in form and slip but also has an added black painted decoration, such as a line on or near the rim or basal break, a geometric pattern on the body, or some combination of both (**Figure 152b**). Benque Viejo-polychrome type is identical to Xunantunich Black-on-orange except that it has additional red painted decorations appearing anywhere on the visible surfaces of the vessel, but can be as simple as the addition of a red band on or near the rim (**Figure 152c**). All of the Chunhuitz Group members date to the Late Classic period, but the plain orange type is the only one that continued to be produced into the Terminal Classic at Xunantunich (LeCount 1996:114; see also LeCount et al. 2002:50).

The issue that arises when analyzing sherds from such ceramic groups is the possibility that they may be from less-decorated spots on the parent vessels, and identifying a specimen as a particular type based on the remaining attributes chances skewing the site's chronology. For example, the sherd displayed in **Figure 153** could be classified as Chunhuitz Orange dating to the Terminal Classic period (A.D. 780-890) if only a part from its lower body was recovered, or as Xunantunich Black-on-orange if the cave growth extended only a few millimeters further down the exterior, obscuring the red rim (LeCount et al. 2002). Since the actual piece has black and red painted lines, it is correctly classified as Benque Viejo-polychrome, indicating a date in the early part of the Late Classic period (A.D. 670-780; LeCount et al. 2002). In this example, if only the basal break was recovered, and subsequently identified it as Chunhuitz Orange then the chronology of the cave would have been skewed towards a later date. I have adopted a

conservative approach that assigns questionable specimens such as those just discussed only to a group level with a type label of "indeterminate" to account for this difficulty. Nevertheless, this approach artificially inflates the amount of the more decorated types (Benque Viejo Polychrome), while deflating those that are less elaborate (Xunantunich Black-on-orange). However, for the present purposes, the potential for mischaracterization outweighs the potential fine-grained chronological specificity.

Data Overview

During my investigations of the Pacbitun karstscape, I recovered 16,122 sherds weighing 173,300 g, as shown in **Table 6.1**. Of those totals, 15,218 specimens weighing 140,800 g were collected during stratigraphic excavations, and the remaining material from non-systematic surface collections. Ceramic group identifications were made for 4,774 specimens of the entire assemblage, 4,294 pieces from excavations. Thirty-eight ceramic groups are represented in the assemblage, and from those, I recognized 63 types among 3,672 pieces of the total assemblage, 3,266 of which had been excavated (**Table 6.2**). I identified forms for 6,069 specimens of all the collected pottery including 5,428 that originated in the extensively investigated karst features Actun Lak, Actun Naj Che, and the Nohoch Tunich Bedrock Outcrop Complex (**Table 6.3)**. Jars are the most common at 53 percent (n=3,025) followed by bowls at 31 percent (n=1,780) and dishes 14 percent (n=788). Other forms present include, "brandy snifters," boxes, drums, lids,

Table 6.1. Tabulation of Pacbitun karstscape ceramic totals and weights.

	Total number and weight of sherds collected	**Total number of ceramic specimens identified to group level.**	**Total number of ceramic specimens identified to type level**
All recovered materials	n=16,122 173,300 g	n= 4774	n=3672
Excavated materials	n=15,218 140,800 g	n= 4294	n=3266
Surface collected materials	n=904 32,500 g	n=480	n=406

and vases, although they only account for approximately two percent of the total assemblage combined.

Ceramics Types and Karstscape Chronology

As displayed below in **Table 6.2**, the earliest recorded use of the Pacbitun karstscape occurred in Actun Lak during the Late Preclassic period (300 B.C. - 100 B.C.) as represented by the presence of Flor Cream and Sierra Red types. However, the latter continued into the Early Classic in the Belize Valley, as did both at Tikal, indicating their appearance in the cave only suggests use at that early time (Awe and Helmke 2005:48; Culbert 1993). The Protoclassic period (100 B.C.- A.D. 250) is represented in more karst features, and by a larger quantity of types than the Late Preclassic –including Aguacate Orange, Chan Pond, Negroman Punctated-incised, Hewlett Bank Unslipped, and San Felipe Brown. Of these, Chan Pond and Negroman Punctated-incised, both belonging to the Chan Group of Tumbac Unslipped ware, as well as Hewlett Bank Unslipped warrant

Table 6.2.Ceramic groups, type and variety names identified in the Pacbitun karstscape features (after Gifford 1976).

Group	Type	Lak	Nohoch Tunich	Naj Che	Balam	Bosh Tunich	Crystal Palace	Hayach Naj	Ch'e'ehem	Kix Och	K'oxol	Merech	Sinan	Slate Cave	Subuul	Xtuyul	Tzul's Cave
Late Preclassic Period (300 B.C.–100 B.C.)																	
Flor	Flor Cream	*															
Sierra	Sierra Red	*															
Protoclassic Period (100 B.C.-A.D. 250)																	
Aguacate (?)	Aguacate Orange	*															
Chan Pond	Chan Pond	*															
	Negroman Punctated-incised	*													*		
Hewlett Bank	Hewlett Bank Unslipped: unspecified	*														*	
	Hewlett Bank Unslipped: unspecified (orange)	*															
	Hewlett Bank Unslipped: unspecified (red)	*															
San Felipe	San Felipe Brown	*															
Early Classic Period (A.D. 250-600)																	
Actuncan- Dos Arroyos	Dos Arroyos Orange polychrome	*	*	*		*	*							*			
	Indeterminate	*	*														
Aguila	Aguila Orange	*	*	*				*							*		
	Indeterminate																
Balanza	Balanza Black	*	*	*								*				*	
	Lucha Incised	*	*														
	Indeterminate	*	*	*													
Dos Hermanos	Dos Hermanos Red	*	*	*													
Fowler	Indeterminate			*													

Group	Type	Lak	Nohoch Tunich	Naj Che	Balam	Bosh Tunich	Crystal Palace	Hayach Naj	Ch'e'ehem	Kix Och	K'oxol	Merech	Sinan	Slate Cave	Subuul	Xtuyul	Tzul's Cave
Minanha	Minanha Red	*									*						
Pucte	Pucte Brown	*	*														
	Chorro Fluted			*													
	Sta. Teresa Incised: Sta. Teresa	*	*														
	Indeterminate		*	*													
Early Late Classic Period (A.D. 600-700)																	
Macal	Macal Orange-red	*															
Mountain Pine Red	Mountain Pine Red: unspecified		*	*													
	Mountain Pine Red: Old Jim	*															
	Rosario Incised	*															
	Indeterminate	*															
Mt. Maloney Black	Mt. Maloney Black (Samal)	*		*		*											
Saxche-Palmar	Saxche Orange Polychrome	*	*						*								
	Sibal Buff polychrome	*															
Sotero	Sotero Red-brown	*		*													
	Orange-walk Incised			*													
Teakettle Bank	Teakettle Bank Black	*															
Late Late Classic Period (A.D. 700-900)																	
Achote	Achote Black	*		*													
	Cubeta Incised	*		*													
Altar	Altar Orange	*															
Belize	Belize Red: unspecified	*				*				*	*						*
	Belize Red Incised	*		*													*

Group	Type	Lak	Nohoch Tunich	Naj Che	Balam	Bosh Tunich	Crystal Palace	Hayach Naj	Ch'e'ehem	Kix Och	K'oxol	Merech	Sinan	Slate Cave	Subuul	Xtuyul	Tzul's Cave
Belize	Gallinero Fluted	*													*		
	Martins Incised	*															
	McRae Impressed	*															
	Planton Punctated -incised	*															
	Puhui-zibal Composite																*
	Indeterminate	*	*	*													
Cayo	Alexanders Unslipped: Beaverdam	*											*				
	Alexanders Unslipped: unspecified	*		*	*	*						*					*
	Cayo Unslipped	*	*	*	*	*		*	*	*	*	*		*	*	*	*
Chunhuitz	Chunhuitz Orange	*								*							
	Xunantunich Black-on -orange	*															
	Benque Viejo Polychrome	*	*					*				*					
	Indeterminate	*	*	*													
Danta	Joyac Cream polychrome	*	*														
Dolphin Head	Dolphin Head Red	*	*	*	*	*		*	*	*	*	*		*	*		*
	Silver Creek Impressed	*															
Garbutt Creek	Garbutt Creek Red	*	*	*	*					*							*
	Rubber Camp Brown	*	*	*						*				*			
	Indeterminate	*															
Macaw Bank	Macaw Bank Self-slipped	*	*	*		*		*						*	*	*	
	Indeterminate	*	*														
Meditation	Meditation Black	*	*														

Group	Type	Lak	Nohoch Tunich	Naj Che	Balam	Bosh Tunich	Crystal Palace	Hayach Naj	Ch'e'ehem	Kix Och	K'oxol	Merech	Sinan	Slate Cave	Subuul	Xtuyul	Tzul's Cave
Mt. Maloney Black	Mt. Maloney Black (Hats' Chak)	*	*	*													
	Mt. Maloney Black (Tsak')	*	*	*													
	Mt. Maloney Black: unspecified	*	*	*	*		*		*							*	*
Saxche-Palmar	Paixban Buff Polychrome	*						*									
	Palmar Orange Polychrome	*						*									
	Tunich Red-on-orange	*															
	Zacatel Cream polychrome	*															
	Indeterminate	*	*	*													
Tu-tu Camp	Tu-tu Camp Striated	*	*	*													
Vaca Falls	Vaca Falls Red	*	*		*												
Yaha Creek	Yaha Creek Cream	*														*	
Yalbac	Yalbac Smudged Brown	*	*														
Early Postclassic period (A.D. 900-1200)																	
Augustine	Augustine Red	*	*	*													
	Swallow Black-on-red	*															
Daylight	Daylight Orange: Daylight		*														
More Force	More Force Unslipped	*															

Table 6.3: Tabulation of vessel forms recovered from the intensively investigated features in the Pacbitun karstscape.

	Actun Lak	Actun Nohoch Tunich	Actun Naj Che	Actun Subuul	Actun Xtuyul	Actun Jcheehem	Totals
Jar	2457 (50%)	257 (69%)	165 (64%)	77 (77%)	46 (78%)	23 (88.5%)	3025 (53%)
Bowl	1678 (34%)	48 (13%)	39 (15%)	4 (4%)	11 (18.5%)	-	1780 (31%)
Dish	667 (13.5%)	63 (17%)	39 (15%)	16 (16%	-	3 (11.5%)	788 (14%)
Plate	49 (1%)	-	-	1 (1%)	1 (1.5%)	-	51 (0.8%)
Vase	20 (0.4%)	4 (1%)	13 (5%)	-	-	-	37 (0.6%)
Lid	6 (0.1%)	-	-	-	-	-	6 (0.1%)
"Brandy Snifter"	8 (0.1%)	-	-	-	-	-	8 (0.1%)
Other	5 (0.1%)	2 (0.5%)	1 (0.3%)	-	1 (1.5%)	-	(0.1%)
Total	4890	374	257	98	59	26	5704

further discussion because of their chronological complications and significance to this study detailed below.

Difficulties exist with differentiating the ceramic types and groups of the Tumbac Unslipped Wares, including Protoclassic period Chan Pond and Negroman Punctated-incised specimens, and their relation to the late Late Classic period Macaw Bank Group. The former two are closely related types distinguished by surface decoration, although the differences in these modifications are fuzzy from their original descriptions, which stated that both are decorated with punctations, but only the latter has incisions (Gifford 1976:150). I differentiate between the two by placing specimens that have rectilinear chains of punctations in the Chan Pond type, and those with curvilinear incisions and

similarly meandering chains of punctations into the Negroman Punctated-incised category.

A further complication arises with distinguishing these two types from the Macaw Bank ceramic Group, which at Xunantunich closely resembles the Negroman Punctated-incised type (LeCount 1996:381). The primary differences between the two is the former is slipped and found in Late-to-Terminal Classic period deposits at that site, while the latter dates to the Protoclassic. Both share coarse, micaceous pastes, and they have distinctive curvilinear decorations unknown on other ceramic types, making them Alternatively, there may be continuity between the two groups, particularly because pre-Hispanic Maya used caves primarily as ritual locations, as discussed in Chapter 4. By their very nature, rituals are conservative actions that depend in part on maintaining anachronistic traditions, including the objects used in them. For example, contemporary British judges donning wigs, robes, buckled shoes, and breeches popular in the 17th century, or by replicating a mythological feast attended by Puritans and their Native American neighbors by eating the same meal, turkey and corn, on the Thanksgiving holiday (Bell 1997:145-147; Kyriakidis 2007:16). Although archaeologists tend to classify unslipped vessels such as those in the Chan Pond Group as domestic wares when found in settlements, the pots are often smudged with copal residue in cave contexts, suggesting they had ritual functions there (Ball and Taschek 2004:158; Brady 1989:212; LeCount 2010b:226).

Gifford (1976:149) placed the Chan Pond Group into the Floral Park (ca A.D. 1-A.D. 250) complex, which began in the Protoclassic period and ended at the start of the

Early Classic. Nevertheless, several archaeologists have noted that the ceramic chronologies employed throughout the southern Maya Lowlands have a central Peten elite tomb bias where distinct changes in assemblages clearly mark temporal horizons, while in surrounding regions some pottery modes continued into later periods (Awe 1992; Awe and Helmke 2005; Ball and Taschek 2004; Brady et al. 1998; Laporte 2007; Laporte and Mejia 2006; LeCount and Blitz 2005). Significant for the present discussion is that the Chan Pond Group has been found in the Upper Belize Valley along with other Early Classic horizon markers indicating its continuity into that time. Specifically, the Chan Pond ceramic tradition survived until sometime between A.D. 240 and 420 at the Buenavista del Cayo site, located approximately 15 km northwest of Pacbitun (Ball and Taschek 2004:157). Aimers (2011:268) notes the possibility that it may even continue into the Late Classic period but does not discuss the evidence for it. On the other hand, the Macaw Bank Group is most heavily represented at Xunantunich in the early Late Classic period Samal phase (A.D. 600-670) but continues to appear into the Terminal Classic Tsak' phase (A.D. 780-890) there (LeCount 1996:Table 5.9). These data thus suggest that Chan Pond and Macaw Bank may be aspects of the same long-lived group originating sometime in the Protoclassic period and persisting relatively unchanged through the end of the Classic period.

The Hewlett Bank Unslipped Group belonging to an unspecified ware is discussed further here because it comprises the largest subset of identified material from my investigations in the Pacbitun karstscape by nearly threefold, but it is also the most geographically restricted. Specifically, most of the pieces (974 out of 1017) were from

Actun Lak Unit 4, directly abutting the modified stalagmite cluster and river cobble pavement in the middle of Chamber 1. All but six of the remainder was recovered from Units 5, 8, and 9 in Actun Lak, the latter two pits of which were placed in a shallow alcove next to the stalagmite cluster. The other six specimens were recovered in Actun Xtuyul Unit 2. In addition to the caves listed above, they are often in caches throughout the Belize Valley, indicating that they were general purpose "ritual vessels" (Awe and Helmke 2005). Their overwhelming presence in Actun Lak reaffirms this specialized use but their highly restricted distribution to the speleothem and pavement cluster suggests that the Maya purposefully selected those bowls for specific rituals in that area. Furthermore, they are crudely made and lack production standardization overall, suggesting either that non-specialists made them on the household level, or were made quickly (**Figure 154**). The quantity of material recovered indicates that all community members used the stalagmite area in Actun Lak intensively, but the ceremonies were likely personal affairs. Lastly, Joe Ball (cited in Brady et al. 1998:note 9; personal communication 2013) believes that the original assignment of this type to the local equivalent of the Uaxactun Tzakol 1 complex (ca. A.D. 278- 360) is too restricted. Instead, he suggests a refined range from A.D. 50/100 to A.D. 300/400, and prefers to classify it as diagnostic of the Floral Park ceramic complex rather than Hermitage, which I follow herein (Brady et al. 1998:note 9).

Early Classic period (A.D. 250-600) material was recovered from all of the karst features excavated (Actun Lak, the NTC, and Actun Naj Che) and was noted in most others, although minimally in some, indicating widespread and regular ritual use of the

karstscape. Ceramics identified from this period include those from the Dos Arroyos Group, Aguila Orange, Balanza Black, Lucha Incised, Dos Hermanos Red, Minanha Red, Pucte Brow, Chorro Fluted: Chorro, and Santa Teresa Incised: Santa Teresa. Only one sherd of Fowler Orange was recovered, while there were 45 pieces of Aguila Orange, and 50 from the Dos Arroyos Group. These findings are significant because the Fowler Group is considered the local Belize Valley equivalent of the Early Classic period glossy, orange-slipped wares including the Aguila and Dos Arroyos Groups (Brady et al. 1998:27). As such, some archaeologists have posited that the related Peten Gloss types are actually rare exotic imports to the region (Brady et al. 1998:26). The presence of the latter ceramics to the near exclusion of Fowler in the Pacbitun karstscape suggests that the distributional patterns of the pottery groups may be more complex than previously suggested, especially when paired with findings by the Petexbatun Regional Cave Survey. Specifically, Brady (2005c) concludes that the massive quantity of ceramics recovered from the Dos Pilas caverns indicates that subterranean rituals must have had a substantial impact on the ceramic economy of that region. Furthermore, Demarest (1997:218) observed that most of the exotic and tribute items imported to Dos Pilas wound up being ritually deposited in the caverns beneath the site rather than placed in caches or tombs. I propose that such a pattern may explain the prominence of Peten Gloss wares and lack of Fowler in the caves in the Belize Valley, and explain their relatively rare status in settlements, (Brady et al. 1998; LeCount et al. 2002:49). In other words, the Pacbitun karstscape data suggests that at least some subterranean locations were also the recipients of exotics.

Early Late Classic period (A.D. 600-700) Tiger Run phase ceramics are poorly represented in the karstscape assemblage, and only Macal Orange-red, Mountain Pine group, a modal variant of Mount Maloney Black, Saxche-Palmer-polychrome, Sotero Red-brown, and Teakettle Bank Black types were recovered. Each of these appear at Actun Lak; however, Macal Orange-red, two types from the Mountain Pine group, and Teakettle Bank Black are only found there. In Actun Naj Che, Mountain Pine Red, Mount Maloney Black, Sotero Red-brow, and Orange-walk Incised types suggest use during this century. For this time in Actun Nohoch Tunich, Mountain Pine Red is the sole representative. Whether this paucity of ceramics represents sampling error, or a hiatus in ritual practice is currently unknown, although a similar disruption documented at Chechem Ha Cave, 11 km to the southwest of Pacbitun, interpreted as the latter based on sedimentation, and a suite of radiocarbon dates (Moyes 2006b). The archaeologist investigating that cave notes that the hiatus corresponds to warfare events between the major centers Caracol and Naranjo, which the cavern is located directly between, proposing it may have been blocked off to prevent desecration (Moyes 2006b:227). Pacbitun is similarly located between the two centers, and the military events between the two could have plausibly impacted use of the karstscape, although none show evidence of blocked entrances.

During the last 200 years of the Late Classic period (A.D. 700-900), karstscape use increased by degrees of intensity, and ceramics from this time were found in all features. The pottery from this time include ceramic types from the Achote, Altar, Belize, Cayo, Chunhuitz, Danta, Dolphin Head, Garbutt Creek, Macaw Bank, Meditation, Mount

Maloney, Saxche-Palmar, Tu-tu Camp, Vaca Falls, Yaha Creek, and Yalbac Groups. Of these, the pottery from the Altar, Mountain Pine, and Mount Maloney Groups warrant specific discussion because they provide significant insight to the use of the karstscape, life histories of artifacts, and Pacbitun's socio-political affiliations at this time.

A single Altar Orange bowl recovered from a cache deep in Actun Lak, Terrace 1, represents the entirety of the Altar Group in the karstscape, and although only a single vessel, it provides the key to understanding the late Late Classic period use of that cavern, which I elaborate in Chapter 10. For the purposes the present discussion, Fine Orange pottery is significant because it demonstrates a Pacbitun connection to the greater Usumacinta region of Chiapas and adjacent areas of northwestern Guatemala during the Terminal Classic period (Bishop 1994, 2003, 2008, Bishop et al. 2005; Rands and Bishop 1980; Rands et al. 1982). However, more significantly is that it is a highly sensitive chronological marker, appearing rapidly throughout the southern Maya Lowlands between A.D. 820 and A.D. 830 (Demarest 1997:215; Foias and Bishop 1997:278; Rands 1974:35; Rands et al. 1982:Figure 31). These data thus establish a *terminus post quem* (not earlier than) date for the construction of the terrace, and, by extension, the modifications made to the entire Entrance Area and Entrance Platform due to their interconnectedness and creation during a single construction event, as detailed in Chapter 5. This date also matches a radiocarbon assay (770- 940 cal A.D.) collected from the rear of the cave, discussed more fully in Chapter 7, but for the present purposes, indicates use of the cave at this time revolved around a single ritual event or several closely timed ones performed only a few decades prior to Pacbitun's abandonment.

Another single artifact from the karstscape, a Rosario Incised sherd of the Mountain Pine Group from Actun Lak Ledge 4 Feature 1, adds to discussions of the practice of symbolic vessel "killing" by way of removing a chip from a rim. The interior of the sherd and part of the rim with a flake scar is covered in calcium carbonate, and a visual inspection of the two modifications indicates this event happening after the mineral accretion, because the stone coating ends along the fracture planes of the chip, and it is absent on the exposed core (**Figure 155**). That the "termination" occurred after the calcium carbonate had grown on the vessel indicates that its location on the ledge was a secondary context. The sherd must have been located below an area of active drip water within a karst environment for a significant length of time for the mineral to grow. The chamber below the ledge is the most likely place, but such processes also occur in any limestone environment, including architectural contexts such as tombs, burials, and caches in surface sites. Either way, the spot of recovery is relatively dry compared to the chamber below, and therefore, the sherd must have been placed there sometime after the mineral had grown. All other pieces of it were absent in the recovery area indicating that the sherd itself was part of a ceremonial offering, and that the ledge may have been part of a ritual circuit within the cave (Moyes 2000, 2005a).

The significance of the Mount Maloney Group in the Pacbitun karstscape is discussed more fully below; however, suffice it to say for now that this pottery type is strongly affiliated with the Xunantunich polity in the Late Classic period, and its presence verifies a heretofore only speculated connection between the two centers (Ashmore et al. 2004; Connell 2000, 2010; Healy et al. 2004; LeCount 1999, 2010b; LeCount et al.

2002). This type is also a sensitive chronological marker for Xunantunich and its surrounding communities (LeCount 1996:Figure 5.6; Thompson 1942). In particular, its rims trend from near vertical when the type appears in the Samal phase (A.D. 600-670), to oblique during Hats' Chaak times (A.D. 670-780), and ends as horizontal during the Tsak' stage (A.D.780-890; LeCount 1996:Figure 5.6). Each of those varieties is represented in the Pacbitun karstscape, although variably so. When sorting by rims recovered during excavations, Mount Maloney Black bowls affiliated with Hats' Chaak are best represented totaling sixteen samples, while those from Samal follow closely in second with ten, and those with Tsak' are the least so with six (**Chart 6.1**). Although these totals are small, adding surface collection data clarifies the distributions, which can then be used as a proxy to measure the intensity of the connections between the two centers. Quantifying the data from both excavations and surface collections in the karstscape reveals that most of the Mount Maloney Black bowls appear in the Pacbitun region during Xunantunich's florescence in the Hats' Chaak phase, and although the other two varieties were present, their numbers are significantly lower, as shown below in **Chart 6.2**. Overall, the results of my analysis of this group suggest that the inhabitants of the two centers interacted throughout the Late Classic period, although most strongly during the time of Xunantunich's florescence that coincided with the defeat of Caracol hegemony in the region and the reemergence of the Naranjo royal dynasty, as discussed more fully below (Ashmore 2010:55; Martin and Grube 2008:73, 95).

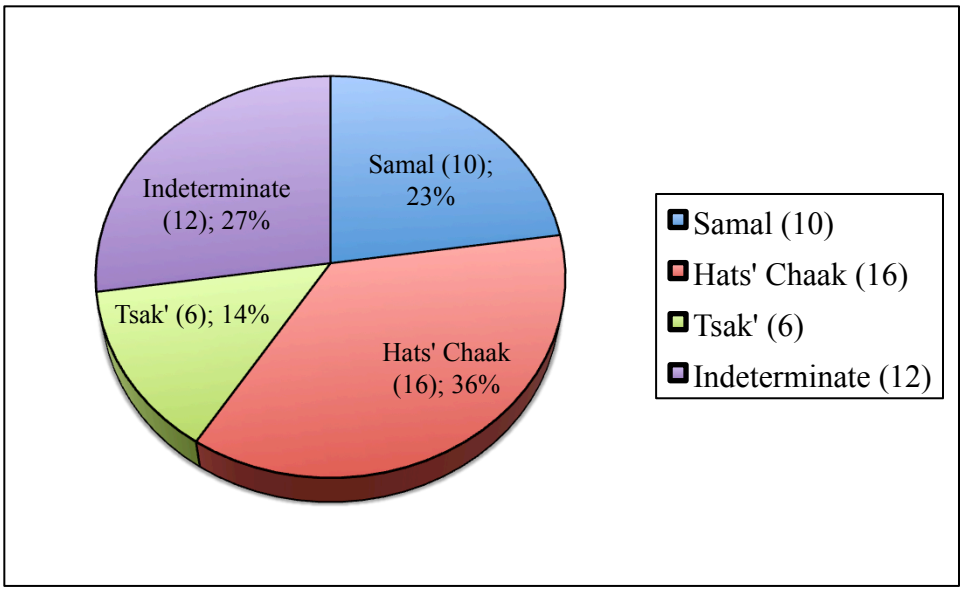

Chart 6.1. Mount Maloney Black bowl rims from excavations. Numbers in parentheses indicate specimen counts.

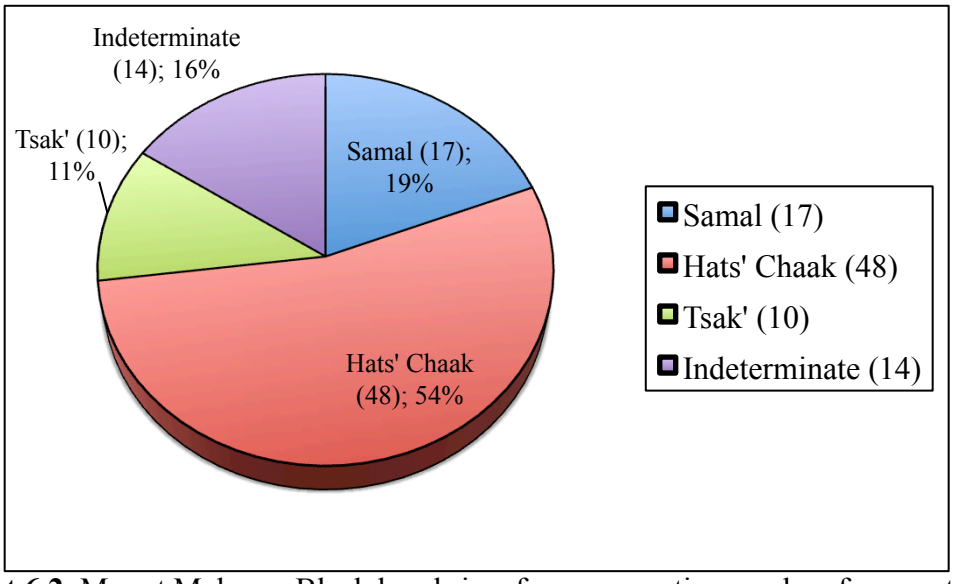

Chart 6.2. Mount Maloney Black bowl rims from excavations and surface contexts. Numbers in parentheses indicate specimen counts.

Following the Late Classic period florescence, ritual performance in the karstscape all but ceases in the Early Postclassic period (A.D. 900-1200). Nevertheless, 31 total sherds from the Augustine, Daylight, and Moreforce groups were recovered from Actun Lak, Actun Naj Che, and Actun Nohoch Tunich, suggesting ritual continuity through the Early Postclassic period. These findings are significant because they challenge previous findings at Pacbitun, indicating the region was abandoned at the end of the Late Classic (Healy 1990a:259; Healy et al. 2007; Healy et al. 2004:208; Terry Powis, personal communication 2013). Furthermore the presence of this late material in all three of the intensively excavated karst features suggests that it is likely more common in the karstscape than uncovered in my less exhaustive investigations elsewhere.

To summarize briefly before moving on to discuss the INAA, the results of my TVM analysis indicate the Maya began using the karstscape as early as the Late Preclassic period, continuing in greatly reduced levels through the Early Postclassic, but most intensely during the final two centuries of the Late Classic. Actun Lak follows this pattern except there is also evidence of an extensive Protoclassic to Early Classic period spike in use, particularly around the central stalagmite cluster and river cobble pavement in Chamber 1. The analysis also demonstrates all excavated modifications date to the Terminal Classic period, while the presence of an Altar Orange bowl in the bottom of Terrace 1 in Actun Lak provides a temporal anchor indicating that the Maya constructed all architecture in the Entrance Area, and on the hillside after A.D. 820 (Foias and Bishop 1997:278). On a regional scale, ties to networks in the southern Maya Lowlands are obvious throughout the use history of the karstscape as indicated by the regular

appearance of Paso Caballo Waxy and Peten Gloss wares, although local Belize Valley ceramics become prominent in the Protoclassic period and continue to dominate the assemblage throughout the Classic. Nevertheless, the results of the INAA study discussed below, suggests that these Central Peten wares were actually locally produced rather than imported, indicating that the technology and knowledge was obtained from that area, rather than the actual vessels themselves. Lastly, the Mount Maloney Black type is one of the local wares regularly encountered in the karstscape, although it is largely absent in Pacbitun settlement contexts. This pottery type is closely affiliated with the Xunantunich polity, and it presence in the karstscape substantiates a heretofore only speculated connection between the two centers (Connell 2000, 2010; Healy et al. 2004; LeCount 1996, 2010a, 2010b; LeCount et al. 2002; Thompson 1942).

INAA Overview

Assumptions

Instrumental Neutron Activation Analysis (INAA) is a nuclear process that is used for determining elemental concentrations in ceramic specimens from an assemblage. Analyzed specimens are then grouped together in some numerical matter that permits inferences to be made concerning their origins at both inter- and intra-regional levels

(Bishop 1980:47). Data from INAA can be useful for reconstructing trade networks and identifying specific pottery workshops, which in turn can help inform about socioeconomic and political organization (Bishop 1980:47; Bishop et al. 1988; Perlman and Asaro 1969; Rands and Bishop 1980; Reents-Budet et al. 1994; Sayre et al. 1957). Three main assumptions underlie the process. The first is that pottery is a heterogeneous system of several different plastic and nonplastic components —including clay, tempering agents, water, and other impurities and trace elements (Arnold et al. 1991:71; Bishop 1980:49; Glascock 1992:11). The constituent elements of these parts can be "read" to determine the chemical signatures of ceramic objects, otherwise known as the compositional profile.

The second assumption is the "provenience postulate" (Weigand et al. 1977:24; see also Bishop 1980:48; Bishop and Blackman 2002:604). This idea holds that although each ceramic object is a unique combination of constituent elements, the differences in chemical signatures of pottery from one source will be less than the differences between those from others because of raw materials used, idiosyncratic practices, and localized compositions of resources used, and that these dissimilarities will be reflected in the compositional profiles (Arnold et al. 1991; Ball 1993; Bishop 1980:48). Similarities are clustered together using multivariate statistical analyses in developing "ceramic groups," that is, pottery coming from a single source (Bishop 1980; Bishop et al. 1988; Bishop et al. 1982; Bishop et al. 1982:306; Glascock 1992; Rands and Bishop 1980). "Source" in this context is a complex notion that often refers to a spatial designation other than the mine from which the parent clay originated. Linking a pottery group to a particular clay

resource is difficult because ceramic production includes a variety of techniques that can alter the chemical signature of the parent material including adding tempering agents, removing particles by levigation, firing practices, use, and other post-discard processes (Arnold et al. 1991:71). Instead, "source" depends on the particular study and availability and quality of data and can refer to a specific location within an archaeological site such as a particular workshop, or more generally to a potter community, a region, or even just distinguishing between local and non-local materials (Arnold et al. 1991; Reents-Budet 2000; Reents-Budet and Bishop 2003; Reents-Budet et al. 1994).

The final assumption is the "archaeological criterion of abundance," which is related to the provenience postulate. This assumption holds that the abundance of similar chemical signatures in a particular ceramic assemblage highlights the pottery that is most likely to have originated from that site (Bishop 1980:48). Put another way, there is a greater chance that a chemical signature was produced a particular site the more prominent it is in that local assemblage compared to other locations.

Sampling method and analytical procedures

The techniques described in this section summarize those used in the National Institute of Standards and Technology (NIST)-Smithsonian INAA laboratory as described by Blackman and Bishop (2007:324), and from conversations with Ronald Bishop (Smithsonian Institution) and Erin Sears (University of Kentucky). The laboratory process begins by grinding the broken edge of a sherd with a tungsten carbide burr,

removing any surface contaminates. Next, 400 mg of powder is collected from the core of the specimen by drilling with a tungsten carbide bit. That material is stored in a cleaned polyethylene container, dried in an oven for 24 hours, and then subsampled and weighed. This process is repeated for each specimen, and both the burr and bit are cleaned after collecting each sample. The powder samples and samples of reference standards of known concentrations for the element of interest are introduced to the NIST nuclear research reactor and irradiated for 4 h (Blackman and Bishop 2007:324). This process produces specific radioactive isotopes of the constituent elements present in the specimen, many of which emit gamma rays with unique energy signatures as they decay according to specific isotopic half-life (see Neff 2000 for detailed discussion of this chemical process). The sample's elemental abundances are calculated by counting the emitted rays over time and then comparing the counts to those obtained by the analyzed reference standards (Neff 2000). The counting process may be repeated after an appropriate waiting period. The standard practice of the NIST-Smithsonian INAA lab allows the irradiated samples to decay for six days and then the emitted gamma rays are counted for 65 minutes. They are then allowed to decay for another three weeks, and then the gamma rays from the longer-lived isotopes are counted again for 130 minutes, now having less background "noise." Isotopes of elements with half-lives of less than 12 hours are not regularly quantified, but the overall process routinely identifies between 20 and 30 trace elements per sample (see Blackman and Bishop 2007:Table 1, and Glascock 1992:Table 2.1 for commonly identified elements). For the present study, 21 elements were recorded as shown below in **Table 6.4**.

Table 6.4. Constituent elements identified in Pacbitun ceramics.

Element abbreviation	Element name
Na	Sodium
K	Potassium
Ca	Calcium
Sc	Scandium
Cr	Chromium
Fe	Iron
Co	Cobalt
Zn	Zinc
Rb	Rubidium
Sb	Antimony
Cs	Cesium
Ba	Barium
La	Lanthanum
Ce	Cerium
Sm	Samarium
Eu	Europium
Yb	Ytterbium
Lu	Lutetium
Hf	Hafnum
Ta	Tantalum
Th	Thorium

After identifying the elements, their abundances within the sample are calculated using a standard, resulting in identifying the sherd's chemical fingerprint (Neff 2000:97). Multivariate statistical analyses on the accumulated set of chemical fingerprints then identify pottery groups guided by the concept of the criterion of abundance discussed above (see Glascock 1992 for discussion of the models used). Applying the provenience postulate to the data allows for determinations of local and imported pottery. Those that occur most regularly are considered local, and those that are infrequent may be non-local, or unusual recipes (Bishop et al. 1988; Perlman and Asaro 1969:30-34). These data are then compared to and incorporated in the Smithsonian database of Maya ceramics,

consisting of more than 45,000 samples (Ronald Bishop, personal communication 2014). Comparing the old and new data sets allows for previously unprovenienced ceramic groups in the database potentially to be located to the tested source, novel ones to be recognized, and to determine where newly sampled nonlocal pottery likely originated, if matches are made (Glascock 1992:16).

Pacbitun Karstscape INAA Sample Selection and Results

Sample Selection

Samples chosen for this study, their quantities, and derived clusters are listed in **Table 6.5**. A range of specimens likely produced at Pacbitun, and those that are likely imported from nearby centers in the Belize Valley were selected to assist defining the local signature, and to determine regional socio-political interactions. Specifically, material was gathered from contexts currently under investigation by other PRAP members throughout the Pacbitun territory, providing a baseline against which the karstscape material could be compared. Samples selected from those assemblages include decorated carbonate and other ash tempered specimens found in both cave and settlement contexts. Non-cave samples are from Structure 3 in the epicenter of the site, the

Table 6.5. Type name, provenience, number of ceramic specimens selected for INAA treatment, and identified Pacbitun compositional groups. Three-letter provenience abbreviations refer to the following locations: Lak=Actun Lak; Naj=Actun Naj Che; Noh= Actun Nohoch Tunich; Xtu=Actun Xtuyul; Jch=Actun Jcheehem; Pac=Pacbitun; Spp= Sak Pol Pak; Mai=Mai Causeway; Tzu=Tzul Causeway. "Comp. cluster" indicates the name of the compositional cluster that the ceramics belong to. Two or more names in this column indicate that those samples belong to separate groups. A "/" in that column indicates a specimen that has not yet been irradiated.

Provenience	Ceramic Type	# of samples	Comp. cluster
Lak Ledge 3	Aguila Orange	1	D2
	Balanza Black	1	S
	Dolphin Head Red	1	C
Lak Terrace 1	Garbutt Creek Red	1	/
	Martins Incised	1	/
Lak Stalag pave	Belize Group	1	A
	Balanza Black	1	S
	Augustine Group	2	I
	Dos Arroyos	1	D2
	Garbutt Creek Red	1	K
	Mount Maloney Black:Samal	1	F
	Mount Maloney Black: Hats' Chaak	2	F, H
Lak Chamber 1 GSC	Sparrow Black-on-orange	1	I
	Sierra Red	1	F
	Saxche Palmar	1	E
	Aguila Orange	2	D2
	Paixban Buff Polychrome	2	A, K
Lak Ent Pass S Wall	Joyac Cream Polychrome	1	M
	Santa Teresa Incised	1	A
	Rubber Camp Brown	1	D1
	Benque Viejo Polychrome	1	K
	Dolphin Head Red	1	D1
Lak Chamber 1 Drop	Flor Cream	1	B
	Xunantunich Black-on-orange	1	K
Lak Chamber 3	Dos Arroyos	1	F
Lak Ent Pass N Wall	Planton Punctated Incised	1	C
Lak 1-1	Rubber Camp Brown	1	D1
Lak 2-1	Mountain Pine Red	1	I
Lak 3-Surface	Aguila Orange	1	D2
	Flor Cream	1	F
	Santa Teresa Incised	1	B
Lak 3-1	Dos Arroyos lid	1	O
Lak 4-1	Sierra Red	1	F
	Dos Arroyos	1	X3
Lak 5-1	Saxche Palmar	1	Q

Provenience	Ceramic Type	# of samples	Comp. cluster
Lak 5-2	Gallinero Fluted	1	I
	Benque Viejo Polychrome	1	F
Lak 5-3	Macal Orange-on-red	1	A
	Santa Teresa Incised	1	R2
	Dolphin Head Red	3	D1, I, K
	Zacatel Cream Polychrome	1	J1
Lak 5-4	Benque Viejo Polychrome	1	M
	Dos Arroyos	2	D2, F
	Sibal Buff polychrome	1	R1
Lak 5-5	Tunich Red-on-orange	1	L
	Rubber Camp Brown	1	D1
Lak 5-6	Altar Orange	1	/
	Sierra Red	1	/
	Meditation Black	1	/
	Augustine Group	1	/
Lak 11-1	Saxche Palmar	1	L
	Benque Viejo Polychrome	2	J2, N
Lak 13-1	Indeterminate vitrified, incised, and punctated	1	E
Naj 2-3	Saxche Palmar	1	I
	Mount Maloney Black: Hats' Chaak	1	F
Naj 3-4	Achote Black	1	I
Noh GSC	Dolphin Head Red	1	/
	Mount Maloney Black: Hats' Chaak	1	/
Noh 2-1	Saxche Palmar	1	X
Noh 3-3	Santa Teresa Incised	1	F
Noh 6-1	Lucha Incised	2	Q
	Saxche Palmar	1	K
Noh 7-1	Balanza Group	2	/
	Augustine Group	1	K
Noh 7-2	Santa Teresa Incised	1	Q
Lak Ent Pass W Wall	Mount Malone Black: Tsak'	1	D1
	Mount Maloney Black: Samal	1	F
Xtu GSC	Molded carved mold	1	M
Jch GSC	Saxche Palmar	1	K
Pac Str 3 1-3	Yalbac Smudged Brown	2	D1
	Belize Group	2	C
	Sierra Red	2	F
	Spout	1	E
	Meditation Black	2	B
	Dolphin Head Red	1	F
Pac Str 3 2-1	Meditation Black	2	/
Pac Str 3 1-4	Planton Punctated Incised	1	C
Spp 1-1	Minanha Red	1	F

Provenience	Ceramic Type	# of samples	Comp. cluster
Spp 1-2	Minanha Red	1	F
Spp 2-1	Dolphin Head Red	1	F
	Red bowl	1	F
Spp 7-2	Mount Maloney Black: Samal	2	F, H
	Dolphin Head Red	1	F
	Balanza Group	1	F
Spp 6-1	Belize Group	1	I
Spp 8-1	Silver Creek Impressed	1	G
Spp 4-2	Figurine	1	F
	Dolphin Head Red	1	D2
Spp 8-2	Dolphin Head Red	1	F
	Garbutt Creek Red	1	F
Spp 3-4	Mount Maloney Black: Tsak	1	F
	Meditation Black	1	E
Mai Str 10 1-1	Cayo Unslipped Censer	1	G
Mai Str 10 1-2	Belize Red	1	D2
	Mount Maloney Black: unspecified	1	D2
	Dolphin Head Red	1	E
	Planton Punctated-incised	1	E
Mai M1 L3	Dolphin Head Red	1	X4
Mai M2 L2	Sierra Red	2	/
	Unknown	1	/
Tzu TL4 L2	Belize Red	1	K
	Dolphin Head red	3	C, D2
	Lucha Incised	1	B
	Cubeta Incised	1	P
Tzu TL4 L1	Mount Maloney Black: unspecified	1	/
	Total	**123**	

secondary center of Sak Pol Pak located three km to the southwest of Pacbitun, and a few from the sacbe system and accompanying pyramidal terminus complex, Structure 10, in the outskirts of Pacbitun's center (Conlon 1999; Micheletti and Stanchley 2014; Reece 2012; Spenard et al. 2012; Weber 2012). A second set of specimens was selected from ceramic groups commonly thought to have been exchanged throughout the greater Peten

and Belize Valley regions (Foias 2002; LeCount 1999). Specifically, I concentrated on materials belonging to the Peten Gloss and Paso Caballo Waxy ceramic wares that have strong affiliations to central Guatemala, the most likely to have been imported to the Pacbitun region from that area (Actuncan-Dos Arroyos, Aguila, Balanza, Flor, Pucte, Saxche-Palmar, Sierra Red, etc.).

Once the compositional data were collected, they were subjected to multivariate statistical analysis, identifying 27 distinct ceramic compositional clusters. Each of these is labeled using an alphanumeric system providing unique letter "names" to each cluster (e.g. "F"). Several of the clusters are closely related, but remain statistically distinct. In such cases, they are given the same group letter name to reflect the similarity, but also a unique number within the supergroup, distinguishing them (e.g. "D1," "D2"). Lastly, the groups were compared to the Smithsonian INAA database to determine if they clustered with any previously recorded with the goal of identifying and sourcing imported pottery.

Results

Overall, the study found that all but one of the sherds sampled were either locally produced at Pacbitun, within the Belize Valley, or were compositional outliers, even the Paso Caballo Waxy and Peten Gloss wares, and four of the 27 groups were most likely produced in and around Pacbitun (Ronald Bishop, personal communication 2014). These four groups contain specimens from all sampled contexts indicating that local people used Pacbitun's karstscape (**Table 6.6**). These data also suggest that long-distance

Table 6.6. Ceramic compositional groups local to Pacbitun region. Provenience abbreviations are the same as Table 6.5. Ceramic phases are abbreviated as follows: BC (Barton Creek), H (Hermitage), SL (Spanish Lookout).

Cluster	Ceramic Group/type	Provenience	Phase
C	Planton Punctated-Incised	Lak Ent Pass, N Wall,	SL
	Dolphin Head Red	Lak Ledge 3	SL
	Dolphin Head Red	Tzu TL4 L2	SL
	Dolphin Head Red	Tzu TL4 L2	SL
	Belize Group	Pac Str 3 1-4	SL
	Belize Group	Pac Str 3 1-3	SL
	Belize Group	Pac Str 3 1-3	SL
D1	Rubber Camp Brown	Lak 5-5	SL
	Mount Maloney Black: Tsak'	Lak Ent Pass W Wall	SL
	Dolphin Head Red	Lak 5-3	SL
	Yalbac Smudged-brown	Pac Str 3 1-3	SL
	Rubber Camp Brown	Lak 1-1	SL
	Dolphin Head Red	Lak Ent Pass S Wall	SL
	Rubber Camp Brown	Lak Ent Pass S Wall	SL
	Yalbac Smudged-brown	Pac Str 3 1-3	SL
D2	Belize Red	Mai Str 10 1-2	SL
	Dolphin Head Red	Tzu TL4 L2	SL
	Aguila Orange	Lak Chamber 1 GSC	H
	Dolphin Head Red	Spp 4-2	SL
	Dos Arroyos Orange-polychrome	Lak Stalag pave	H
	Aguila Orange	Lak Ledge 3	H
	Aguila Orange	Lak Chamber 1 GSC	H
	Dos Arroyos Orange-polychrome	Lak 5-4	H
	Mount Maloney Black: Unspecified	Mai Str 10 1-2	SL
	Aguila Orange	Lak 3-Surf	H
F	Dos Arroyos Orange-polychrome	Lak 5-4	H
	Mount Maloney Black: Tsak'	Spp 3-4	SL
	Mount Maloney Black: Samal	Spp 7-2	SL
	Mount Maloney Black: Hats' Chaak	Lak Stalag pave	SL
	Flor Cream	Lak 3-Surf	BC
	Garbutt Creek Red	Spp 8-2	SL
	Mount Maloney Black: Samal	Lak Stalag pave	SL
	Santa Teresa Incised	Noh 3-3	H
	Figurine	Spp 4-2	IND
	Dolphin Head Red	Spp 8-2	SL
	Mount Maloney Black: Tsak'	Naj 2-3	SL
	Roaring Creek Red	Spp 7-2	SL
	Sierra Red	Lak 4-1	BC
	Minanha Red	Spp 2-1	H
	Minanha Red	Spp 1-2	H
	Minanha Red	Spp 1-1	H
	Dolphin Head Red	Spp 7-2	SL
	Dolphin Head Red	Pac Str 3 1-3	SL
	Sierra Red	Pac Str 3 1-3	BC
	Dolphin Head Red	Spp 2-1	SL
	Dos Arroyos Orange-polychrome	Lak CH 3 Entrance	H
	Sierra Red	Lak Chamber 1 N. Wall	BC
	Benque Viejo polychrome	Lak 5-2	SL

pilgrimages to those subterranean areas sampled were unlikely, although they are insufficient to rule it out completely as foreign visitors may have acquired locally produced goods (Woodfill 2007, 2010).

Mixing of differently tempered wares within the clusters is present throughout the sampled assemblage, although those likely from Pacbitun, C, D1, D2, and F, are less so. In particular, both C and D1 are purely carbonate and ash tempered wares from the Spanish Lookout phase. Cluster F is the largest group and consists primarily of carbonate-tempered wares, as well as a few fine paste Peten Gloss specimens. This suggests that additional subdivision might be possible with additional sampling. Those materials date from the Late Preclassic/Early Classic through Terminal Classic periods, also making it the longest lasting group. D2 is primarily composed of fine-tempered, Hermitage phase Peten Gloss wares although a few Spanish Lookout phase carbonate and ash wares are present. Overall, C and D have heavy carbonate components, as does F, but the latter significantly less so (Ronald Bishop, personal communication 2014). In general, the derived cluster, although populated too sparsely to be susceptible to rigorous statistical evaluation, allows one to infer that the local clayey sediments were used to which was added various classes of tempering materials.

Only one non-local sherd was identified when comparing the data set to the Smithsonian database, a Dos Arroyos lid piece recovered from Actun Lak 3-1 (**Figure 156**). Its chemical signature suggests that it came from the Tikal-Uaxactun area of the central Peten, although the attribution is not tight (Ronald Bishop, personal communication 2014). The lack of other imported specimens in the remainder of the

material prevents any discussion of Pacbitun's long-distance ceramic exchange networks from any time except to note that it was primarily local to the Belize Valley.

A Ceramic Approach to Late Classic Period Geopolitics of the Belize Valley and southern Maya Lowlands

In Chapter 3, I proposed a model of geopolitical territorial organization for the Northern Boundary Fault polities in central Belize based on recently acquired settlement data. The question that remains is, does this settlement pattern represent actual political territories that the pre-Hispanic Maya would have recognized? The answer to this question hinges on the recognition by archaeologists and ethnographers that Maya community identity was often expressed materially through crafting, such as the production of pottery, and that ritual was vital to group cohesion (Bartlett and McAnany 2000; Connerton 1989; Kertzer 1988; Reina and Hill 1978; R. Thompson 1958). With these considerations, we would expect to find that the various ritual sites and settlements within the proposed territories would share similar unique ceramic attributes because they were being used and inhabited by members of that polity.

Results of the small INAA study of the Pacbitun pottery indicate that the pre-Hispanic Maya likely would have recognized the proposed 9 km regions surrounding the Northern Boundary Fault polities as actual political territories. It has also revealed that

the people in the Pacbitun region manufactured ceramics for ceremonial purposes using special recipes. Specimens from Clusters C and D, the local signatures, were found in all of the major contexts sampled- site core, causeway system, and caves- indicating that the nearby populations were using these places. Cluster F, which is the most represented, and longest lasting local group identified, is the primary chemical signature identified at both Actun Lak and the secondary center Sak Pol Pak. However, it is nominally present at Pacbitun where it only appears as two samples from Structure 3 and is completely absent in the causeway assemblages (see **Table 6.6**). The only other appearances of this cluster at other sites are single sherds from Actun Nohoch Tunich and Actun Naj Che located directly above Actun Lak and on an adjacent hill respectively.

Minimal excavations have been undertaken at Sak Pol Pak, but they have revealed that it was an important landscape shrine for the inhabitants of the Pacbitun region (see **Figure 13;** Conlon 1999; Reece 2012; Spenard et al. 2012). It is located on a hilltop 3 km to the southwest of Pacbitun in the first range of foothills of the Maya Mountains. This location places it well within the proposed territory of Pacbitun, and a causeway effectively connects the two, running from the primary center to the base of the hill that Sak Pol Pak was built on (Conlon 1999; Spenard et al. 2012; Weber 2011b; Weber et al. 2012). The proximity of these two sites, as well as the road connecting them suggests that Pacbitun controlled Sak Pol Pak directly, as well as the land between them.

Sak Pol Pak consists of three interconnected courtyards and 14 structures, two of which are nonresidential, all in a setting unique to the region for a number of reasons (Conlon 1999:32). The hill upon which it was built stands alone as an individual feature

along an otherwise undifferentiated line of gently undulating foothills (see **Figure 9**). Furthermore, a large denuded white cliff face is on the lower hillside, and a trunk conduit cave, leading to the most complex documented subterranean system in the area is at the foot of the hill (see **Figure 12**; Francis et al. 1995:15). The cavern, called Actun Mai, is the only other known karst drain within Pacbitun's territory, the other being Rocky Crab Cave below Actun Lak. Accessing Sak Pol Pak is difficult and requires scaling the steep hill, yet it houses one of the two largest pyramids in the region, highlighting the site's importance as a ritual center for the polity (Spenard et al. 2012). The other pyramid is Structure 1, the primary ceremonial building at Pacbitun. As discussed more fully above, Actun Lak was also a significant landmark for the pre-Hispanic inhabitants of the Pacbitun region as it was likely the polity rain shrine. The symbolic importance of both Actun Lak and Sak Pol Pak to the pre-Hispanic inhabitants of the Pacbitun region, coupled with the limited distribution of Cluster F suggests that those ceramics were likely produced using a special recipe specifically for use in ceremonial settings by members of the Pacbitun polity.

In sum, the above discussion has attempted to elucidate the socio-political organization of the greater Belize Valley, which includes the primary centers along the Belize River and the northern Boundary Fault area. The primary settlements in those regions are regularly spaced, although some leeway is given for geographic constraints. Nevertheless, their distributional pattern suggests the existence of geographic territories, a supposition that is reinforced by the presence at the midpoints of the primary settlements of secondary centers, which appear to have been boundary markers. INAA

data from the Pacbitun ceramics were used to evaluate the validity of these proposed territories. The primary assumption of the test was that community identity was expressed materially through the crafting of ceramics, and therefore, the same chemical signatures for locally produced pottery should be found throughout the proposed territory. Alternatively, if the tested ceramics demonstrated a wide variety of chemical signatures, then the sites that they belonged to were not closely affiliated and thus not part of a politically defined region. The former assumption was verified, but the exercise also identified a distinctive paste recipe used for ceremonial ceramics.

Pacbitun in a Belize Valley Context

My TVM ceramic analysis indicates that the people using the karstscape in the Pacbitun region had some ties to the central Peten from the Late Preclassic through Early Postclassic periods as demonstrated by similar pottery types and decorative motifs. It also established definitively a previously unsubstantiated connection to the Xunantunich polity during the late Late Classic period with the identity of Mount Maloney Black bowls. These findings help clarify Pacbitun's position within the Late Classic period sociopolitical dynamics of the Belize Valley and the greater Peten region, which continues to be debated. For example one scenario suggests that the site was conquered and became the northern most extent of the Caracol polity as evidenced by agricultural practices, burial patterns, ceramic styles, and hieroglyphic evidence, as discussed above (Chase 2004:330; Helmke and Awe 2008, 2012). Another proposes that Pacbitun was

clearly affiliated with central Belize Valley centers based on the lack of Mount Maloney Black pottery and prevalence of red-slipped carbonate tempered bowls in the ceramic assemblage recovered from a portion of the settlement excavations there (Connell 2000, 2010). A third submits that the ceramic assemblage from Pacbitun's palace structure is a regional subcomplex of the Naranjo sphere, and thus it was a secondary center of that polity (Ball 1993:255). What these three models have in common is that archaeologists working at sites other than Pacbitun have developed them, depending largely on published data, which is limited in the case of ceramics as mentioned in Chapter 6. Nevertheless, researchers at Pacbitun have employed ceramic and burial pattern data, and invoked geographic proximity, suggesting instead that the site was affiliated primarily with the Belize Valley during the Late Classic period, and have speculated that it was politically associated with Xunantunich (Ashmore 2010; Healy et al. 2004:225). Nevertheless, direct evidence for that latter scenario has heretofore been lacking (Healy et al. 2004:225).

Xunantunich was closely affiliated with Naranjo, and the ruling lineages from that latter site regularly warred with those of Caracol in the Late Classic period (Ashmore 1998, 2010; Ashmore et al. 2004; Helmke et al. 2010; Houston et al. 1992:506-507; LeCount et al. 2002; Martin and Grube 2008). Logic suggests that if Pacbitun was on the frontier of the Caracol polity, then its interactions with Naranjo and affiliated Belize Valley sites should tend towards indifference or hostility, which would be expressed in part by a lack of shared traits and practices, and the presence of defensive architecture. Alternatively, if it were included in the Naranjo sphere of influence then interactions with

affiliated sites should be prevalent, which would be expressed in shared traits such as ceramics (Ball 1993:255). Defensive architecture is not apparent at Pacbitun, suggesting that warfare was rare, and the karstscape ceramics indicate strong ties to the Belize Valley throughout its period of use, and, more specifically, with the Xunantunich polity in the Late Classic as evidenced by the regular occurrence of the Chunhuitz, Macaw Bank, and Mount Maloney ceramic Groups (Connell 2000, 2010; LeCount 1996, 2010a, 2010b; LeCount et al. 2002; Yaeger 2000:125). Mount Maloney pottery is particularly noteworthy because it is closely affiliated with Xunantunich, relatively geographically constrained to the west of the Macal River, and communities that wanted to demonstrate affiliations with it began using regularly those ceramics as elaborated below (Connell 2000, 2010; LeCount 1999, 2010a, 2010b). Overall, these findings reinforce models that have posited strong connections between Pacbitun and the Belize Valley and Naranjo while challenging those that see close affiliations between it and Caracol.

Comparisons to ceramic collections from Belize Valley sites and caves along the northern Boundary Fault demonstrates Pacbitun's Late Classic period connections to Xunantunich, and reinforce the geopolitical territorial model of the region presented in the previous section. Researchers have proposed that Late Classic period socio-political affiliation with seats of power throughout the Belize Valley is reflected in the geographic distributions of particular types of ceramics used in secondary centers and smaller settlements (Connell 2000, 2010; LeCount 2010a, 2010b; LeCount et al. 2002; Mirro 2007; Yaeger 2000). More specifically, those archaeologists posit that people considering themselves to be part of the greater Xunantunich community used Mount Maloney Black

bowls as a shared cultural tradition, those with allegiances to centers to the lower Belize Valley preferred red slipped calcite tempered basins, and the two traditions rarely, if ever overlapped at the same time (Connell 2010; LeCount 2010a). Connell (2000, 2010) suggests that the secondary center of Chaa Creek, located 7 km to the northeast of Xunantunich on an elevated ridge above the western bank of the Macal river was a border settlement between the two ceramically-defined regions. As mentioned above, he proposes that Pacbitun was clearly affiliated with the lower Belize Valley "red basin" polities due to a paucity of black-slipped carbonate wares, a conclusion challenged by the karstscape data (Connell 2000, 2010; Sunahara 1995). Instead, Pacbitun appears to be at a nexus of influence between the two regions.

Cave ceramic assemblages from the Northern Boundary Fault polities reify these broad distributional patterns of red and black slipped carbonate tempered bowls, although they suggest the situation is more complex than presented in the original model. In particular, changes in the assemblages appear to coincide with the territories proposed in the Chapter 3. All of the caves in the following discussion fall near the predicted geographic confines of proposed Northern Boundary Fault polities. For example, Chechem Ha Cave, located on the Vaca Plateau 10 km to the southeast of Xunantunich, and 5.5 km due south of Guacamayo, contains an abundance of Mount Maloney Black bowls, few Dolphin Head Red, and no reported occurrences of Roaring Creek Red specimens (see **Figure 142**; Ishihara-Brito et al. 2000; Moyes 2006b). On the other hand, only one Mount Maloney Black bowl fragment out of approximately 7,000 sherds was recorded at Barton Creek Cave, and instead, Garbutt Creek materials abound there (Mirro

2007; Mirro and Mirro 2001). Heading further east, analysis of the pottery assemblage from Petroglyph Cave, on the fringes of the Deep Valley polity, reveal no Mount Maloney Black, and only a few Roaring Creek Red specimens, but instead, vessels from the red slipped Garbutt Creek and Chichiha ceramic Groups were most common during the late Late Classic period (Reents-Budet 1980a, 1980b).

My TVM analysis suggests that the Pacbitun karstscape ceramic assemblage is an outlier of this distributional pattern because the calcite bowls are a mix of red (Dolphin Head and Garbutt Creek, 75 percent) and black slipped (Mount Maloney Black, 25 percent), even though it trends strongly towards the former. These values are significantly higher than those previously reported for Pacbitun where Mount Maloney Black makes up less than 7 percent of the reported calcite tempered bowl assemblage recovered from settlement contexts (Sunahara 1995). When including monochrome slipped jar forms, the percentages change to 70 and 30 respectively. The discrepancies between the red and black slipped vessels is even less when considering that the problematic mottled and non-black slipped Late Classic period globular jars discussed earlier likely include Mount Maloney specimens. Thus, my findings challenge the suggestion that Pacbitun was clearly affiliated with the lower Belize Valley "red bowl" polities, and instead they indicate that the people using the karst features were interacting regularly with centers throughout the Belize Valley, including Xunantunich as well as those along the Belize River (Connell 2010:309). Alternatively, caves are well-known pilgrimage destinations throughout Mesoamerica, and the results of the TVM ceramic data may equally be interpreted as evidence that the sacred landmarks in the Pacbitun area received visitors

from the Xunantunich polity, a proposition that I discuss more fully below (Brady 1989:407; MacLeod and Stone 1995; Patel 2005).

The entirety of the Pacbitun ceramic assemblage collected in this and other investigations at the site stylistically demonstrates a close affinity to the Belize Valley, rather than to Caracol, which is supported by the INAA results (Bill 1987; Campbell-Trithart 1990; Healy 1990a; Healy et al. 2007; Richie 1990; Sunahara 1995). More specifically, the appearance of Mount Maloney Black specimens in the subterranean assemblage demonstrate ties to Xunantunich, particularly during the Hats' Chaak ceramic phase (A.D. 670-780) when the rulers from that site began to rise in prominence in the region after the downfall of the Naranjo dynasty (Ashmore 1998, 2010; LeCount et al. 2002; Martin and Grube 2008). Nevertheless, the relationship between Pacbitun and Xunantunich has yet to be determined. Excavations in Pacbitun's settlement found that Mount Maloney pottery was poorly represented there as mentioned above, but it is prominent in the karstscape assemblage, establishes those ties. The discrepancy between the assemblages from the different contexts reinforces that archaeologists *must* include local cave pottery in any comprehensive analysis of a site's ceramics, particularly when addressing broader questions of socio-political organization (see also Brady 2005b; Demarest 1997).

Archaeologists working within the territory of the Xunantunich polity have noted that community identity there is expressed through practices of affiliation, that is, shared behaviors between individuals that express their commonalities (Yaeger 2000:125). Primary among these practices in affiliated communities is the use of Mount Maloney

Black bowls, as mentioned earlier (Ashmore et al. 2004; Connell 2000, 2010; LeCount 1996, 1999, 2010a, 2010b). Their presence in the Pacbitun assemblage thus demonstrates definitive ties between the two sites, although whether the vessels were imported from Xunantunich or made locally was indeterminate from my TVM analysis. Ten Mount Maloney Black bowl specimens were sampled for INAA to address this issue, six belonging to Cluster F, two to H, and one each to D1 and D2 (**Table 6.7**). As detailed above, Clusters F and D are the main expressions of locally made pottery, thus indicating that the Mount Maloney Black vessels were being produced at Pacbitun, rather than imported from Xunantunich (Ronald Bishop, personal communication 2014). These data also discount long-distance pilgrimages to those subterranean areas sampled, although they are insufficient to rule it out completely as such visitors may have entered the region and performed rituals using locally produced materials, as was found in the Candelaria Caves in Guatemala (Woodfill 2007, 2010).

The Mount Maloney Black INAA clusters show a possible chronological trend, although more data are necessary to determine its validity. All three temporal varieties of the type are represented in Cluster F. The earliest variety, Samal, is represented three times, Hats' Chaak once, and the latest, Tsak' twice. Their appearance in this compositional group is not surprising considering its dominance of the Pacbitun material, long history in the region, and wide variety of types within it. Nevertheless, other specimens of the earlier two varieties cluster into Group H, which is otherwise unrepresented in the sampled material, and dates to the Late Classic period (roughly A.D. 600-800). Furthermore, one Task' piece, the latest of the three Mount Maloney Black

Table 6.7. INAA sampled Mount Maloney Black temporal modes, proveniences, and compositional group affiliations. Provenience abbreviations are the same as Table 6.5.

Temporal mode	Provenience	Composition cluster
Tsak’	Lak Ent. Pass W	D1
Unspecified	Mai Str 10 1-2	D2
Tsak’	Spp 3-4	F
Samal	Spp 7-2	F
Hats’ Chaak	Lak Stalag pave	F
Samal	Lak Ent Pass W	F
Samal	Lak Stalag pave	F
Tsak’	Naj 2-3	F
Samal	Spp 7-2	H
Hats’ Chaak	Lak Stalag pave	H

chronological modes identified at Xunantunich, falls into D1, a group that consists wholly of late Late Classic period (A.D. 700-900) carbonate wares. Another indeterminate Mount Maloney Black specimen clusters into D2, although this specimen is anomalous and not considered further. Overall, these clusters suggest that although most of the sampled Mount Maloney Black pottery was produced using the same special F-group ceremonial recipe over time, several other secondary formulas were developed, but have a minimum presence.

Comparisons were made between the Pacbitun INAA results and the Smithsonian database to determine if any of the material was imported from other previously identified sources. These attempts were inconclusive, although several sherds were located to the general Belize Valley, specifically the Actun Xtuyul Ahk'utu' mold, and a Santa Teresa Incised piece and the Sibal Buff-polychrome specimen with PSS text, both from Actun Lak (Ronald Bishop, personal communication 2014). The latter two samples

comprise the totality of R1 and R2 clusters respectively indicating that they are closely related, but remain statistically distinct from one another. Both Balanza and Pucte Group ceramics, which include Santa Teresa Incised, historically have proven difficult to classify using INAA and tend toward small, messy groups (Ronald Bishop, personal communication 2014). In light of such difficulties, I focus this discussion only on the Actun Xtuyul mold, and the Sibal Buff-polychrome PSS sherd, and the significance of their attribution to the Belize Valley in a further attempt at disentangling Pacbitun's Late Classic period socio-political organization.

The Actun Xtuyul Ahk'utu' mold, discussed in the following chapter, was sampled because it was an unusual item in the ceramic assemblage, and where those types of vessels were being produced has only been speculated (Ting and Helmke 2013). As mentioned, the comparisons to the Smithsonian database were inconclusive for directional contact, although the chemical signature indicates that it was produced somewhere in the Belize Valley (Ronald Bishop, personal communication 2014). It belongs to Group M, an outlier composed only of the mold and two polychrome sherds recovered from Actun Lak. One is a Joyac Cream type Peten Gloss ware, and the other a Benque Viejo polychrome type Vinaceous Tawny ware. The former was recovered from the entrance area of the cave, and the latter from Unit 5, sunk in Terrace 1. All three ceramic types date to the Terminal Classic period, suggesting the group represents a temporally restricted recipe.

The presence of the mold and its sourcing to the Belize Valley indicates that at least some members of the polity were involved in a secondary elite gifting network that

spanned the entirety of central and southern Belize and adjacent eastern Peten. As mentioned in Chapter 7, the ceramic type name, Ahk'utu', is derived from the hieroglyphic texts that accompanies all known examples of this pottery. Translated, the word means "his/her give thing," and the texts indicate who was doing the gifting (Helmke and Reents-Budet 2008:38). Invariably, an individual identified as Lady Olom is named as the patron of these vessels, regardless of the workshop at which it was produced (Helmke and Reents-Budet 2008:41). Based on carved stone monuments from Uaxactun, Lady Olom rose to power between A.D. 810 and 830, and, although she is never identified with the royal title *ajaw,* she is referred to on the vessels as "the great western kalo'mte" (Helmke and Reents-Budet 2008). This title was typically reserved for the highest-level regents and, although it has eluded decipherment, it is related to warfare (Coe and van Stone 2005:76). Given that Lady Olom was never identified in any known text mentioning her as an ajaw, she was most likely a person of secondary elite status who rose to prominence and was able to usurp the kalo'mte title due to the political instability and balkanization that occurred during the Terminal Classic period (Helmke and Reents-Budet 2008:46). Considering that most known references to her appear on the Ahk'utu' vessels, her rise was seemingly predicated on the network of allegiances developed through the production and gifting of these vessels. The presence of the mold indicates that the Pacbitun territory was part of that network, although the extent of her influence there has yet to be fully delineated.

Results of the INAA indicate that the Pacbitun elite were involved in other Belize Valley exchange networks. Specifically, the results suggest that someone from Pacbitun

may have acquired the Actun Lak PSS sherd as a participant in a political feast somewhere in the Belize Valley. Ceremonial feasting has long been recognized as a primary vehicle for the establishment of elite gift-giving networks, including exchanging elaborate polychrome pottery throughout the Classic period and into Colonial times (Ball 1993; Boot 2005a, 2005b; Hendon 2003; Houston et al. 1989; LeCount 1996, 1999, 2001; Montero-Lopez 2009; Reents-Budet 1998, 2000; Reents-Budet et al. 1994; Stuart 1989; Tozzer 1941; Webster et al. 1998). Feasts were often used as tools to gain political leverage by indebting the participants to the sponsor (LeCount 1999, 2001; Tozzer 1941). The exchanged vessels were likely commissioned by the feast's patron as mementos of the event handed out to the participants, that simultaneously acted as reminders of the debt incurred (LeCount 1999, 2001). Participation was likely a significant life event, and the vessels received for it were highly regarded and treasured objects as evidenced by their inclusion in burials (Ball 1993; Coe 1973, 1978; Stuart 1989). Nevertheless, not all feasting vessels wound up in mortuary contexts, many were shattered afterwards and deposited in middens near the event stage, although mementos may have been taken from these contexts (Pendergast 1979:127). Evidence for this latter practice was uncovered at Altun Ha, Belize, where archaeological excavations revealed an extensive midden adjacent to a feasting platform into which shattered vessels had been deposited. Attempts at reconstructing the vessels failed because pieces were invariably missing. Reents-Budet (2000:1029) posits that the missing fragments from the vessels may have been taken as souvenirs of the event.

Feasting and the concomitant exchange of elaborate polychrome ceramic vessels has been particularly well documented in the Late Classic period pottery assemblages in centers near the confluence of the Mopan and Macal rivers in the Belize Valley, collections showing strong connections to Holmul and Naranjo (Ball 1993; Houston et al. 1992; Reents-Budet 1991; Reents-Budet and Bishop 2003; Reents-Budet et al. 1994; Reents-Budet et al. 2000; Taschek and Ball 1992). The chemical attribution of the Actun Lak Sibal Buff-polychrome PSS sherd to the general Belize Valley, rather than to Pacbitun specifically suggests that the elite from that site may have been engaged in such a feasting network, although determining if it originated from the same Holmul-Naranjo system is currently not possible, although it is unlikely. Archaeologists have identified several regional and local polychrome pottery styles, including from Holmul and Naranjo, neither of which the Actun Lak PSS sherd resembles (Reents-Budet 1991; Reents-Budet et al. 1994). Instead, it more closely resembles the Altun Ha style from northern Belize, distinguished by ubiquitous black and unusual yellow-cream backgrounds, although the sherd's local chemical signature rules out this possibility as well (Reents-Budet et al. 1994:198). Nevertheless, these data suggest that the Actun Lak sherd may have been acquired at a ceremonial feast somewhere in the greater Belize Valley region, or possibly beyond, and curated it as a treasured object, ultimately giving it as another item of great wealth for the rain ceremonies during the rain ceremonies the last few decades of the Pacbitun settlement.

Direct artifactual evidence of Pacbitun's contact with centers beyond the Belize Valley was rare in the karstscape artifact assemblage. Jade and obsidian were undoubtedly imported from the Guatemalan highlands, and the *Spondylus* shell fragments indicate connections to either the Caribbean Sea or Pacific Ocean. As discussed previously, both TVM and INAA studies on the karstscape material shows strong ties to the Belize Valley, and indicate that most of the ceramics were made locally, with the exception of the Altar Orange bowl imported from the greater Usumacinta region. Nevertheless, the appearance of similar motifs on polychrome pottery over broad geographic distances, such as the patterned geometric designs on some Earl Classic period Dos Arroyos Orange-polychrome sherds recovered in the Pacbitun karstscape, Uaxactun, and Barton Ramie, suggest that ideas and techniques for production and decoration were circulating widely over broad regions, even though the objects were not. Undoubtedly, palace schools, workshops, and village traditions were responsible for some of the regional stylistic similarities, but such potter communities tend to rely on the same raw materials and production techniques, resulting in matching chemical profiles between sites (Ball 1993; Bishop et al. 1985:80; Reents-Budet et al. 2004; Reents-Budet et al. 1994; Reents-Budet et al. 2000). As such, these specialized communities are unlikely sources for all stylistic likenesses appearing over broad regions, particularly when the compositional profiles of the ceramics are dissimilar.

Research on textiles from the Andes provides a possible explanation for how such decorative motifs may have been spread. Both there, and throughout pre-Hispanic Mesoamerica, fine textiles with elaborate painted and woven designs were commonly produced as both markers of identity and wealth, and were exchanged as both commodities and gifts (Anawalt 1981; Brumfiel 1991; Ciaramella 1994, 1999; Evans 2001; van de Guchte 1999:15-158; Murra 1968). These objects also were used in the Andes as vehicles to transport information and ideas over long distances on the rugged and uncertain terrain (Stone-Miller 1992:337). Perhaps best known are the khipu, knotted string objects used to record information that would be read to recipients by their porters (Urton 1998). Nevertheless, textiles were a primary component of Andean culture and their geometric motifs were applied to a wide range of other media. For example, a Chimu adobe frieze at Chan Chan, Peru, replicates identically stepped bird motifs found on textiles dating to the same period (Stone-Miller and McEwan 1990/1991:58-59). Transportation of painted textiles that typically hung on temple walls were likely used to bring Chavín iconography and ritual practices to the southern coast during the Early Horizon (900 B.C.- A.D. 200; Burger 1996). Furthermore, Andean archaeologists have also noted that the Middle Horizon (A.D. 600-1000) Sun Gate at Tiwanaku, Bolivia, is laid out in a textile-like pattern (Bennett 1954:72). Parts of Late Horizon (A.D. 1476-1534) ceramic vessels representative of Inka overlords were decorated with textile motifs appropriate for the corresponding parts of the body suggesting that the designs were analogous to the pots' clothes (Bray 2000:173). The appearance of such motifs in these media suggest that the style and form that replicated the woven designs was a cultural

preference, but also indicates that textiles were vital for transferring artistic ideas over broad areas throughout the Andes (Pasztory 1998:102-103).

Evidence for use of textiles as vehicles for artistic cannons is less common in Mesoamerica than it is in the Andes, although the practice has been identified as a primary component of the Postclassic period International Style, and more recently among the Classic Period Maya (Houston 2014:35-39;Taube 2010c:150). The International Style is found on polychrome architectural murals and screen fold books with scenes that are often embellished on their edges with ropes, and crenellated textile designs and patterns (Taube 2010c:154). The presence of the painted designs on the architectural elements in particular indicates that the textiles were frequently removed and brought elsewhere. Textile motifs were also commonly incorporated into architecture during this time, such as on the interior and exterior of buildings at Mitla, Oaxaca (Miller 2001:168-169). Additionally, the items inspired design elements on building façades and decorated natural landmarks such as hills in the Mixtec Codices (McCafferty and McCafferty 2006:333). Similar geometric decorations, such as step-frets, appear on ceramics suggesting that the textiles also influenced the pottery economy. Houston (2014:35-39) has recently drawn the same conclusion regarding Classic period Maya ceramics, and he found that some designs might even serve as markers of social or political attachment (Houston 2014:39). These examples demonstrate that ideas and practices were spread through pre-Hispanic Mesoamerica on textiles similar to the Andes, and, by extension, appear to have been vehicles for transporting and exchanging pottery

decorative techniques throughout the Classic period Maya Lowlands, a system that flowed through Pacbitun, and its karstscape.

CHAPTER 7

ARTIFACTS AND HUMAN REMAINS

In this chapter, I discuss the artifacts that I recovered during my investigations of the Pacbitun karstscape, including ceramic objects, lithics, faunal remains, ethnobotanicals, radiocarbon, and human remains. A short overview of the object classes begins each section and includes a general description of the artifact types that compose each, their approximate distributions within the karstscape, and the general methods that I used for their analysis. Data presentations of the particular artifact categories within the classes follow the short introductions, after which I offer brief contextualizing syntheses to understand the significance of the material that I recovered.

Ceramic Artifacts

I consider ceramic artifacts as unusual pottery objects and sherds that have been tooled. This artifact class is composed of boxes, modified sherds that have been shaped into a variety of forms or drilled, and a ceramic mold use for creating a special class of pottery.

Boxes

Actun Lak Chamber 2 held the remains of three ceramic boxes, two of which were located behind a series of extinct formations in the Sloth Alcove's rear wall, and the other from the surface of Unit 1. I refer to the pieces in this section as Fragments A, B, and C for ease of discussion. To clarify, Fragments A and B are those recovered in the Sloth Alcove, and C during Unit 1 excavations. The former two have round, flat nubbin feet, and the latter is too fragmentary to determine if it had them also.

Fragment A. This piece is the largest of the three box fragments, averaging 1.38 cm thick, and weighing approximately 800 g. It is composed entirely of the base of the original vessel except for one slightly upturning portion that is the remnant of the corner wall. The piece has two remaining nubbin feet that are 14.5 cm apart measured from their centers, one of which has an additional 2.5 cm of vessel remnants beyond it (**Figure 157**). A portion of a hole punched from the bottom is adjacent to one of the nubbin feet and the corner wall remnant. Such a modification is unlikely to either be a "kill-" or mend-hole because the former typically appear in the direct centers of vessels, and the latter adjacent to breaks on the walls of pots. The residual portion of the vessel indicates that it was originally rectangular in shape, and that the extant supports are from the same narrow end. I use this information to reconstruct a minimum size of 24 cm long by 19.5 cm wide for the original vessel.

Classifying this fragment to a specific ceramic type was hindered by the presence of extensive smudging on both interior and exterior surfaces that I decided to preserve for

future residue studies. Nevertheless, I cleaned a small area on both sides uncovering no decorations beyond smoothing, and sparse calcite tempering is obvious on all surfaces. A thin calcite layer, discussed in more detail below, covers most of the bottom of the vessel. The presence of a distinctive smudged area in the center and on top of the calcite crust suggests that it was used to burn an offering sometime after it had been exposed to drip water in a cave-like setting.

Fragment B. This piece is the corner of a box composed of the lower wall, base, and a nubbin foot, the latter of which is approximately 4 cm in from the edge of the vessel's basal break (**Figure 158**). Measuring 1.5 cm thick, weighs 338.8 g, and the support has a diameter of 1.7 cm, the remaining portions of this box suggest that the original vessel was either a rectangular or a square shape with rounded corners. The exterior surface has been smoothed and the interior shows extensive pitting indicative of use ware. Dense clusters of opaque calcite tempering up to 3.5 mm in size are visible on all surfaces including the nubbin foot. Burned residue and fire clouding suggests that this piece was originally left near the altar and may have been moved out of the way by the contemporary landowner to protect it. Nevertheless, the other two fragments suggest that the pre-Hispanic Maya likely moved them around the cave multiple times, as discussed in further detail below, indicating that Fragment B may have been subject to the same practice. No formal ceramic type name was applied to this piece, although the visible tempering and surface treatment resembles the late Late Classic period Cambio Unslipped (see Smith and Gifford 1966:155 for type designation).

Fragment C. I recovered this fragment from the surface of Unit 1, and it consists of the vessel bottom and lower wall of a box corner (**Figure 159**). The piece measures 1.5 cm thick and weighs 81.7 g. The remaining portions suggest that the original vessel was rectangular shaped with squared corners. The exterior surface was smoothed, and the condition of the interior is unknown due to a thick calcite crust that covers it. Opaque calcite tempering up to 3.5 mm in size is visible on all exposed surfaces of the piece, but it is significantly less dense than that in Fragment B. Extensive smudging and fire clouding are also present. Overall, the tempering and surface treatment suggest that this fragment is related to the late Late Classic period Cambio Unslipped type.

Discussion. All three pieces are extensively smudged suggesting that they were exposed to an intensive fire. Although the burning at the altar seems to be the likely explanation for the charred material, Fragments A and C have cave growth that covers over portions of the blackened areas that could only have occurred by being exposed to water in a karst setting. Chamber 2 lacks any active dripstone formations with the exception of Ledge 1, and only a few other specimens collected in the entire area had similar cave growth. On the other hand, the ceiling in both Chamber 1 and the Entrance Passage are blanketed with thick formation clusters that drip extensively after rain storms making that area a likely candidate for the fragments being there prior to their arrival in Chamber 2. Such multiple movements of pieces within the cave that would allow for formation growth may be indicative of enduring ritual circuits, similar to those identified in Actun Tunichil Muknal cave in the Roaring Creek Valley, Belize (Moyes 2000, 2005a).

Overall, box-shaped containers are rare in the Maya area. A few "rectangular cache vessels" from Tikal that are affiliated with the Classic period pottery groups Balanza, Cambio, and possible Tinaja (Culbert 1993). The Cambio type specimen is particularly noteworthy because it is footed like those from Actun Lak, a mode that is unusual for the Tikal assemblage (Culbert 1993:Figure c1). A square vessel with the remains of a copal offering in it that was drudged from the Cenote of Sacrifice at Chichen Itza that was described as "unique" for that site (Coggins 1984:128). The Birth Vase is composed of four rectangular panels that display complex iconographic scenes detailing Classic period Maya natal ritual and mythology (**Figure 160**; Taube 1994). Other four-sided, lidded vessels are often depicted as symbolic houses or temples in which gods preside (Houston 1998; Taube 1994, 1998, 2013). Pendergast (1974) reports on an otherwise undecorated black-painted wooden box recovered from Actun Polbilche Cave near the Sibun River, Belize. Two other carved wooden boxes are known from Tabasco, Mexico, both of which are unprovenienced but likely originated in caves (Anya et al. 2001; Coe 1974). One of the boxes contained marl, which may have been the remnants of a disintegrated codex (Anya et al. 2001).

Three lidded coffers were recently recovered from Hun Nal Ye Cave in northern Alta Verapaz, Guatemala, two of which are ceramic, and the third that the Maya carved from dark volcanic rock (Woodfill 2011; Woodfill et al. 2006; Woodfill et al. 2012). The pottery boxes and their tops are slipped orange but are otherwise unadorned, and they lack supports. The stone container is elaborately carved with a series of iconographic panels depicting gods and humans framed by hieroglyphic texts. The archaeologists who

recovered the vessels date all three items to the Terminal Preclassic through Early Classic periods and suggest that they may have been used to house codices, although Taube (personal communication 2014) suggests that the stone box likely dates to the Late Classic period (Woodfill et al. 2006). The reporting archaeologists base their suggestion on the iconography of the stone box that in part depicts several books, and its dimensions, 38 cm long by 21.7 cm wide, which they claim are consistent with the sizes of the known remaining pre-Hispanic codices (Woodfill et al. 2012). The latter part of their argument is significant because its measurements are similar to those that I reconstructed above for Actun Lak ceramic box Fragment A, suggesting that vessel, and possibly the other two may have also held books sometime during the Classic period.

Modified Sherds

Modified sherds are defined here as those that have been tooled after they had been separated from their parent vessels. Shaping and drilling are the two techniques identified, although the latter modification is rare, only occurring two times in the entire ceramic assemblage. The shaping was an unrefined reductive process producing roughly formed round, crescent, and tear dropped-shaped objects, of which 21 were recovered from Actun Lak, Actun Nohoch Tunich, and Actun Subuul (**Table 7.1**; **Figure 161**). Collectively, the shaped pieces are small and measure 4 cm at their widest points on average, except for two that were significantly larger that are discussed below. All but one of the smaller pieces were made from body sherds, and all but three were unslipped.

Table 7.1. Modified ceramic sherds and shapes recovered from the Pacbitun karstscape.

Shape	Dimensions (cm)	Provenience	Ceramic info.	Vessel form	Part
Discodial	2.67 diam	Lak LP E of U1	Cayo Unslipped	Indeterminate	Body
Discodial	3.4 diam	Lak 1-1	Cayo Unslipped	jar	Body
Discodial	4.8 diam	Lak 1-1	Cayo Unslipped	Indeterminate	Body
Discodial	3.5 diam	Lak 1-1	Cayo Unslipped	Indeterminate	Body
Crescent	4.2 l	Lak 1-1	Cayo Unslipped	Indeterminate	Body
Crescent	5.2 l	Lak 1-1	Cayo Unslipped	Indeterminate	Body
"Kidney bean"	Indeterminate	Lak Ch1 GSC	Indeterminate	Indeterminate	Rim
Discodial	9.8 diam	Lak 2-1	Mt. Maloney Blk.	Jar	Body
Discodial	4.14 diam	Lak 3-1	Tumbac ware	Indeterminate	Body
Crescent	Indeterminate	Lak 5-2	Cayo Unslipped	Jar	Body
Discodial	4.12 diam	Lak 5-3	Cayo Unslipped	Jar	Body
Crescent	5.0 l x 2.0 w	Lak 5-3	Dolphin Head	Dish	Ring base
Crescent	3.7 l x 2.1 w	Nohoch Tunich 1-2	Cayo Unslipped	Jar	Body
Crescent	4.5 l x 2.5 w	Nohoch Tunich 1-2	Cayo Unslipped	Jar	Body
Crescent	3.4 l x 2.2 w	Nohoch Tunich 1-2	Cayo Unslipped	Jar	Body
Discodial	3.0 diam.	Nohoch Tunich 7-1	Cayo Unslipped	Jar	Body
Discodial	11.0 diam	Nohoch Tunich SC E of U7	Peten Gloss	Dish	Ring base
Teardrop	3.81 l x 2.85 w	Subuul GSC	Cayo Unslipped	Jar	Body
Discodial	4.23 diam.	Subuul GSC	Cayo Unslipped	Jar	Body
Teardrop	3.38 l x 2.99 w	Subuul GSC	Cayo Unslipped	Jar	Body
Discodial	3.42 diam	Subuul GSC	Cayo Unslipped	Jar	Body

A Dolphin Head Red type ring base was formed into a crescent. The other two pieces were formed from a Mount Maloney Black jar and an unidentified orange-slipped vessel. Overall, the purpose of these objects has eluded archaeologists. Some have speculated that they were "gaming pieces," which is unlikely when found in subterranean contexts, although Taube (personal communication 2014) suggests that such objects were commonly used for divination sortilege (Willey 1965:406).

I recovered one of the large disks during excavations at the foot of the altar in Actun Lak Chamber 2. The object was made from a Mount Maloney Black globular jar

sherd, and it had been broken in the past into at least three pieces, only two of which representing 75 percent of the whole artifact were recovered (**Figure 162**). Its diameter is 9.8 cm, making it over twice as large as the other shaped sherds. Smudging was present on both surfaces that likely originated from the burning events at the altar, although it may have been used as a saucer-like container to hold an offering.

The area in front of the looted alcove near Unit 7 in Actun Nohoch Tunich produced the other large shaped sherd. It measures 11 cm in diameter, weights 127.3g, and was created from the complete ring base of an Early Classic period Peten Gloss vessel (**Figure 163**). Orange slip remnants appear on the well-worn interior, which, when considered with the ring base, indicates that the parent vessel belonged to either of the Protoclassic to Early Classic period Actuncan-Dos Arroyos or Aguila Groups. Nevertheless, when the Maya transformed the original vessel into a disk is unknown. Similar objects have been identified as jar lids at other sites in the Maya area such as Barton Ramie and Uaxactun, an observation that offers a likely analog for the Actun Nohoch Tunich disk (Ricketson 1937:219-220; Willey 1965:406).

Biconical drilling is the other ceramic modification technique noted in the Pacbitun karstscape pottery assemblage, but the tool used for that process is unknown. I recovered only two drilled sherds, both from Actun Lak Unit 6, which abuts the altar in Chamber 2. Furthermore, they are both Mount Maloney Black globular jar body pieces, and a single hole punctured each. The boreholes measure 0.488 cm and 0.376 cm in diameter, but both pieces are broken along the drilling plane.

Ahk'utu' Molded-carved Ceramic Mold

Description. Originally part of a larger ceramic production cast now lost, the Actun Xtuyul mold recovered in Unit 1 was reshaped by chipping, and biconically drilled twice prior to its caching in the rockshelter, and a close analysis reveals the order the modifications were made (**Figure 164**). Specifically, the holes are on an unflaked edge, but only portions of them remain indicating that the current piece is half of an originally circular-shaped object broken by the drilling. Evidencing this chain of events is the lack of modification along the break containing the two drill holes, and the otherwise extensive reshaping along the remaining profile surfaces. In its current form, the artifact measures 8.249 cm long by 4.477 cm wide by 1.139 cm thick, weighs 37.5g, and is sand and calcite tempered, with some magnetic nodules visible on its dorsal surface. The mold surface is slightly concave rather than flat suggesting that the vessels it was used to produce would have been stamped after they were formed, as suggested by Werness (2003:3).

The iconographic program on the mold displays a right-facing individual (left-facing when cast) squatting on a twisted rope while their elbow rests on their bent knee (**Figure 165**). The individual wears a six-piece bracelet, that is possibly knotted and a crease in the hand delineates their palm. A set of grooved object, probably beaded feathers, runs the length of the arm three others float below it. These floating objects are highlighted with fine incised lines, indicating the veins and shafts of feathers originating from a missing part of the scene (**Figure 166**). The squatting individual wears a beaded

necklace, although the reworking of the piece has obscured much of that detail's part. The person also wears a six-piece anklet, and a possible loincloth appears behind the bent leg starting above the knee. A small indent at the front of the triangular foot defines the person's big toe. The drill holes are located at one of the extant ends of the rope and the area behind the ankle. The objects in the lower register are difficult to identify, although another rope appears to go straight down beneath the main character's toe, out of which pokes an unknown object. This position indicates that the extant scene is the upper register of the vessel. Another grooved object, likely a feather, floats at the bottom left of the piece heading off to another missing part of the scene to the left.

Discussion. As elaborated below, the ceramic cast had likely been used for creating Ahk'utu' Molded-carved vessels, a recently defined ceramic type produced in the greater Belize Valley area between A.D. 850 and 950 (Helmke and Reents-Budet 2008). It is related to the Pabellon Molded-carved and Sahcaba Molded-carved pottery traditions first identified at Uaxactun, but its paste composition, slip colors, vessel form, and decorative modes clearly distinguish it from them (Helmke and Reents-Budet 2008:39; Smith and Gifford 1966:160, 162). The name is derived from the pre-Hispanic Mayan name for the vessel class, **ya-k'u-tu-u**, or "his/her-give-thing," that is always written hieroglyphically on all known Primary Standard Sequence texts of the type (Helmke and Reents-Budet 2008:38).

I propose here that the Actun Xtuyul mold was likely used to make Ahk'utu' vessels, although that assignment is somewhat problematic. The type tends to be geographically oriented to the Belize River and its tributaries, although it reaches as far

south as Caracol, an area that includes the greater Pacbitun region (Helmke and Reents-Budet 2008:43-45). Furthermore, the other two types are largely constrained to discrete areas beyond Belize (Helmke and Reents-Budet 2008:44). These geographic distributions thus suggest the mold was used to produce Ahk'utu' vessels. Nevertheless, researchers investigating the molded-carved tradition have reported on the occurrence of identical scenes at various sites indicating the production casts were likely used to make several vessels, although they were unlikely to have been mass produced (Graham et al. 1980:164; Helmke and Reents-Budet 2008:38; Werness 2003:3-4). I compared the Actun Xtuyul mold's iconographic program to other published examples of all three Molded-carved types, as well as an online photographic database of them, concluding it is a rare scene in the known corpus (Adams 1971; Coe 1982; Graham 1987b; Graham et al. 1980; Helmke 2000; Helmke and Reents-Budet 2008; Sabloff 1972; Smith 1955; Werness 2003, 2007). The presence of twisted cord acting as framing device separating two vertical frames on the mold program distinguishes it from all known molded-carved scenes except for a vase recovered at Lamanai (Graham 1987b:Figure 3d). Unfortunately, the part of that scene that would verify this observation was not recovered, although two spots on the vessel could accommodate the Xtuyul cast (**Figure 167**). Graham (1987b:79) notes that the vessel form is common to central Belize, suggesting it belonging to the Ahk'utu' tradition; however, Helmke and Reents-Budet (2008:Figure 6) indicate it belongs to another type, although they do not identify which one. For these reasons, the molded-carved vessel type the cast was used to produce remains uncertain, although given the geographic distributions of the types, Ahk'utu is the most likely.

The Actun Xtuyul mold is a unique item in the Pacbitun karstscape artifact assemblage, and it represents one of only four archaeologically recovered production cast for any of the three molded-carved types. Archaeologists have recovered two others at Altar de Sacrificios, and one at Seibal, each used to make Pabellon Molded-carved types (Adams 1971:51;Willey 1978:49). Nevertheless, the Actun Xtuyul mold contains the most comprehensive scene yet recovered, described above. The Altar pieces retain the upper borders and very tops of the scenes, and the Seibal piece was from an indistinguishable position in the middle of the iconographic program (see Adams 1971: Figure 67 h,i; Willey1978: Figure 55). This overall lack of molds has led scholars studying the vessels to have to speculate about their manner of production based on the condition of the decorations, the walls of the object itself, or variances in minor details (Adams 1971:49; Graham 1987:79; Graham et al. 1980:164; Sabloff 1972:195; Smith 1955:43; Werness 2003:3-4). Their conclusions tend to suggest that the elaborate decorations on the vessels were made by some combination of carving, gouging, incising, modeling, molding, or tracing. More recently, Helmke and Reents-Budet (2008:40-41) have observed that the size and clarity of Ahk'utu' vessels lessen over time, suggesting casts made from earlier pots were used to produce the later ones, although whether their observation is applicable to the other Molded-carved types is uncertain. The high level of detail discussed above for the Actun Xtuyul mold suggests post-pressing modifications such as gouging, molding, and incising, would likely have been minimal on vessels produced by actual molds rather than vessels casts.

Lithics

Lithics represent the most diverse artifact class in the Pacbitun karstscape assemblage in terms of material present and the variety of objects recovered. Nearly all excavation contexts and visited karst features contained both local and exotic materials in worked and unmodified states. Identified materials include calcite, chert, granite, hematite, greenstone, limestone, indeterminate igneous rock, indeterminate rock, obsidian, quartz, quartzite, sandstone, slate, and speleothems. Chert artifacts are the most abundant followed by those of slate, greenstone, limestone, and speleothems. I encountered the remaining materials infrequently during my investigations. Worked objects are those that had been subjected to some form of intentional shape modification such as flaking, grinding, or drilling. Imports are rock objects that the pre-Hispanic Maya carried to the place they were recovered but are otherwise unmodified. In the case of cave rocks, these movement may have involved little more than shifting the stone from one part of a cave to another, although archaeologists in the Sibun region, Belize have documented transport between caverns (Nation et al. 2012:140).

The presentation in this section is organized alphabetically by material type subdivided into artifact classes, and followed up with contextualizing overviews as applicable. I combine the material description and discussion of its significance into one section in instances where only a few objects of a material type were recovered. In general, my analysis consisted of identifying material and artifact classes, and recording

dimensions and weights for all stone objects. I employ two different methods for recording dimensions that are determined by the artifact. I identify approximate maximum dimensions using a "numerical size class" for all informal lithic objects including flakes, and unworked stone objects. The number of the class refers to the maximum dimension of the object rounded up to the nearest centimeter. For example, an object that is size class 5 has a maximum dimension between 4.1 and 5.0 cm in length, width, or height. I collected exact measurements for formal tools and crafted objects such as obsidian blades, greenstone beads, and spindle whorls along all intact dimensions.

Chipped stone flakes, commonly referred to as debitage, are a common component in the karstscape artifact assemblage, and the Maya in the Pacbitun region made them from a variety of materials including chert, quartz, and quartzite. My analysis of this class of artifacts of all material types is focused on identifying debitage classes that are useful to lithicists, each of which I define briefly below. I echo Peterson's (2006:162) sentiment in my hope that this analysis can begin to facilitate future comparative studies of karst feature lithic assemblages.

Flake core: a chunk of chert from which flakes are removed.

Core tool: a chunk of chert from which flakes are removed, and that has a sharp edge with accompanying use ware. I define use ware as the presence of three or more sequential micro flakes along the sharp edge. The only example of this artifact class was recovered in Actun Subuul Unit 2.

Proximal flake: This category is defined as a flake that minimally retains it striking platform. I adopted this artifact category from Andrefsky (2005:82) who uses it to determine the minimal number of objects in an assemblage.

Flake shatter: A flake remnant that is lacking a striking platform (Andrefsky 2005:82).

Flake tool: Similar to "core tool" defined above except that the primary object is a flake rather than a core. Only two of these artifacts were recovered, which were excavated in Actun Nohoch Tunic Units 3 and 7.

Chert

Chert objects comprise the largest variety of artifact types of all lithic material in the Pacbitun karstscape assemblage, which include debitage, bifacially flaked formal tools, and imports. I recovered a combined total of 323 of these objects from Actun Lak, Actun Naj Che, Actun Nohooch Tunich, Actun Subuul, and Actun Xtuyul, the majority of which (n=291) consists of random flakes that had been mixed with *jute* (*Pachychilus* spp.) snail shells in structured caches in the rockshelters. By random I mean nonsystematic and unrelated to tool production. In other words, the flakes appear to have been part of the ritual process created specifically to be deposited along with the *jute* shells within the karst features. I discuss the significance of this connection in more detail below following the data presentation.

Debitage. I encountered chert debitage in all of the karst features that I investigated, but my excavations in Actun Naj Che and Actun Nohoch Tunich unearthed most of the material accounting for 274 out of 317 pieces (**Table 7.2**). Flakes account for 90 percent of the total chert debitage assemblage, split 70 and 30 percent between proximal flakes and shatter respectively. Informal tools are exceptionally rare and only account for 1 percent of the recovered material. The presence of cores suggests that flakes may have been produced in the karstscape although only 12 were found, and most are no more than 3 cm along their maximum dimension indicating that they may have been brought there for another yet unrecognized function (**Table 7.3**). Tabulating the range of size classes for proximal flakes presented in **Table 7.4** suggests some standardization in their production. Size classes 2 and 3 (1.1 to 3.0 cm) are well represented with 80 and 100 specimens respectively, after which the totals drop off rapidly.

Table 7.2. Tabulation of chert debitage classes recovered from excavation contexts.

Artifact class	Lak	Naj Che	Nohoch Tunich	Subuul	Xtuyul	Totals
Flake core	4	2	4	1	-	11
Core tool	-	-	-	1	-	1
Proximal flake	22	81	113	8	1	225
Flake shatter	4	26	45	2	-	77
Flake tool	-	-	3	-	-	3
Totals	30	109	165	12	1	317

Table 7.3. Tabulation of size classes for flake cores recovered from excavation contexts. Only size classes represented in the assemblage are plotted.

Size class	Lak	Naj Che	Nohoch Tunich	Subuul
3	1	2	4	-
5	1	-	-	1
7	1	-	-	-
9	1	-	-	-

Table 7.4. Tabulation of size classes for proximal flakes recovered from excavation contexts. Only size classes represented in the assemblage are plotted.

Size class	Lak	Naj Che	Nohoch Tunich	Subuul	Xtuyul	Total
2	9	30	41	-	-	80
3	9	37	49	4	1	100
4	3	6	19	3	-	31
5	1	7	4	-	-	12
7	-	-	-	1	-	1
8	-	1	-	-	-	1

Discussion. Archaeologists commonly encounter chert debitage in subterranean contexts, although predominantly in rockshelters and cave entrances rather than deep passages. For example, in a previous study, I found several random chert flakes and their cores in excavations confined to the first five meters of Torre Hun Cave, Guatemala, and noted an additional core cached in a small depression in the wall (Spenard 2006:Figure 5.25). All of these chert artifacts had similar coloring, indicating that they were parts of the same rocks. These facts led me to argue that the cores were stored in the cave and used to make flakes during ritual events there (Spenard 2006a:118). I encountered no other chert artifacts in any of my other excavations further inside the cave, even though other archaeological objects were uncovered. Additionally, I found that pattern replicated throughout all of the karst features that I investigated on that project (Spenard 2006a:119-

120). Prufer (2002:225) reports on massive quantities of chert flakes that he recovered in rockshelters in the southern Maya Mountains, Belize, in both mortuary and non-mortuary contexts. Peterson (2006:164) notes that over 75 percent of the flakes that she recovered in her investigations of five karst features in the Sibun Region, Belize came from one rockshelter, and that only three pieces out of the assemblage of nearly 150 came from the dark zone of a cave. Ishihara-Brito (2007:213) collected 250 small flakes from the main chasm in Aguateca, Guatemala, and Woodfill (2007:631) reports finding over 4,000 pieces of debitage from his regional cave investigations in the Upper Pasion Region, although he includes surface and subterranean data in his totals.

Alternatively, only a small amount of chert debitage was recovered at Naj Tunich cave, Guatemala, most of which came from the Balcony, a massive stone construction that dominates the cave's entrance chamber (Brady 1989:319). Moyes (2006a) collected only a few chert artifacts from her investigation inside Chechem Ha Cave. Pendergast (1969:53) reports finding only one flake in Actun Balam, Belize, and the material is absent in his descriptions of his excavations in other Belize caves (Pendergast 1970, 1971, 1974). Similarly, Rissolo (2003b125-126) recorded only one chert core from his aerial cave survey in the Yalahau region, Quintana Roo, Mexico.

Moving to the surface, archaeologists regularly note that chert flakes are often significant components of elite burials. For example, at Pacbitun, a bed of thousands of chert flakes 8-10 cm deep was found covering the top of slate roofing slabs of a Late Classic period royal tomb (Healy et al. 2004:230). Haviland and Moholy-Nagy (1992:54) report that masses of both chert and obsidian debitage are strong indicators of royal

tombs at Tikal. More specifically, Chase (1992) notes that a thick lens of chert and obsidian chips covered Burial 77, an interment thought to be the remains of the last known ruler at that site. Coe (1988:232) notes that in general, such a practice was common to all of the great Maya royal tombs.

The regular appearance of chert flakes in such ritually charged contexts suggests that the objects held some significance that has yet to be fully appreciated, although some archaeologists have discussed their symbolic significance. For example, Coe (1988:232) draws on Central Mexican ideology to argue that they may have been components of burial rituals because the material symbolized death and the underworld. Similarly, the Classic period Maya commonly depicted flint in their art in scenes related to death and warfare, and it has connections to the god, K'awiil, a deity associated with lightning, rain, fertile maize, and royal lineages (Bassie-Sweet 1991:29; Schele 1976; Stone and Zender 2011:49, 83; Taube 1992a:79). Alternatively, other archaeologists believe that the presence of the artifacts in ritually charged contexts suggests that the actual process of chipping stone was part of a religious framework (Sheets et al. 1992:167-168). These arguments are not necessarily mutually exclusive as elaborated below.

Most of the chert flakes from the Pacbitun karstscape were mixed exclusively with *jute* snail shells lining the bottom of a structured cache in front of the natural stone bench in Actun Nohoch Tunich. Archaeologists have noted similar patterns in rockshelters elsewhere in both Belize and Guatemala (Glassman and Bonor 2005:286-287; Prufer 2002:225; Spenard 2006; Woodfill 2007). The significance of these arrangements can be understood when placed within a broader context of the ideological

underpinnings of pre-Hispanic Maya caching practices. In particular, the Maya commonly arranged their dedicatory caches as replicas of the world (Chase and Chase 1998a:314-315; Coe 1988; Kunen et al. 2002:198; Mathews and Garber 2004; Schele and Freidel 1990:21). For the present purposes, the most significant aspect of that model is that the Primordial Sea from which the world arose at the moment of creation underlies everything (Bassie-Sweet 1996:19; Freidel et al. 1993:67; Miller and Taube 1997:148; Taube 1988; 2010; Tedlock 1996). Chert is symbolically connected to lightning as discussed above, and the relationship between *jute* and water is obvious when considering that they live in streams (Healy et al. 1990). What these data suggest is that the lowest layer in the Nohoch Tunich rockshelter cache, and perhaps, the other contexts where similar arrangements of artifacts have been found, were intentionally designed in part to replicate the cosmos. Furthermore, that the flakes are unrelated to tool production reaffirms arguments that in some cases flint knapping was done for ceremonial purposes (Sheets et al. 1992:167-168).

Formal tools. Excavations in Actun Naj Che and Actun Nohoch Tunich produced the only three formal chert tools that I recovered during my investigations, two of which came from the former rockshelter, and the other from the latter (**Table 7.5**). All three are fragments of bifacially knapped projectile points. The Actun Naj Che pieces are a tip and a midsection from Unit 2, and likely parts of the same original object (**Figure 168**). The specimen from Actun Nohooch Tunich is a midsection fragment recovered from Unit 5 Level 2. Both of its faces have extensive heat spalls indicating that it had been heat treated sometime prior to its deposition. **Table 7.5** displays the measurements for these

Table 7.5. Dimensions of chert biface fragments recovered in the karstscape.

Provenience	Thickness (cm)	Weight (g)
Nohoch Tunich Unit 5 Level 2	1.167	11.4
Naj Che Unit 2 Level 1	1.57	10.1
Naj Che Unit 2 Level 2	2.38	59.8

objects. Only thickness and weight measurements were able to be collected for all three objects due to their fragmentary nature.

Imports. This artifact category details the three unmodified chert rocks that I recovered during my excavations, two from Actun Naj Che, and the third from in front of the Entrance Platform in front of Actun Lak. By import here, I refer specifically to materials brought into the features from outside, not long-distance trade goods. I collected the first Actun Naj piece from Unit 1. It fits into size class 5, weighs 19.4 g, and is extensively weathered. Unit 3 produced the second Naj Che piece, which fits into size class 6, weighs 61.2 g and has been heat treated. The Actun Lak piece is an unmodified chert nodule recovered near the surface of Unit 12 that fits into size class 6, and weighs 90.4 g.

Granite

My excavations in the Pacbitun karstscape uncovered four granite objects, two from Actun Naj Che, and one each from Actun Nohoch Tunich and Actun Subuul, Actun Hayach Naj contained over 50 of the objects although I did not collect information about

them. Two of the collected objects are hand held grinding stones commonly called manos, one of which was excavated in Actun Naj Che Unit 3 Level 2, and the other from Actun Subuul Unit 2 Level 3. Their dimensions are presented below in **Table 7.6**. The Actun Subuul mano has one round and two flat surfaces that give it a loaf-like appearance in cross-section, resembling the triangular variety found at Barton Ramie (**Figure 169**; Willey 1965:462). Furthermore, it is complete except for a large flake removed from one of its ends, and use ware on the larger rounded surface. The Actun Naj Che mano is broad, flat, and elliptical in cross-section, resembling the rectangular-thin variety found at Barton Ramie, and its grinding surfaces are heavily polished (**Figure 170**; Willey 1965:459). Overall, this object resembles the mano performs that Ward (2013) recovered from the groundstone workshop recently discovered in the outskirts of Pacbitun. Nevertheless, the heavy polish and broad flat surfaces attest to the mano having had a long use life prior to its deposition in the rockshelter. The other two granite objects are a proximal flake from Actun Nohoch Tunich Unit 1 Level 4 that fits into size class 5 and weighs 12.9 g, and an unmodified pebble from Actun Naj Che Unit 2 Level 3 that is size class 2 and weighs 4.6 g.

Discussion. Manos are encountered in subterranean contexts frequently paired with metates, and they have been subject to several interpretations, which I summarize below (Brady 1989:304; Ishihara-Brito 2007:216; Moyes 2005a, 2006a; Pendergast 1969:54; Peterson 2006:170; Spenard 2006:123; Woodfill 2007). Nevertheless, my findings suggest that the Maya in the Pacbitun region may have incorporated cave rituals as a previously unrecognized component of the production process of those grinding

stones. Andrews (1970:32) encountered 252 unused miniature manos and metates cached in Balankanche Cave in Yucatan, Mexico, where the overall artifact assemblage indicates that rain rituals were the primary focus of activities there, which suggests that the grinding implements were involved in those ceremonies. MacLeod and Puleston (1978:72) found an association between the grinding implements, bloodletting paraphernalia, and human remains in Petroglyph Cave, suggesting to them that the objects may be related to auto- and human sacrifice. Alternatively, archaeologists have drawn on the *Popol Vuh,* the 16th century Quiche account of creation, which relates that humans were made from corn that was found in a cave and ground with mano and metate into dough by the creator grandmother, to suggest that the pre-Hispanic Maya may have used the implements in the caves to reenact that story (Bassie-Sweet 1996:31; Prufer 2002:219; Spenard 2006:123;Tedlock 1996:43). Nevertheless, the large quantity of manos noted in Actun Hayach Nah closely resemble those recovered in the recently discovered granite workshop on the outskirts of Pacbitun investigated by Ward (2013). The similarities suggest that cave ritual may have been involved in the production process in some manner that has yet to be determined.

Table 7.6. Provenience and measurements of manos recovered in the karstscape.

Provenance	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)
Naj 3-2	8.71	6.82	4.412	400
Noh 2-3	12.8	7.90	6.24	800

Jadeite

Excavations in Units 1, 2, 6, and 7 adjacent to the altar in Actun Lak Chamber uncovered one hundred and thirty seven jadeite objects including beads, ear spool flares, and undefined worked pieces (**Figure 171**). The beads are in various states of completeness, but account for the bulk of material recovered (n=124), followed by the undefined worked pieces (n=10), and ear spool fragments (n=3). Miller and Taube (1997:101) note that ancient Mesoamericans used the greenstones, jadeite, albite, and diopside to produce the same precious objects, but that the former is the hardest of the three falling between 6.0 and 7.0 on the Mohs' hardness scale. I attempted hardness tests on the objects to determine which greenstone they are, but the results were inconclusive because all of the material is brittle due to the high heat of the burning events at the altar. Furthermore, several have burned residue on their outer surfaces indicating that they may have been embedded in lumps of resin similar to those recovered from the Cenote of Sacrifice at Chichen Itza (**Figure 172**; Coggins and Ladd 1992; Proskouriakoff 1972). Lastly, the colors of the material ranged from nearly white to dark, apple-green, the latter of which the Maya considered to be the most valuable (Miller and Martin 2004:86).

Beads. I identify three classes of beads based on their state of completeness. A whole bead is one that retains more than 90 percent of its outer surface. Partial beads are those that retain enough of the original object so that either length or outer diameters are measureable. Drill holes are biconical in all but one instance, and I measured their diameters when possible, but they are often too irregular to obtain. Bead fragments are differentiated from undefined worked pieces by their round outer surfaces or by the

remains their boreholes. Overall, all but one of the beads are undecorated. The one that is has a dark apple green color and has single incisions at either end that run along its outer circumference that give it a collard appearance. Another group of regularly spaced lines was carved on the outer surface that follow the bead's long axis (**Figure 173**). **Table 7.7** tabulates the greenstone bead classes, **Table 7.8** presents a tabulation of bead fragment counts and weights by provenience, and **Table 7.9** provides provenience and measurement information for the whole and partial beads.

Table 7.7. Tabulation of jadeite bead classes recovered in the karstscape.

Whole bead	Partial bead	Bead fragment
3	22	99

Table 7.8. Tabulation of jadeite bead fragment quantities and weights by provenience.

Provenance	Qty.	Weight (g)
Lak 1-1	3	0.9
Lak 2-1	2	1.2
Lak 2-2	40	9.0
Lak 6-1	5	1.3
Lak 6-2	35	6.0
Lak 7-1	5	0.2
Lak 7-2	7	0.4
Lak 7-3	2	0.1

Table 7.9. Provenance information and measurements for whole and partial jadeite beads.

Provenance	Type	Color	Weight (g)	Length (cm)	Outer Diameter (cm)	Bore hole diameter (cm)
Lak 2-1	Whole bead	Green	1.3	0.67	1.16	-
Lak 2-1	Partial bead	Green	0.6	0.816	-	
Lak 2-1	Partial bead	Green	0.4	0.778	-	
Lak 2-1	Partial bead	Green	0.4	0.585	0.895	0.334
Lak 2-1	Partial bead	Green	0.6	1.055	-	-
Lak 2-1	Partial bead	White	0.3	0.687	-	-
Lak 2-1	Partial bead	Green	0.8	0.625	0.989	0.485
Lak 2-2	Whole bead	Green	2.6	0.84	1.35	-
Lak 2-2	Partial bead	Green	2.6	1.373	-	-
Lak 6-1	Partial bead	Green	0.9	0.855	-	-
Lak 6-1	Partial bead	White	0.8	0.844	-	-
Lak 6-1	Partial bead	Green	1.5	1.074	-	-
Lak 6-1	Partial bead	Green	0.2	0.752	-	-
Lak 6-1	Partial bead	Green	0.6	0.862	-	-
Lak 6-1	Partial bead	Green	0.5	0.737	-	-
Lak 6-1	Partial bead	Green	0.6	0.889	-	-
Lak 6-2	Partial bead	Green	1.2	0.975	-	-
Lak 6-2	Partial bead	Green	0.1	0.544	-	-
Lak 6-2	Partial bead	Light green	0.2	0.656	-	-
Lak 7-1	Partial bead	Green	0.2	0.59	-	-
Lak 7-1	Partial bead	Green	0.5	0.74	-	-
Lak 7-1	Partial bead	Green	1.2	0.9	-	-
Lak 7-1	Partial bead	Green	3.4	1.378	1.544	-
Lak 7-1	Whole bead	Green	0.4	0.43	0.75	0.285

Ear spool flares. I recovered three ear spool flare fragments in Unit 2 Level 1, two of which refit (**Figure 174**). The two flares share a similar light green color, and their overall similarities suggest that they were likely part of the same set when whole, but their differing diameters indicate that they are separate items. I refer to them here as Flare 1 and Flare 2 for ease of description. Flare 1 is composed of the two pieces that refit, which together make up approximately one-third of the original object. It weighs 1.6 g, has a wall thickness of 1.84 cm, and its diameters measure 3.5 cm and 2 cm for the flare

lip and inner plug respectively. The remnants of Flare 2 are in poor condition, and only the out lip remains. The object is burned, its exterior surface is extensively pockmarked, and the wall of the plug portion has been snapped off. Whether these modifications are the result of human agency or exposure to the intensive heat during the burning events is unknown, although the later is more likely. It weighs 0.6 g, has a wall thickness of 0.295 cm, and the outer flare has a diameter of 2.5 cm.

Other. This is a residual category for unclassifiable jade objects, all of which appear to be polished pebbles. Units 1, 7, and 7 produced ten objects of this class weighing 11.9 g in total. Each has a unique shape, and all unfractured surfaces were polished indicating that they were created from pebbles as unique items rather than fragments of a larger object (**Figure 175**).

Discussion. Greenstone was the most valued material throughout ancient Mesoamerica, and its presence and quantity in the altar area of Actun Lak indicates royal participation in the rituals there. Simply put, the material was synonymous with rulership and supernatural power (Miller and Taube 1997:102; Taube 2005a:25). For example, the Maya carved images of their kings ornamented with jade belt celts, necklaces, ear spools, and crown-like head jewelry on their public stone monuments. Kings and jade are so inextricably linked that the taking of it from a war captive was used as a status-stripping insult (Taube 2005a:23). Nevertheless, the stone was understood as more than a royal status indicator, it was a complex symbol that represented maize, wealth, moist breath, wind, ancestors, and the world center (Taube 1998:427, 2005a). The greenstone objects like those recovered from Actun Lak held specific symbolic connotations beyond those of

the stone. For example, beads represented vital breath, raindrops, and corn kernels (Marcus 2007:57; Taube 2005a). Iconographic depictions of ear spools often displayed them emitting moist breath, and rain (Taube 2005a). These associations suggest that a royal personage made the greenstone offerings in Actun Lak as petitions for rain and agricultural fertility.

Limestone

Three distinct portable limestone artifact classes were recovered during my investigations including beads, a celt-like object, and a spindle whorl. Additionally, the pre-Hispanic Maya regularly moved imported limestone boulders around the karstscape, most frequently to create small-scale spaces such as the terraces in Actun Lak and Actun Ku'uk, and the stone alignments noted throughout the Nohoch Tunich Bedrock Outcrop Complex. Those architectural features are discussed throughout the feature descriptions in Chapter 4, and I do not elaborate on them here. Instead, my focus is on the portable objects in this sections.

Beads. I analyzed the limestone beads using the same analytical process described above for those of greenstone. All of these artifacts were recovered from the excavations adjacent to the altar in Actun Lak Chamber 2, and a total of seven, one whole and six fragments, were uncovered (**Table 7.10**). Their boreholes are the result of biconical drilled and their outer surfaces are heavily polished, although their exposure to the events at the altar left them heavily burned and brittle.

Table 7.10. Provenience information and measurements for whole and partial limestone beads from Actun Lak.

Provenance	Type	Weight (g)	Length (cm)	Outer Diameter (cm)
2-1	Bead frag.	0.1	-	-
2-1	Bead frag.	0.2	-	-
2-1	Bead frag.	0.2	-	-
2-1	Bead frag.	0.3	0.837	-
6-1	Bead frag.	0.8	1.119	0
6-1	Bead frag.	0.1	-	-
7-1	Bead frag	1.9	1.249	1.321

Celt. I recovered a single, roughly hewn celt-like object from Actun Naj Che Unit 1 Level 2, which is the same location that produced the only human remains during my investigations. It is 9.3 cm wide and currently 12.5 cm long although one of its ends is fractured indicating that it was larger at one time (**Figure 176**). Possible battering ware is present although minimal. Overall, the function of this object is unknown although its association with the human remains suggests that it had a funerary purpose.

Spindle whorl. One spindle whorl was excavated in Actun Nohoch Tunich Unit 7 Level 1, which represents the only object of this class that I recovered during my investigations (**Figure 177**). It has vertical sides, a rounded top, and a flat bottom, traits that together resemble in profile known stone whorls from other sites (Moholy-Nagy 2003:Figure 106). The object weighs 20.2 g, and measures 1.708 cm tall. The outer diameter is 2.73 cm and the size of the center hole varies from 0.657 cm on the rounded side to 0.549 cm on the flat bottom. The whorl's outer surface is undecorated and in overall excellent state of preservation, save for a single large chip in its flat bottom suggesting that it had been symbolically killed prior to its final deposition in the

rockshelter. Both stone and ceramic spindle whorls are common artifacts in cave assemblages, where they are often understood to be components of rain rituals due to the close affiliation between clouds and weaving (Ciaramella 1994, 1999; see Brady 1989:302-303 for discussion and summary of caves where they have been found).

Obsidian

Obsidian is a volcanic glass that occurs in several areas throughout the highlands of Mesoamerica. The Maya primarily obtained the material from three sources in present day Guatemala, El Chayal, Ixtepeque, and San Martin Jilotepeque. I recovered five obsidian artifacts from the karst features examined in this study, and used the previously established visual criteria to preliminarily source the material (Braswell et al. 2000:Table 1). The interested reader is directed to that defining study for an in-depth discussion of this sourcing method (Braswell et al. 2000). All of the artifacts in this category are prismatic blades in various stages of completeness, and I recovered them from Unit 5 Level 6 and Unit 17 Level 1 in Actun Lak, and Unit 1 Level 2, and a wall cleaning of Unit 2 in Actun Naj Che (**Figures 178**). All but the blades from Actun Lak Unit 5 and Nohoch Tunich Unit 2 are fragments, and all three major obsidian sources listed above are represented in the assemblage. Actun Naj Che investigations produced all of the El Chayal obsidian, and those specimens from the other two sources are associated with Actun Lak. **Table 7.11** presents the dimensions, weights, and suspected source for each of the blades.

Table 7.11. Dimensions and weights of obsidian blades. CHA= El Chayal, IXT= Ixtepeque, and SMJ= San Martin Jilotepeque.

Provenance	Length (cm)	Width (cm)	Thickness (cm)	Weight (g)	Source
Lak Unit 5 Level 6	6.91	1.02	0.255	2.3	IXT
Lak Unit 11 Level 2 Feature 2	1.3	0.78	0.185	0.2	IXT
Lak Unit 17 Level 1	1.71	0.99	0.338	0.6	SMJ
Naj Unit 1 Level 2	2.05	1.15	0.117	0.6	CHA
Naj Unit 2 Levels 1-3 N Wall Clean	6.07	1.61	0.337	4.1	CHA

Discussion. The Maya used prismatic obsidian blades in ritual settings as bloodletting implements, and their presence in the Pacbitun karstscape indicates that activity happened in some of those features (Miller and Taube 1997:125; Schele and Miller 2001:175). Little more can be said about the fragments from Actun Lak Unit 17, and Naj Che Unit 2 beyond suggesting that the Maya used them to let blood in those places. On the other hand, the remaining three objects were affiliated with special contexts within the karst features that indicate that the practices was involved in the creation of masonry architecture and the interment of human remains in the Pacbitun karstscape. The Maya had buried one of the two complete blades that I recovered just above the Fine Orange bowl in the bottom of Actun Lak Terrace 1. The placement of these two objects suggests that the blood offering that they represent initiated the extensive Terminal Classic period modification project to the Entrance Area of that cave. Similarly, one of the fragments was recovered directly beneath the proposed centerline slate cache in the middle of the Entrance Platform in front of the same cave. The

placement of these two blades indicates that bloodletting was closely associated with masonry construction projects in the Pacbitun karstscape.

The final obsidian fragment was associated with the disarticulated human remains in Actun Naj Che, as well as *jute* snail shells, chert flakes, and charcoal, among other objects. The co-occurrence of these remains and artifacts is part of a broad pattern of mortuary rockshelter use documented throughout the southern Maya Lowlands that has only begun to be discussed in earnest since 2005 (Bonor and Glassman 1999; Glassman and Bonor 2005:286-287; Prufer 2002:225; Spenard 2006). Based on these connections, I suggest here these objects from Actun Naj Che were used to symbolically inter the remains of the deceased into the watery underworld and that blood offerings were also made as part of the ceremony.

Slate

Slate is ubiquitous in both the Pacbitun karstscape and its settlement (Healy et al. 1995:341). I recovered it in almost every level of every unit in every cave and rockshelter that I excavated, and noted it in most others. Of all of the places that I sunk units, the only area that regularly failed to produce any slate objects was the immediate vicinity of the altar in Actun Lak Chamber 2, and the area directly below it, save for one small piece from the surface of Unit 2. This absence is notable when considering that I found it nearly everywhere else in the cave, including the Sloth Alcove located only a few meters away.

During my reconnaissance of the region, I noted that slate boulders of varying size are abundant in stream and creek beds that flow seasonally throughout the area, although smaller pieces of it become readily available on the ground surface as one moves into the Mountain Pine Ridge. I also noted that the color of the material ranges widely and includes silver (10YR 8/2), dark gray (N3), tan (10YR 8/6), and deep red (10R 4/6), the latter two of which are due to iron pyrites that regularly occur with slate in outcrops (**Figure 179**; Healy et al. 1995:340). Additionally, the colors can be mottled or separate ones can appear on the different sides of the same rock. All of the different hues and a variety of color combinations are represented in the karstscape assemblage but dark gray occurs the most. No further distributional patterns were discernable indicating that the color of the material was of secondary importance to the Maya when selecting which of the rocks to include in their ceremonies. Nevertheless, I have observed that nearly all of the slate objects found in surface contexts around the Belize Valley are pure gray.

Quantifying this material overall proved difficult because it readily fractures along sheeting planes, most of the pieces are small, and, as a result, determining if they belonged to a single decomposing rock, or if they were deposited as separate items was not possible. In these cases, I record the total weight of the questionable pieces, measure the largest to provide a size class, and tabulate the data by unit in **Table 7.12**. Overall, this questionable material accounts for 10,792 g of the total 16,709 recovered during excavations. Nevertheless, I was able to identify some individual rocks within the units of which I recorded 144 pieces weighing 5918 g, as presented in **Table 7.13**. Five of those

pieces weighing 3847 g are worked, by drilling in two cases, and shaping in the other three, as detailed in **Table 7.14**.

Discussion. Slate is abundant at Pacbitun, and its presence in the karstscape is thus expected (Healy et al. 1995). The archaeologists working at that site have found it in deposits from all time periods of the sites' occupation, but that it has strong ties to the elite. For example, a small annex on the palace complex was revealed to be a late Late Classic period workshop specializing in the production of large slate slabs (Bill 1985). The Pacbitun Maya used the slabs as roofing stones in elite burials, analogous to those made of chert or limestone documented at other sites (Healy et al. 1995:340).

Table 7.12. Tabulation of weight and size class of indeterminate slate pieces by unit.

Karst feature	Provenience	Weight (g)	Largest size class
Lak	Unit 4	331.3	10
	Unit 5	265.7	11
	Unit 10	1330.4	14
	Unit 11	7154.5	15
	Unit 12	70.2	5
	Unit 13	22.9	5
	LP E of U1	68.2	9
	Unit 16	42.3	7
	Unit 17	269.7	9
	Unit 18	136.9	8
Naj Che	Unit 2	54.1	3
	Unit 3	191.3	8
Nohoch Tunich	Unit 1	141.6	9
	Unit 3	222.5	10

Table 7.13. Tabulation of quantity, weight, and largest size class of unmodified slate rocks by unit.

Karst feature	Provenience	Count	Weight (g)	Largest size class
Lak	Unit 2	1	24	7
	Unit 3	9	53.2	5
	Unit 4	3	5.3	4
	Unit 5	14	950	17
	Unit 8	4	32.8	6
	Unit 9	1	0.9	2
	Unit 11	3	121.1	10
	Unit 14	2	2.3	2
	Unit 15	5	55	6
	Mod. Hill	2	44.5	6
Naj Che	Unit 1	3	32	4
	Unit 2	17	65.7	9
	Unit 3	9	16.6	3
Nohoch Tunich	Unit 1	19	54.5	4
	Unit 2	6	36	5
	Unit 3	3	10.5	4
	Unit 4	2	10.9	3
	Unit 5	6	18.7	3
	Unit 6	6	69.6	8
	Unit 7	4	13.8	5
	Unit 3/5 F2	1	2.4	3
Subuul	Unit 1	2	41.9	6
	Unit 2	10	158.8	7
	Mitigation	4	69.7	6
Xtuyul	Unit 1	1	2.6	3
Kajaw Tunich	Unit 1	1	4.5	3

Table 7.14. Worked slate objects recovered from Actun Lak.

Provenience	Artifact type	Size class	Weight (g)	Color	Comment
Unit 3 Level 1	Indeterminate	6	18.9	Gray	Possible unifacially worked projectile point but the tip is broken.
Unit 4 Level 1	Drilled	8	116.5	Silver	Biconically drilled, 6.49 mm in diameter
Unit 5 Level 5	Block	14	700	Gray	
Unit 5 Level 6	Block	24	2900	Gray	
Unit 8 Level 1	Drilled	9	111.3	Gray	Single drill hole or punched. Hole is 13.13 mm in diameter

Nevertheless, the pattern has been documented at other sites in Belize such as Caracol and at a small mound directly outside of Actun Tunichil Muknal Cave in the Roaring Creek Valley (Chase 2004:342; Song et al. 2000:216). Furthermore, the rock type is commonly found at sites throughout the Maya area, and as far south as Costa Rica, where it retains is connection with the elite, but there they are consumers rather than producers (Healy et al. 1995:Table 2). For example, archaeologists most regularly encounter portable finished artifacts such as mirror backings, ceremonial maces, axes, bark-beaters, figurines, pendants, beads, celts, *patolli* boards, and vessels in royal funerary contexts (Healy et al. 1995:340). The pre-Hispanic Maya also used slate in the Belize Valley to produce stelae that are found in site centers and cave contexts (Awe et al. 2005:227; Awe and Helmke 1998; Ehret and Conlon 1999; Healy et al. 2004:213; Song et al. 2000:216).

Even though slate artifacts are common as just discussed, few archaeologists collect, let alone report the material when they encounter it in an unmodified form, which prohibits a full understanding of its use (Healy 1995:341). Nevertheless, it is regularly reported from cave contexts throughout the southern Maya Lowlands in both modified and unmodified form, although often only a few pieces are present when found (Brady 1989:308-309; Ferguson 2000:167; Ishihara-Brito 2007:142; Moyes 2006a:207; Pendergast 1969:54; Peterson 2006:Table 4.7; Prufer 2002:225; Woodfill 2007:630). The ubiquity of slate in the karst features around Pacbitun thus appears to be a represent a localized ceremonial practice that is unique to the region. While the proximity to local slate sources in the Mountain Pine Ridge certainly helped facilitate the practice, it does not appear to have been common in other areas near known outcrops. For example,

several sources are present in the southern Maya Mountains, but the material is infrequently reported in the caves there (Dunham 1996:326-327; e.g. Ishihara-Brito 2002; Ishihara-Brito et al. 2011; Prufer 2002:225). An area to the south of the site of Guacamayo on the Macal River, nine km west of Pacbitun, is known today as "Black Rocks," and is the primary material source for the workers in the souvenir slate carving industry in San Ignacio town. This outcrop is near Actun Chapat, Actun Halal, and Chechem Ha, in which only a few slate objects have been reported (Ferguson 2000:167; Griffith and Helmke 2000; Moyes 2006a:207). Perhaps more significantly is that another cave known by a variety of names including Black Rock, Flour Camp, and Uchentzub is located in the immediate Black Rocks area, and only one unmodified slate slab was found within (Gifford 1976; Ishihara-Brito 2001a; Schmidt 1976-1977). Similarly, slate deposits can be found throughout the Sibun floodplain but only 10 finished artifacts were recovered during archaeological investigations in the caves of that region (Peterson 2006:171).

Speleothems

The word "speleothem" is as a general term that refers to any secondary mineral deposit found in a karst settings, and they are commonly known as "cave formations," or simply "formations" (Palmer 2007:413). Although they are native to karst environments, a close inspection of the area surrounding a formation find spot can assist in determining whether it arrived there as a result of human agency, or if it is likely to have gotten there

due to non-human action, and is thus not an artifact. Most speleothems form as a result of water percolating through cracks and fissures in limestone bedrock that dissolve the parent material and then deposit it elsewhere as the liquid drips, flows, or evaporates (Palmer 2007:271). How the water deposits the mineral will determine the type of formation that grows. For example, stalactites form as water drips down towards the ground, frequently also resulting in the growth of stalagmites up towards them. Each type of speleothem requires a specific set of conditions to grow, and therefore, if a formation is found in an area that lacks even one of those, then it could not have grown there and human agency is most likely responsible for its placement. I refer to these objects as cultural speleothems.

Using the above criteria, I identified three classes of cultural speleothems in the Pacbitun karstscape, soda straws, cave pearls, and indeterminate, that are tabulated in **Table 7.15**. Soda straws formations are named so because they are long, thin-walled, hollow, and tubular, closely resembling their namesake. Cave pearls are layered concretions that form in pools, and are often found in shapes that resemble the jewels after which they are named (Hill and Forti 1997:84). Nevertheless, I did find other speleothems in locations where the situation was less clear, and they are referred to here as "indeterminate."

Table 7.15. Cultural speleothems from the Pacbitun karstscape.

Cave	Provenience	Speleo. type	Qty.	Weight (g)
Actun Lak	1-1	Indeterminate	3	32
	2-1	Soda straw	1	0.1
	4-1	Soda straw	10	2
	4-2	Indeterminate	18	41
	4-3	Indeterminate	32	15
	5-1	Indeterminate	1	15
	5-3	Indeterminate	1	20
	5-4	Indeterminate	1	3
	6-1	Indeterminate	15	20
	6-2	Indeterminate	8	1
	7-1	Indeterminate	31	6
	7-3	Indeterminate	3	0.5
	9-1	Soda straw	1	1
	10-3 Feat. 1	Cave pearl	7	0.1
	13-1	Indeterminate	6	451
	13-1	Soda straw	13	10
	LP E of U1	Cave Pearl	3	3
Naj Che	3-4	Soda straw	1	0.5
Nohoch Tunich	3-4	Soda straw	2	4
	5-4	Indeterminate	5	102
	7-1	Indeterminate	4	16
	7-2	Soda straw	2	6

Soda straw bead. This is an extremely rare speleothem artifact type that has yet to be documented elsewhere in the Maya Lowlands, although a drilled stalagmite has been recovered from a site in northeast Honduras that likely dates to the Late Classic period (Brady et al. 1997:737). Soda straw formations are thin walled, and easily crushed and as such they are unlikely to survive the ravages of time, indicating that they were likely more common than current evidence suggests (Spenard et al. 2013:153). A total of 14 beads were found, all in Actun Lak from Units 3, 4, 6, 7, and 13, and they range from 0.66 cm to 2.15 cm long (**Table 7.16**). They are identified only by their distinctive, angular cut ends, which if missing make identifying them difficult (**Figure 180**). The

overall shape, size, and angling of the cut are similar to tubular obsidian beads recovered from the Cenote of Sacrifice at Chichen Itza (Moholy-Nagy and Ladd 1992:Figure 5.14-2 and 3).

Table 7.16. Measurements, weights, and counts of Actun Lak soda straw formation beads. Lengths are only presented when both cuts ends are present, otherwise they are treated as fragments and tabulated together when from the same provenience.

Provenience	Qty.	Weight (g)	Length (cm)	Diameter (cm)
3-2	1	0.5	1.88	0.505
3-2	1	0.9	2.15	0.505
4-3	1	0.4	-	0.612
4-3	1	0.6	1.18	0.552
4-3	1	0.3	-	0509
6-1	4	0.4	-	-
7-1	1	0.2	0.66	0.62
7-1	1	0.2	1.18	0.468
7-1	1	0.2	-	0.418
13-1	2	1.3	-	-

Quartz

A combined total of 11 debitage and imported objects make up the two quartz artifact classes recorded in the Pacbitun karstscape assemblage. Actun Nohoch Tunich produced seven of the artifacts, Actun Naj Che held five, and Actun Xtuyul one. I analyzed the debitage using the same criteria discussed above for chert objects of that class.

Debitage. This class comprises 10 of the 11 quartz artifacts recovered in the Pacbitun karstscape, which were restricted to Actun Nohoch Tunich, and Actun Naj Che (**Table 7.17**). Six pieces came from the former rockshelter, and all but one are proximal flakes. The other is a flake lacking a striking platform and is therefore categorized as shatter. Three of the Actun Naj Che pieces are proximal flakes, and the fourth is a core. The distribution of the objects in this artifact class is notable due to their restriction to particular areas within the rockshelters. I encountered those from Actun Nohoch Tunich in the excavation units adjacent to the natural bench in the center of the feature, and the objects from Actun Naj Che all came from the same unit. Nevertheless, whether these distributions reflect actual depositional patterns or are the result testing bias is unknown due to the small sample size.

Imports. One large cracked pebble recovered during surface collections in Actun Xtuyul is the sole representative of this artifact class (**Figure 181**). It is size class 5 and weighs 76.6 g. Artifacts associated with this rock include the ceramic mold described above as well as several burned seeds found near it.

Discussion. Quartz objects appear with some regularity in subterranean artifact assemblages, although usually in small quantities (Halperin 2002:103; Ishihara-Brito 2007; Spenard 2006a:124; Woodfill 2007:626). Comparisons to ethnographic accounts suggest that the Maya may have used these objects as well as other crystals for shamanistic curing and divination (Brown 2000; Brady and Prufer 1999; Hanks 1990:246-248; Love 2004:15-20; Tedlock 1982:59; Wisdom 1940:345). Sastun are a special type of stone, whose name translates to "transparent, bright clear, or light stone,"

but the word is used colloquially to refer to a special class of round divining crystals, usually made from quartz, similar to the pebble recovered from Actun Xtuyul (Brady and Prufer 1999; Brown 2000; Hanks 1990:246; Hofling and Tescún 1997; Love 2004:12). Furthermore, Tedlock (1982:59) notes that the basic tools of day-keepers in highland Guatemala are crystals and divining seeds. When considering the above ethnographic evidence, the presence of the round quartz pebble and burned seeds in Actun Xtuyul strongly suggest that rockshelter may have been used as a location for divination.

Table 7.17. Tabulation of all quartz debitage classes recovered.

Provenance	Artifact type	Weight (g)	Size class
Nohoch Tunich 1-4	Proximal flake	1.3	2
Nohoch Tunich 1-4	Proximal flake	0.4	1
Nohoch Tunich 1-6	Proximal flake	0.1	1
Nohoch Tunich 3/5 Feature 2	Shatter	2.3	2
Nohoch Tunich 5-4	Proximal flake	5.4	3
Nohoch Tunich 5-4	Proximal flake	0.5	2
Naj Che 2-1	Proximal flake	0.2	1
Naj Che 2-1	Proximal flake	0.4	1
Naj Che 2-2	Proximal flake	0.8	2
Naj Che 2-3	Flake core	38.2	5

Quartzite

All karstscape investigations only recovered two proximal quartzite flakes, but both are massive in size. One collected in Actun Hayach Naj is size class 11, and weighs

235.3 g. Cortex covers nearly 70 percent of its dorsal surface, while the remaining 30 percent is flake scars (**Figure 182**). Excavations in the Entrance Platform of Actun Lak uncovered the other proximal quartzite flake. This specimen is size class 9 and weighs 166.4 g. The large size of both flakes is suggestive of primary cobble reduction, although their recovery in a ritual contexts in conjunction with a lack of hammer stones and other debitage indicates an alternative, unknown function for them.

Other

This is a residual category for rock objects that are difficult to classify due either to their form, mineral type, or uncertain origins, although human agency is likely responsible for their presence in the karst features. The materials discussed in this section include calcite, concretions, hematite, igneous rock, indeterminate rock, limestone, and sandstone.

Calcite. This material is a translucent crystal that Maya healers use today in a manner analogous to quartz discussed above (Brady and Prufer 1999). I encountered them regularly while excavating Actun Lak, Actun Naj Che, and Actun Nohoch Tunich, but they are also a component of the local bedrock near those karst features. As a result, I was unable to differentiate between artifacts and natural cave spall.

Concretion. I recovered three concretions during my investigations of Actun Lak and Actun Naj Che. The latter cave produced two, one from Unit 6, and the other from Unit 8. Both are small objects of unknown origin. The third concretion is a massive round

object that weighs 1800 g recovered from Actun Naj Che Unit 1 Level 2 (**Figure 183**). Its origins are unknown but it is associated with the only human remains recovered in that rockshelter indicating that it may have been a burial object.

Hematite/pyrite. Excavations in Actun Lak Unit 1, Actun Naj Che Unit 2, and Actun Nohoch Tunich Unit 1 each produced single nodules that are either hematite or pyrite . The Actun Lak object is the smallest of the three, fitting into size class 0.5 and weighing less than 0.1 g. The Actun Naj Che specimen is the largest, fitting into size class 3 and weighing 12.9 g. Lastly, the Nohoch Tunich nodule fits into size class 2 and weighs 3.2g. The pre-Hispanic Maya commonly used hematite and pyrite to make portable artifacts such as mosaic mirrors and mosaics, as a component for dye to make red stucco, and as a tempering agent for pottery (Coe 1965:601; Gifford 1976:88; Miller and Taube 1997:62). Nevertheless, it is rarely reported from cave contexts (except see Spenard 2006:124; Woodfill 2007:678).

Igneous rock. I recovered three gray colored igneous rocks objects during my investigations of the Pacbitun karstscape, one each from Actun Jcheehem, Actun Lak, Actun Naj Che. Surface collections in Actun Jcheehem produced the largest of the three measuring 11.8 cm long, 6 cm wide, 2.9 cm thick, and weighing 271.4 g (**Figure 184**). The object's overall shape resembles a mano, although all of its surfaces are rough, covered in pockmarks, and has a grainy texture indicating an alternate function. A large chip has been removed from the end of one of the sides, although no battering ware is present that would indicate human agency in its removal. Both the Actun Lak and Actun Naj Che pieces are gray chunks of igneous rock. I recovered the former from Ledge 3,

which fits into size class 5, and weighs 24 g, and the latter chunk from Unit 2 Level 3, which is size class 3, and weighs 10.1 g.

Indeterminate stone. This is a catchall category for stone objects whose material type could not be determined. It includes formally worked objects, flakes, and unmodified imports. The formally worked object is a small, banded tan and brown colored bead recovered from Actun Lak Unit 2 Level 1 that has an incision on the side wall. It weighs 0.1 g and has a height of 0.358 cm. In some ways the material visually resembles shell, although it is hard and dense suggesting that it is stone. The flake is a piece of shatter recovered from Actun Nohoch Tunich Unite 3 Level 4. It is size class 4, weighs 12.7 g, is gray in color and visually resembles crystallized slate. The imported items include three water-worn pebbles that resemble river cobbles, and a possible igneous rock that is otherwise unmodified. The pebbles are from Actun Nohoch Tunich Unit 3/5 Feature 2, and Actun Naj Che Unit 3 Levels 2 and 4. The former pebble is size class 4, weighs 12.2 g, and is gray in color. The Naj Che Level 2 pebble is size class 2, weighs 2.6 g and is black in color. The final pebble is size class 4, 11.6 g, and is shattered. The possible igneous rock is size class 2 and weighs 1.2 g.

Sandstone. I recovered one round, fire cracked sandstone cobble from Actun Nohoch Tunich Unit 4. The object is a size class 6 and weighs 189.6 g.

Faunal Remains

With the exception of shell, faunal remains coeval with Pre-Hispanic Maya use of the Pacbitun karstscape are nearly absent. Nevertheless, my recovery of the remains of several extinct giant ground sloth species in Actun Lak indicate that at least some of the features have conditions favorable for bone preservation, and therefore, the lack of faunal material is likely indicative of the nature of the rituals performed there (De Iuliis et al. 2014; Spenard 2012:147; Stanchly et al. 2013). Overall, I recovered 3,805 unique faunal remains of which 3,771 belong to the riverine snail, *jute* (*Pacychillus* spp.). The only post-Pleistocene non-aquatic animal remains are microfauna recovered from flotation samples gathered in Actun Lak that likely belong to common cave dwelling animals such as bats and rodents, and from Actun Naj Che, the long bone of a small animal, and an herbivore tooth. These non-shell remains are likely to have arrived in the karst features as a result of natural processes and therefore, I give no further consideration to them in this dissertation.

Shell

My investigations revealed both worked and unworked shell, and the former category is composed of a variety of bead forms, while the latter is primarily *jute* remains. Based on distribution patterns recorded at Pacbitun, the results of these analyses

suggest that the elite Maya used Actun Lak as a ritual space during the Late Classic period, although the data are less clear about the other karst features.

Worked Shell

Shell bead production was a chief economic concern of the inhabitants of Pacbitun throughout its settlement history, and those objects made from marine species were indicative of elite status throughout the Classic period (Hohmann 2002; Spenard et al. 2013). I recovered 16 worked shell objects all from Actun Lak, six of which are conch (*Strombus* spp.). I employ the shell typology previously established for investigations at Pacbitun by Hohmann (2002:104-109), and summarize the following definitions from her work. The data from these analyses are presented in **Table 7.18**, and illustrations appear in **Figure 185**.

Beads. Beads appear at Pacbitun in a wide variety of size, shape, and species used in their production. Hohmann (2002:105-106) subdivides this artifact class into several sub-types to account for that variability. I identified two of her sub-types among Actun Lak shell assemblage, which include disk and irregular beads. Disk beads are the most common in the Belize Valley and are circular to oval in shape. They have been perforated in their centers by biconical drilling, and their edges prepared by grinding or smoothing (**Figure 185a**). The shapes of the objects of this sub-type that I recovered range from flat to spherical in profile. Furthermore, calcium carbonate covered one of the beads from the looter back dirt screening east of Unit 1, indicating it had been exposed to dripping water

Table 7.18. Results of worked shell analysis. Weight is reported in grams, and measurements given in centimeters. Irr indicates a bead that is too irregularly shaped to collect a measurement. N/A indicates a measurement category that is not applicable to the artifact type. Length and width measurements are provided in lieu of diameters for disk beads that are oval shaped.

Provenience	Type	Shell name	Weight	Diam.	Length	Width	Thickness	Bore hole diam.
Lak 2-1	Irregular bead	Indet.	3.5	N/A	2.341	2.497	0.267	0.26
Lak 3-1	Disk Bead	Indet	0.4	0.886	N/A	N/A	0.44	0.21
Lak LP E of U1	Disk bead	Indet	0.2	0.728	N/A	N/A	0.342	Indet
Lak LP E of U1	Tinkler	*Olivella*	6.2	N/A	3.41	N/A	N/A	0.266
Lak LP E of U1	Disk bead	Indet	0.6	1.398	N/A	N/A	0.338	0.211
Lak LP E of U1	Disk bead	Conch	1.2	N/A	1.339	1.197	0.863	0.257
Lak LP E of U1	Disk bead	Conch	1.7	N/A	1.538	1.309	0.751	0.263
Lak LP E of U1	Disk bead	Conch	0.4	0.915	N/A	N/A	0.412	0.21
Lak LP E of U1	Disk bead	Conch	2.7	N/A	1.192	1.55	0.787	0.248
Lak LP E of U1	Disk bead	Indet	0.6	N/A	1.295	1.107	0.437	1.168
Lak LP E of U1	Disk bead	Indet	0.3	N/A	1.065	1	0.266	0.202
Lak 5-4	Detritus	Conch	1	N/A	N/A	N/A	N/A	N/A
Lak 8-2	Disk bead	Conch	0.6	N/A	1.145	N/A	0.331	0.22
Lak 13-1	Disk bead	Indet	1	1.488	N/A	N/A	0.377	0.235
Lak 13-1	Disk bead	Indet	1	1.334	N/A	N/A	0.198	0.264
Lak 13-2	Disk bead	Indet	0.2	0.798	N/A	N/A	0.175	0.167

in a karst environment prior to its deposition in the dry Chamber 2. Irregular beads are those that have irregular outlines, their edges display little to no modification, and they have been drilled in their centers (**Figure 185b**).

Tinklers. These shell objects are made from small to medium sized marine gastropods that have been drilled at their posterior ends for vertical suspension. Hohmann (2002:107) notes that the Maya often removed the spire portions of the shells and then smoothed their edges among the specimens she recovered at Pacbitun. The one tinkler

that I recovered from the looter back dirt near Unit 1 in Actun Lak Chamber 2 follows that pattern, except that the artisan also removed the columella (**Figure 185c**).

Detritus. Fragmented marine shell that has not been intentionally worked or shaped, and that cannot be readily separated into a formal artifact category as a result. I recovered one piece of conch shell detritus in Actun Lak Terrace 1 just above the slate blocks in Unit 5.

Unworked shell

This artifact class is comprised of shell artifacts that were not modified into costume elements, and *jute* remains dominate it, although mussel shells and crab claws are present.

Jute. Jute are a type of freshwater gastropod that are most commonly found in rivers and streams throughout the Maya subarea (Healy et al. 1990:173). Archaeologists working in the Pacbitun region have noted the presence of the animals in many of the waterways in the area, even those that degrade to series of pools during the dry season (Healy et al. 1990:174). Furthermore, the inhabitants of that site exploited the snails as both food and ceremonial resources throughout its settlement history (Halperin et al. 2003; Healy et al. 1990; Hohmann 2002:114).

I recovered 3,771 of the shells from my combined investigations at Actun Lak, Actun Naj Che, Actun Nohoch Tunich, and Actun Subuul, the distributions of which are presented below in **Table 7.19** (**Figure 186**). Overall, excavations in Actun Nohoch

Table 7.19. Tabulation of *jute* shell quantities and weights by unit.

Feature Name	Provenience	Qty.	Weight (g)
Actun Lak	Unit 10	26	73.5
Actun Naj Che	Unit 1	2	4.5
	Unit 2	40	67.3
	Unit 3	49	76.3
A. Nohoch Tunich	Unit 1	377	441.3
	Unit 2	119	152.9
	Unit 3	1204	1354.4
	Unit 5	827	842.9
	Unit 6	28	34.2
	Unit 7	17	14.3
	Unit 3 & 5 Feat. 2	800	770.6
	GSC	11	15.8
Actun Subuul	Unit 1	41	57
	Unit 2	91	110.2
	Mitigation	139	191.5

Tunich produced the highest number of the shells (n=3,383), followed by Actun Subuul (n=271). I recovered all 26 *jute* remains from Actun Lak during excavations in the Entrance Platform, and 91 from the units sunk in Actun Naj Che. The distributions of the material in the latter two cases are unusual, and I already discussed the significance of the Actun Nohoch Tunich cache above. For Actun Lak, they were restricted to Unit 10, and all but one came from the top level. Although I did not note any discernable patterns at the time of excavation, the restricted distribution of the shells to that unit, coupled with their absence in the others sunk into the Entrance Platform suggests that the Maya deposited them in a single event. Their complete absence inside the actual cave currently defies explanation except to note that perhaps they were unnecessary for the rituals performed within. The location of the shells in Actun Naj Che is curious because of the

oft noted close affiliation between the shells and human remains in rockshelters (Halperin et al. 2003:210-211). Actun Naj Che challenges this pattern seen elsewhere because only two out of the 91 *jute* collected there were associated with the human remains excavated in Unit 1.

The Pacbitun karstscape *jute* assemblage also differs from others previously described from other cave contexts by how the shells were treated prior to their deposition. In particular, the shells from other collections are found with missing spires (Healy et al. 1990; Halperin et al. 2003). The Maya likely removed these parts to break the muscle attachment that holds the animal in the shell, allowing it to be sucked out after it was cooked (Healy et al. 1990:179; Stanchly and Iannone 1997:5). Many of the spires of the shells that I recovered had been snapped, particularly those from the cache in Units 3 and 5 in Actun Nohoch Tunich, but a closer inspection of them revealed that the breaks did not reach the inner cavity where the muscle attachments were located. This pattern suggests that a natural process may have been responsible for the breakage (Stanchly and Iannone 1997:5). The completeness of the shells from the Nohoch Tunich cache suggest that the pre-Hispanic Maya harvested thems pecifically to create the cache as evidenced by the overall lack of spire lopping.

Nephronaias. *Nephronaias* sp. is a bivalve commonly referred to as "pearly mussel" found in the same geographic region and riverine environments as *jute* described above, although these animals prefer the sandy bottoms of the waterways (Powis 2004:129). Barton Creek, located 7.5 km to the east of Pacbitun is the only known local source for the shells (Powis 2004:129). I recovered two pearly mussels, both in Actun

Nohoch Tunich Unit 2 Level 3 (**Figure 187)**. Two animals are represented as indicated by the different sizes of the specimens. Only one is complete and measures 3 cm at it maximum. The other is broken, but it size can be reconstructed to 3.5 cm based on the remaining diagnostic features, and together, the two shells weigh 6.1 g. These sizes are significantly smaller than those commonly reported from archaeological contexts in the Belize Valley, which average 5 cm in length (Powis 2004:132). Alternatively, their sizes closely resemble samples that Powis (2004:132) collected during the summer months from Barton Creek for an experimental archaeology study of the animals. He posits that the discrepancy between the sizes of the samples that he studied and those recovered from archaeological contexts may be a result of seasonal differences, but notes that observation needs further testing (Powis 2004:132). If Powis' (2004:132) speculation about the size of the shells is correct then the two that I recovered may have been harvested during the dry season.

Crustacea. Excavations in Actun Naj Che Units 2 and 3 uncovered three crab claw fragments although they are still awaiting full analysis. I have witnessed crabs living in caves and rockshelters in both Belize and the southern Peten, Guatemala suggesting that they may have been deposited because of non-human agency. Nevertheless, in a previous study, I recovered several crab claws from two caves in the Cancuen region, Guatemala, that had been burned indicating that they had a ritual function (Spenard 2006:126). In the Candelaria cave system, also in Guatemala, massive quantities of gastropod, bivalve shells, and crab claws were mixed together to create a watery symbolism in areas that served as ritual stages in or near cave entrances (Woodfill

2007:693). A total of five claws recovered from three caves in the Sibun region, Belize were collected in dry areas, near pottery, and in restricted contexts, which together indicate that they were components of cultural deposits (Peterson 2006:203). Twenty seven land crab fragments were recovered during archaeological investigations in Actun Balalm, Belize, but the archaeologist who reported them notes that they were likely sources of food for the Maya (Pendergast 1969:57). Nevertheless, a variety of worked marine shells were recovered in that cave suggesting that the crab remains may have had an overlooked ceremonial function.

Ethnobotanicals

Ethnobotanicals are plant remains that are deposited in archaeological contexts as a result of human agency, and often times they are burned. Megan Parker analyzed this material for her Master's project at Georgia State University, and the full report can be found in her thesis (Parker 2014). Nevertheless, several of the results that she reports are relevant for my investigations. In particular, 100% of 1300 grams of botanicals collected from the altar area in Actun Lak is pine (*Pinus* sp), most of which was burned as raw wood, rather than as charcoal, and that Actun Xtuyul produced the largest variety of plant species in all of the karst features tested (Parker 2013:12-14). The remains from the latter

rockshelter include pine (*Pinus* sp.), several species of angiosperms, and seeds, one of which belongs to the Oxalidaceae family, a small, herbaceous shrub (Parker 2013:14).

Radiocarbon

One piece of unidentified, partially burned wood recovered from Actun Lak Unit 2 Level 1 has been processed by Beta Analytic (Beta-313731). The assay retuned a date of 1180±30 with a date range of 770- 940 cal A.D. (Calibrated at 2σ with the program INTERCAL09 [Heaton et al. 2009; Oeschge et al. 1975; Reimer et al. 2009; Stuiver et al. 1993]). These data reaffirm the late Late Classic period use of the area as indicated by the ceramic analysis presented in the previous chapter. More specifically they suggest that the activities at the altar were coterminous with those at the entrance of the cave, indicating that the extensive architectural modification project and the burning may have been part of a single event.

Human Remains

Actun Naj Che Unit 1 held the only human remains that I recovered from the Pacbitun karstscape, although others have also been noted in Actun Pech and Actun Xux caves (Healy et al. 1996; Spenard 2012a). Overall, the remains are in a state of poor preservation, which has hindered their analysis. I have already discussed their significance above and summarize here only the results of PRAP osteologist C.L. Kieffer's osteological report on them presented in Spenard (2013c). Twenty-six human bones, identified here as Actun Naj Che Individual 1, were recovered from Actun Naj Che Unit 1 Levels 2 and 3 (**Table 7.20**). Fused epiphyses and tooth wear indicate that the individual was a young adult between the ages of 20 to 30 years. The remains are otherwise in too poor condition to collect nutritional or pathological information or to determine biological sex.

Table 7.20. Human skeletal elements recovered from Actun Naj Che Individual 1.

Element	Count	Comment
Pedal distal phalange	2	
Pedal proximal phalange	2	One is only a shaft fragment
Pedal medial phalanax	1	
Metatarsal	2	One is a head fragment
Canine	1	
Indeterminate shaft	1	
Indeterminate fragments	16	

CHAPTER 8

SOCIALIZING THE PACBITUN KARSTSCAPE

In this chapter I attempt to socialize the Pacbitun karstscape by exploring the production of spaces and places within it, tracing the consequences of those practices, and understanding their relationships to the surrounding local and regional communities. I follow several authors by defining socialize as an exploration of the myriad ways that humans and their world interacted and produced meaning for one another (Ashmore 2002, 2004b; Bender 1993; Knapp and Ashmore 1999; Lefebvre 1991). This discussion also draws on the cartographic idea that a flexible or shifting interpretive scale of resolution between local and regional levels allows a wealth of social information to be teased out of a landscape (Fedick 1996a:335; Zedeño and Bowser 2009:7). In the first section, I begin at an intermediate scale, treating Actun Lak as a place, a rain shrine, within the Pacbitun karstscape, and then sharpening my focus on the roles and significances of the specific spaces the Maya created within and outside it for understanding its long-term use. In the second section, I begin by examining the small, created spaces within the various features of the karstscape, focusing on the significance of architectural constructions and other modifications. I then use those data as the basis for understanding Slate Cave, Actun Naj Che, and the features of the Nohoch Tunich Bedrock Outcrop Complex in relation to similar archaeological sites in pre-Hispanic Mesoamerica.

From Place to Space in Actun Lak: A Diachronic Analysis of a Pre-Hispanic Maya Ceremonial Rain Shrine.

The pre-Hispanic Maya believed that hills were water-engorged places, and the caves that penetrated them were mouths that exhaled aromatic, rain-cloud rich breath into the air, as elaborated in Chapter 4. Because of these beliefs, rituals to Chahk, the rain god, were often performed in subterranean places. The discussion throughout this section demonstrates that the locations of the abundant artifacts and modifications found in Actun Lak coupled with the landscape surrounding it suggests that cave was a primary rain shrine for the Pacbitun Maya from the Late Preclassic/Protoclassic through the late Late Classic periods. I present artifactual and spatial evidence that indicates that its earliest use was a shrine open to the entire community for individual or small group rituals, practices that I submit established the cave as *the* place for performing rain ceremonies in the social memory of the polity. That memory was later drawn upon when the cave was transformed into a royal ritual space near the end of the Terminal Classic period in preparation for what appears to have been a single ceremonial event, or several closely timed ones, aimed at correcting the failing weather system.

Rituals are inherently contradictory social phenomenon. On the one hand, they are staunchly conservative and dependent upon anachronistic practices and beliefs to convey their messages (Bell 1997; Kyriakidis 2007). Such ceremonies are at the core of community identity because they create and reinforce the shared memories and traditions

that bond past and present generations together (Connerton 1989; Halbwachs 1980, 1992). On the other hand, ritual can be a locus of change particularly during times of social and political crises (Kertzer 1988:20). These changes occur when old, established ceremonies are incapable of accommodating a new social norm, and novel ritual traditions are invented (Hobsbawm 1983:1; Kertzer 1988:20). Nevertheless, some continuity with the past is necessary to find validation and acceptance by the communities that adopt them (Connerton 1989:51; Hobsbawm 1983:1; Rowlands 1993:146). Such changes are evident from an archaeological perspective when shifts are encountered in the material correlates of particular ritual practices. I identify here three such correlates from Actun Lak Cave, which are, variability in use-intensity, shift in ritual space, and construction of architecture that led to changing access to the cave. A use-intensity study examines the variation in the appearance of material proxies to estimate the amount of activity that occurred over time, which in this case are ceramics, jadeite, and charcoal (Moyes 2006a:20-21). I examine these three indicators throughout the following discussion to understand the changing social role of this cave for the nearby community, and then widen my gaze to conclude with a discussion of previous archaeological and paleoclimactic studies of Pacbitun and the broader region for proposing why these changes may have occurred.

The earliest evidence of ceremonial use of Actun Lak is from the limestone boulder and river cobble pavement in Chamber 1 that abuts a series of broken stalagmites, and where excavations in Unit 4 recovered fragments of hundreds of Hewlett Bank Unslipped bowls. Most of the matrix in that immediate area consists of sherds of

that type with only a sparse intermixing of ashy soil, indicating a high use intensity there. As discussed in Chapter 6, Hewlett Bank Unslipped type is used in the Belize Valley from ca. A.D. 50 to 400, and although some later material was present, it is in much smaller quantities indicating that the most intensive use of the feature occurred at this early time (Brady et al. 1998:note 9). Hewlett Bank Unslipped type is commonly encountered in ritual contexts throughout the Belize Valley, and it appears to have been also in Actun Lak considering that all but the two cached vessels from Units 8 and 9 were smashed in antiquity (Awe and Helmke 2005). Furthermore, most of the sherds were either burned or smudged, and the presence of ash mixed into the sparse soil matrix indicates that burning events regularly occurred there, a practice indicative of ceremonial activity (Garber et al. 1998; Vogt 1976). Hewlett Bank Unslipped is the most common ceramic type that I identified in my all my investigations, numbering 394 rims, although all but nine came from immediately adjacent to the speleothem cluster suggesting that its use in the Pacbitun karstscape was highly restricted to this area for what I propose was a particular ritual purpose.

Archaeological, iconographic, and ethnographic studies from throughout Mesoamerica have documented a close relationship between rain and caves, and speleothems in particular, suggesting that the rituals performed around the Chamber 1 pavement were to Chahk (Bassie-Sweet 1991:152; Brady 1999:63; Fitzsimmons 2005; Josserand and Hopkins 2007; Navarrete and Martinez 1977; Seler 1901:163-169; Stone 2005b). For example, a high percentage of pre-Hispanic and contemporary stone effigies of the rain god, both carved and unmodified, were made from cave formations (Brady

1999:65-66). In Cueva de los Andasolos, Chiapas, archaeologists discovered two speleothems that had been carved to represent anthropomorphic figures, one of which was a full body, the other a cluster of simple faces (Navarrete and Martinez 1977). Such faces were frequently carved near sources of water, particularly in cenotes, suggesting connections to the rain god (Rissolo 2005b:81; Strecker 1985a:20). In the entrance of La Pailita Cave, Guatemala, the Maya created out of limestone rock and stucco a statue of Chahk seated on a throne adjacent to a large columnar formation indicating that was his domain (Graham 1997; Stuart and Stuart 1977:53). The numerous censers decorated with the visage of the Central Mexican rain god, Tlaloc, found in Balankanche in Yucatan, were placed around a large stalagmitic column deep in the cave (Andrews 1970). At Tumben-Naranjál, Quintana Roo, speleothems were regular components of offerings at rain shrines (Lorenzen 1999:102). As discussed in detail in Chapter 4, mountains were perceived as water receptacles in Mesoamerican thought, and rain clouds were often depicted in art rising up to the sky as billowing, aromatic smoke-like breath exhaled from zoomorphic caves, such as at Chalcatzingo, Mexico, and the San Bartolo North Wall mural, Guatemala (see **Figure 32**; Broda 1991:84; Taube 2001:104; Taube et al. 2010). For contemporary Maya in Chichicastenango, Guatemala, stone effigies, possibly speleothems, are associated with wind and tempests, which are considered to be the destructive aspects of rain (Brady 1999:65; Bunzel 1952:268). Lacandon Maya place small stones that had been taken from the sacred abodes of deities into censers called god pots (McGee1990:52; Soustelle 1961; Tozzer 1907:87). The stones are variably referred to as mediums or thrones for the god whose residence it was taken from, and they allow

the Lacandon to communicate with those beings (McGee 1990:52). Among the Nuyoo Mixtec of Oaxaca, the saints of rain are believed to live in caves in water-filled mountains, and the shrines of these supernaturals are frequently found in caverns with pools or that have active drip formations, the latter of which is considered precipitation (Monaghan 1995:106-108). Additionally, speleothems are treated as the rain god and are presented with offerings accordingly by Mixtec in general (Ravicz and Romney 1969:394).

Given such connections, I submit that the Maya understood the stalagmite cluster around the pavement in Actun Lak Chamber 1 as manifestations of the rain god, and performed rituals there to the deity (see **Figure 64**). Furthermore, that area of the cave was likely specifically chosen for these ceremonies because water rains down heavily from the thousands of soda straw formations that cover the ceiling of the chamber, particularly following times of heavy precipitation. Additionally, water enters the mountain during the rainy season by way of Rocky Crab Cave below, one of only two known trunk conduits in the area. That the cavern intakes massive volumes of water during the rainy season as evidenced by a variety of trees and other organic flood debris found imbedded in niches and clogging passages several meters above the cave floor (Flavell et al. 1994; Francis et al. 1995:12-13). The roar emitted from the water cascading down the 10 m boulder-clogged drop during heavy rains was likely heard from large distances away, particularly if the area was less vegetated than it is currently, as the noise was easily audible at the entrance of Actun Lak after a moderate three-day storm during

my investigations there. As such, the Maya certainly would have perceived the hill as a water-engorged place, thus making it ideal for rain rituals.

I understand this early intense use of the cave as a form of place making whereby the repeated rituals inscribed it with socially significant meaning (Connerton 1989:73). In particular, I suggest that they established in social memory Actun Lak as the primary place for rain ritual for the greater Pacbitun community (Mills and Walker 2008:6). The use and ubiquity of Hewlett Bank Unslipped type bowls in Chamber 1 can help identify who was responsible for these rituals. Overall, it is a crude ceramic type, and some specimens that I recovered resemble little more than expedient pinch pots (see **Figure 154**). Such overall lack of production standardization indicates household, rather than specialized production, and their abundance in the chamber suggests unfettered access to the cave by all members of the Pacbitun community. As will be discussed in further detail below, this open access is further suggested by the late Late Classic period modifications made to the entrance that restricted admission to high level elites and royalty.

Use of the cave waned during the first half of the Late Classic period as suggested by a relative lack of pottery from that time[1]. However, intensive use for rain ceremonies resumed during the Terminal Classic period, although the ritual patterns and participants changed greatly. In particular, the stalagmite cluster in Chamber 1 was no longer the primary ceremonial focus as evidenced by the notable drop in quantity of Late Classic period ceramics compared to earlier times. Instead, the entrance of the cave and Chamber

[1] This period of less intensive use may also be explained by the continuity of Early Classic types into later times, as explained in Chapter 6. Indeed, some early Late Classic Tiger Run phase types were identified indicating that the cave was used at that time, although the intensity is uncertain.

2 became the principal activity areas, although ceramics from this time are ubiquitous throughout the entire cavern. Additionally, ceramic cross dating indicates that all of the investigated architecture was constructed during this time. For reasons that will become clear below, I suggest that these changes was were linked to a socio-political crisis resulting from a sustained period of severe drought that enveloped the region during the later half of the Terminal Classic period that required the king to commandeer the space (Kennett et al. 2012; Medina-Elizalde and Rohling 2012; Webster et al. 2007).

Modifications to Actun Lak's Entrance Area and exterior were extensive, and include creating Terrace 1, the Entrance Platform, and the hillside staircase connecting the cavern to Rocky Crab Cave below. The magnitude of the changes, that they were each single-phase constructions in close proximity to one another, and the continuity of the buried slate floor in Terrace 1, collectively indicate that they were all part of the same single program that dramatically altered the appearance of the entrance and hillside. Additionally, all of the formations at the entrance were broken except for a large one in the center, which created the appearance of an agape, toothed maw (see **Figure 55**). Although attempts to date the speleothem breakage were not made, these reductive changes are likely to have occurred near the same time as the constructions because evidence of any cave modifications prior to this time is currently unknown.

Unit 5 excavations penetrating Terrace 1 demonstrate how extensive these modifications were. The reader is reminded that Terrace 1 is positioned adjacent to the three-meter drop into Chamber 1, and that the construction appears to be a modest modification just over 70 cm tall from the current ground surface, and that creates a

platform approximately 1.5 m^2 in area. Nevertheless, the excavations in Unit 5, as well as a large crack in the bedrock wall that reaches the floor of Chamber 1, and that is choked with rubble and ceramics, indicate that the terrace represents only a small portion of an artificial construction that is at least four meters deep. The buried slate floor encountered in Unit 5 demonstrates that the in-filling was intentional rather than collapse because it capped a cached Altar Orange bowl and complete obsidian blade surrounded by a dry, sandy matrix, while the soil above was clayey, rife with boulders, and peppered with charcoal, which indicate collectively purposeful deposition. Furthermore, the slate floor continues towards the mouth of the cave indicating that the entire Entrance Area from the drop into Chamber 1 to the Entrance Platform is artificial, an unassuming, yet large-scale construction project (**Figure 188**). That effort continued for tens of meters down the hillside toward Rocky Crab Cave through the building of a rough staircase with an upper course that terminates at the Entrance Platform.

A spatial analysis of Terrace 1 and the Entrance Area suggests community access to the cave was restricted in the Terminal Classic period. Positioned between a thumb of rock, the eastern cave wall, and adjacent to the drop into Chamber 1, that construction created the only flat spot in the Entrance Area. Restriction is indicated by the placement of the terrace in a spot that is obscured from the interior by a curtain formation originating in the ceiling that blocks from view the feature from deeper inside the cave. Nevertheless, people standing on it are readily visible from outside (**Figure 189;** see also **Figure 59**). If instead the terrace was constructed on the western side of the narrow passage, then performances on it would have been visible to anyone standing below in

Chamber 1, a room that can accommodate 40 to 50 people comfortably, but that area is invisible to anyone outside due to the slope in the floor, and heights of the ceiling and Entrance Platform (**Figure 190**). The extensive filling discussed above indicates that the Maya designed the Entrance Area to conform to a specific plan, and the terrace was one of the primary features created during that building program. That the architects chose the spot visible from the exterior, rather than the interior, demonstrates that the performances on it were intended to be viewed from outside. Thus, positioning the terrace as they did passively restricted access to the depths of the cave and forced the audience to watch any ceremonies from outside.

The jadeite objects recovered from around the speleothem altar in Chamber 2 suggest that a regent of Pacbitun conducted the Terminal Classic period ceremonies in the cave, and thus, the entrance restriction included all community members aside from the highest-level elites and their ritual retainers. In particular, the types of artifacts recovered and quantity of material offered suggests royal use. As will be seen, even though all but one of the jadeite artifacts lack of surface elaboration beyond polishing, they were likely understood as offerings of great wealth with deep symbolic significance. The Maya considered jadeite as a form of wealth that was closely affiliated with kingship (Fields 1991; Freidel 1990; Houston 2014:126; Taube 1996, 2000a, 2004c, 2005a). This value was due in part to the hardness of the material that makes working it an exceedingly difficulty and time-consuming task (Houston 2014:126-127; Taube and Ishihara-Brito 2012:140). Nevertheless, objects made from the material are found in both commoner and elite contexts throughout the Maya area, but the former typically has a

few pieces at most, and abundance of it is a distinctive marker of the latter (compare Masson and Peraza Lope 2004; Yaeger and Robin 2004 to Garber et al. 1993; Schele and Miller 2001:68). I recovered over 100 jadeite items in Units 2, 6, and 7, most of which were beads, although ears spool fragments and polished pebbles were present. Even though all matrix was removed from those units, they sampled less than half of the ledge on which the altar was constructed, suggesting that the total quantity of jadeite objects offered there was significantly larger than I recovered. Several of the pieces were dark apple-green colored, which the Maya considered to be the most valuable of the hues, and jewelry made from the material was a marker of Maya rulers, particularly earspools and carved beads (Chase 1992:37; Miller and Martin 2004:86; Taube and Ishihara-Brito Brito 2012:137-138). Thus, the objects offered at the altar represent an offering of great royal wealth (Miller and Martin 2004:86). This observation is buttressed by the fact that jadeite artifacts are exceedingly rare at Pacbitun. For example, the richest royal burial discovered there contained only three jadeite beads, the same number of objects- one bead and two polished pebbles- were recovered during excavations in the palace structure, and the North Group, and an elite compound adjacent to Plaza A contained only four objects of the material, two beads and two "Charlie Chaplin" figurines (Bill 1987:235-238; Cheong 2013; Healy et al. 2004:231).

Jadeite was also symbolically tied to maize, rain-carrying winds, and life essence, suggesting that the objects made from it offered at the Actun Lak altar may have been chosen for their ability to coax precipitation and agricultural fertility from the cave (Coe 1988:225; Houston 2014:93-94; Taube 1996, 1998, 2000a, 2005a). Ornaments made

from the material were vital costume elements of the Maya Maize God because it represented condensed agricultural wealth, and the vital qualities and color of the living plant (Taube 1996:173-174, 2000a:312). Furthermore, the material was closely affiliated with Chahk, the rain god. This connection is perhaps most obvious in a maskette and statuette of the deity carved from jadeite held in the collections at Dumbarton Oaks, as well as Late Preclassic period fish figurines recovered from Izapa and Kaminaljuyu (Taube and Ishihara-Brito 2010:145). Chahk was often depicted as a fisher during the Late Preclassic period, and his actions as such were considered rain-making activities (Taube 1992a:23-24, 1995:95). The offering of the earspools and beads further supports my suggestion that the objects were selected for their symbolic connections to natural forces. For example, earspools are often depicted in iconography emitting volutes emblematic of aromatic breath that occasionally drip rain, and as having ties to the Wind God (Taube 2001:108-109, 2005a:32-43). Furthermore, those fragments from the altar area were crafted from a fine, light green parent source. The Aztec considered jadeite objects of this color as particularly special because they were believed to attract moisture, and had a quality of wetness (Sahagún 1963:222).

Jadeite beads were commonly placed in the mouths of the deceased, a practice that was likely related to capturing souls before they escaped, and as such, they are emblematic of vital breath essence (Coe 1988:225; Houston 2014:93; Houston and Taube 2001:267; Taube 2005a:31). However, they were depicted in Classic period Maya iconography as representations of precious breath in general, and many were rendered in flower form suggesting that they were sources of the same sweet, aromatic essences that

created and carried rain clouds into the sky from water-filled caves (Houston and Taube 2001:267; Taube 2001:104). The aromatic rain-producing wind symbolism of the jadeite objects from the altar is further suggested by the presence of resin residues on many of the pieces because the billowing smoke produced from burning incense was used to conjure rain throughout Mesoamerica (Taube 2001:110). Overall, the jadeite objects recovered from the altar area thus indicate that a regent from Pacbitun likely performed rituals at Actun Lak aimed securing agricultural fertility and rain.

Circumstantial chemical evidence and ethnobotanic data indicate that the actual burning in the altar area was a vital component of the rituals performed in Actun Lak because it reinforced the aromatic breath symbolism implicated by the presence of the jadeite objects discussed above. As elaborated in Chapter 4, quicklime was accidentally detected in the matrix surrounding the altar when processing ethnobotanic samples collected from Units 2, 6, and 7. Considering that chemical can only be produced in temperatures above 980ºC, but that 900ºC is the upper most sustainable temperature for open-air fires, then the burning at the altar must have been unusually intense. Reaching and maintaining such a high temperature would have undoubtedly required large quantities of fuel that would have also created massive quantities of smoke. Results from the ethnobotanic analysis of the plant material recovered from the altar area indicate that the pre-Hispanic Maya likely intended for that to happen (Megan Parker, personal communication 2014). More specifically, nearly all of the botanicals collected were pine, some of which was only partially carbonized. Contemporary Maya often transform pinewood into charcoal before using it, lessening the quantity of smoke emitted

(Breedlove and Laughlin 2000; Lentz et al. 2005:574; Parker 2014:41-42; Wisdom 1940:21). Therefore, the use of raw pinewood indicates that heavy smoke was desired when deciding what to burn.

The use and burning of pine also had symbolic significance related to rain and moist breath. Specifically, the Maya often collected resin from the wood that they then used as incense (Morehart et al. 2005). I submit that burning raw, rather than transformed pinewood, would have achieved the same aromatic smoke as the incense because the resin is still present. Furthermore, as mentioned previously, incense and fire offerings were often used in rain rituals because the rolling smoke signified the aromatic billowing clouds thought to be exhaled from caves (Taube 2001:110). These data suggest that the overall results of the burning events at the altar would have thus been an extremely hot, massive fire that produced vast volumes of aromatic smoke that would have billowed out from the altar area, likely filling the entire cave, and possibly pouring out of the toothed maw that is its entrance, a vivid reenactment of the rain producing, zoomorphic caverns depicted through pre-Hispanic Mesoamerican iconography (**compare Figure 55 to Figure 32**; Taube 2001).

The questions that remains are why would the regent of Pacbitun have commandeered the cave, and why are most of the offerings symbolically connected to aromatic breath? The answer to both of these questions begins when they occurred. Ceramic cross dating indicates that all of the architectural modifications were made sometime in the late Late Classic period, roughly A.D. 700-900. However, the smashed Altar Orange bowl cached in Terrace 1 provides a more refined date for them. Altar

Orange is a highly sensitive temporal marker appearing throughout the eastern Peten and Belize beginning around A.D. 820 (Demarest 1997). This vessel thus provides a *terminus post quem* date for the terrace, and all of the architectural modifications made to the Entrance Area and hillside, due to their all having been parts of a single construction event as elaborated above. Ceramics from the altar area also indicate a primarily Terminal Classic period use-date, which is reinforced by the radiocarbon assay measured from one of the raw pinewood fragments to be 770- 940 cal A.D, the median of which is A.D. 855, approximately 35 years later than the earliest entrance of Altar Orange to the greater Peten region. Although speculative, the date range provided by the radiocarbon assay and the Altar Orange bowl suggests that the use of the altar likely coincided with the architectural modifications and ceremonial events performed at the front of the cave. Furthermore, excavations at Pacbitun have revealed that the region was generally abandoned by A.D. 900, thus the king performing these rituals was one of the last, if not the ultimate ruler of that site (Healy et al. 2004:208).

Recent studies of speleothems collected from caves throughout western Belize show that an extensive drought dried out the region between A.D. 820 and 870, the same time that the radiocarbon assay and Altar Orange bowl indicate the resurgence of rain rituals at Actun Lak (Kennett et al. 2012; Medina-Elizalde and Rohling 2012; Webster et al. 2007). Pacbitun would have been particularly hard hit by the droughts because it is the only primary center in the greater Belize Valley that does not have access to a major riverine course or perennial creek within its territory. Furthermore, even though springs and other sources of groundwater are available in the area, they are not dependable, and

would have been inadequate to serve the needs of the expanded Terminal Classic period population described below (Spenard 2011a; Spenard et al. 2012; Weber 2011a). In fact, they are even inadequate for the needs of the modern village of San Antonio, with a year 2006 population of 1760 inhabitants (Colas 2009:7). Instead, the community leaders had to commission a gravity feed system from the Privación Creek near the ancient settlement of La Caoba Viejo, 5.5 km to the southeast of the village, through the extensive foothills at the northern edge of the Mountain Pine Ridge (Javier Mai, personal communication 2012).

This strain on the availability of water would have been further exacerbated by the unprecedented boom in the Pacbitun population during that time that expanded from approximately 1,500 to 5,500 persons, and which would have also taxed the preexisting agricultural system (Healy et al. 2007; Kennett et al. 2012). As discussed in Chapter 2, hillside terracing became prominent around Pacbitun in the Terminal Classic period, a practice that was likely necessary do to the fact that all of the prime farmland was already in use, the new population settled most of the low-lying areas around the center, and the established fields were unable to accommodate the new increased demand for food (Healy et al. 2007; Healy et al. 2004:222; White et al. 1993). Nevertheless, isotopic data collected from human and faunal remains at the site indicate that the intensification was insufficient and much of the population suffered from poor health (White et al. 1993:370).

I follow several others who suggest that the performance of water and agricultural rituals were one of the primary functions of Maya regents, and thus the political power of

the Pacbitun throne, which may have already been weakened after the proposed defeat at the hands of Caracol a century earlier, waned when the weather system failed (Awe and Helmke 2012; Brady 1997a; Brady and Ashmore 1999; Demarest 1992; Helmke and Awe 2012:68-69; Ishihara-Brito 2007, 2008; Inomata 2006a, 2006b; Lucero 1999a; Schaafsma and Taube 2006:246-247). Thus, curing the drought was politically expedient, but also the purview of the royal lineage. I propose that the social memory of Actun Lak as the primary place for rain rituals for the Pacbitun community made it the ideal location for the king to attempt to reinvent the tradition to correct the failing weather system and boost agricultural production for the polity. When considering that rain was understood to originate in caves, and that it reached the sky via exhaled aromatic breath, we may suppose that the Pacbitun Maya may have understood the drought as Actun Lak's cessation of respiration. I submit that the breath and wind symbolism of the Terminal Classic period offerings, particularly the jadeite objects and use of raw pine wood, indicates an extensive effort get the cave to breathe again. In the end, these efforts were unsuccessful, and the region was largely abandoned only a few decades later by A.D. 900 (Healy et al. 2004:208).

The *Toh* and *Lob'* of the *Ch'een*: Rock Art and the Constructed Wilderness Spaces of the Pacbitun Karstscape

Archaeological understanding of pre-Hispanic Maya perceptions of cave and karst features has varied widely since they became a focus of scientific investigations beginning in the Early Foundation period of the subdiscipline. Early proponents based their discussions on readings of the 16th century Quiche Maya creation story, the Popol Vuh, and suggested that caves were considered dangerous places because they were entrances to Metnal or Xibalba, the Place of Fright and home of the Underworld gods of Death and Disease (MacLeod and Puleston 1978; Tedlock 1996; Thompson 1970:300). Others turned to ethnographic and ethnohistoric sources and suggested that caverns and their surrounding environments were dangerous because they were amoral wilderness spaces diametrically opposed to communities (Hanks 1990; Stone 1995:15-18; Taube 2003a). As discussed more fully in Chapter 4, caves are now understood as one of many types of *ch'een*, or sacred locations that were access points to the revered, animate Earth and abodes of the ancestors, both of whom interactions with were met with ambivalence (Brady and Prufer 2005a:8, 2005b:367; Kieffer and Scott 2012:21; Prufer and Brady 2005a:12 2005c:403; Tokovinine 2013; Vogt and Stuart 2005). Nevertheless, *ch'een* were undoubtedly multivocalic places, and recent archaeological evidence suggests that aspects of these earlier interpretive models remain useful for understanding cultural remains in subterranean sites, even though they have largely fallen out of favor in the current paradigm (Kieffer and Scott 2012; Moyes 2012).

The following discussion draws on the idea that the pre-Hispanic Maya, like their descendants today, viewed their world as divided into two opposing, socially constructed spatial categories, community and wilderness, and that caves belonged to the latter (Stone 1995:15; Taube 2003a:467). Nevertheless, this distinction is problematic as the discussion below demonstrates because most of the karst features investigated in the Pacbitun region were heavily modified making them ambiguous spaces within this community-wilderness paradigm. What follows is an attempt to bridge this disparity by proposing that a purposefully crude aesthetic guided the modifications, which allowed the karst features to maintain their wilderness character, even though their appearance is largely the result of human efforts. In short, I suggest that the Pacbitun Maya constructed "natural" spaces throughout the karstscape.

Among the Yucatec Maya of Oxkutzcab, "community" and "wilderness" are referred to as *ka'ah*, and *k'aax*, respectively, and such binary worldviews are common to many Maya communities (Gossen 1974:232; Hanks 1990:306; Sosa 1986:243; Vogt 1976:51). What distinguishes these spaces is that the former are the result of human endeavors, while the latter are steeped in the divine and mythological past (Stone 1995:16). More specifically, work is necessary for transforming primordial wilderness in to human space, but such endeavors are cognitively tied to morality (Garcia-Zambrano 1994; Taube 2003a:463). Human work such as making milpas, building houses, and producing art requires measuring, using straight lines, and establishing corners, actions that are described by the Yucatec word, *toh*, and its cognates in other Mayan languages, but it also means truth, rectitude, and upright behavior (Hanks 1990:357; Taube

2003a:465). Alternatively, the *k'aax,* wilderness, is characterized as the antithesis of *toh*, it is amoral, chaotic, curving, entangled, lacking spatial divisions, and the place of the mythological past, all of which the Yucatec Maya refer to as *lob'* (Stone 1995:16; Taube 2003a:466). Maya scholars have noted that caves are landmarks that best reflect the properties of *lob'* because they have winding passages, rounded walls and chambers, and lack squared corners (Stone 1995:16; Taube 2003a:466).

Archaeological data from the Pacbitun karstscape suggest that this community-wilderness dichotomy is more complicated than presented above. Most of the karst features investigated for this dissertation demonstrate extensive human modifications, which include various combinations of petroglyphs, formal architectural constructions, boulder alignments, large buried caches, blocked passages, and snapped speleothems, indicating that they are equal parts modified and natural environments. Nevertheless, all modifications are similar in that they are crude when compared to Pacbitun's art and architecture. For example, the petroglyphs are overall unrefined and consist of simple faces and geometric patterns, and the rocks and boulders used for the constructions, alignments, and blocked passages are all uncut and dry laid (see **Figures 43, 57, 92, and 135**). These traits contrast with the finely carved Pacbitun monuments Altar 3, and Stela 6 depicting kings in fine royal regalia, as well as the cut stone and plastered buildings found in the epicenter of that site (**Figure 191**). I propose that the modifications the Maya made to the Pacbitun karstscape were designed specifically to mimic the unruly *lob'* environments in which they are found to maintain and enhance the natural essences of the surrounding areas, even though they were transformed into cultural spaces. That karst

modifications found throughout the Maya area are similarly crude suggest that this *lob'* interpretation is broadly applicable.

Such overlap between natural and cultural spaces have been recorded throughout the Maya area and beyond, suggesting that both *kaah*, and *k'aax*, and *toh*, and *lob'* are ends of a cognitive continuum, and that overlap between them was the norm. For example, Oxkutzcab Maya categorize agricultural fields in an intermediate position because they are both irrigated and rain fed, and quickly revert to forest when left fallow (Hanks 1990:307). Similarly, McAnany (1995:66-68) finds fault in the translation of *k'ax* simply as "forest" for colonial period documents and suggests instead that the term refers to an established, yet fallow field. Ashmore (2004a:172) notes that the Maya intentionally blurred the boundaries between built environments and natural landscapes, particularly through the use of metaphor, such as labeling pyramids as mountains, the temples on top or the tombs within as caves, and labeling stela as trees, transforming their plazas into metaphorical forests. For the Aztec, gardens and pleasure palaces were places where culture and nature overlapped significantly (Evans 2000). The spots chosen were often dramatic and beautiful landmarks that were then enhanced with temples, rock art, petroglyphs, water features, and a wide variety of exotic and local flora and fauna (Evans 2000; Nuttall 1925). Stonework is particularly noteworthy for its play between modified and unmodified rock throughout the pre-Hispanic Andes in South America. For example, sections of boulders were elaborately carved at Saywite, Kenko Grande, and Altarani, while other parts were left unmodified (Arkush 2005:229). Additionally, outcrops were directly incorporated into architecture such as the Temple of the Sun and the Royal

Mausoleum at Machu Pichu (Dean 2010). Ancestral Puebloans commonly built their settlements directly into cliffs throughout the U.S. Southwest (**Figure 192**). Nevertheless, small outcrops were also converted into dwellings, such on the Parajartio Plateau, New Mexico where apartments were carved into most rock faces, and Wupatki pueblo, Arizona where buildings were seamlessly blended with bedrock protrusions with commanding views (**Figure 193**; Noble 1991:148-152; Powers 2005:3).

As demonstrated in the previous section, speleothems also straddled the nature and culture divide for the Maya because some were worshipped as representations of the animate Earth yet were carved, usually with single crude faces, giving them anthropomorphic forms (Brady 1999; Brady et al. 1997; Helmke and Awe 1998; Navarrete and Martinez 1977; Stone 1995; 2005b; Strecker 1976, 1977, 1984, 1985a, 1985b, 1987a, 1987b). This crudeness has resulted in their equation with folk traditions because they sharply contrast with the finely carved stone art found in elite contexts (Brady 1999; Houston 2014). Andrea Stone (2005b:218-219) challenged this folk classification model and proposed instead that their crude character represents an intentional aesthetic that members of any social class could have produced. I suggest that the merits of this challenge are reinforced when considering that pre-Hispanic graffiti, which shares the same poorly executed condition and palimpsest-like features of petroglyphs, is found in and on plastered surfaces in both commoner and elite settings such as the primary temples and palaces in many Maya sites (Kampen 1978:Chart 1, 164; Trik and Kampen 1983). Although the two art forms undoubtedly served different purposes, the presence of poorly executed graffiti particularly in strictly elite urban

spaces demonstrates that the quality of the product is an undependable marker of the artist's social class. Nevertheless, and more poignantly for the current discussion, is that extensive carving would have obliterated the intrinsic, divine essence of the speleothems that is reflected in their pebbly, uneven surfaces, and general uniquenesses (Stone 2005b:232). Put another way, the artists maintained the *lob'* of the speleothems, while marking them as socially significant via carving and gouging. This discussion suggests that the Maya believed that they could modify something without changing its inherent naturalness. Even so, Stone's discussion focuses primarily on shaft-shaped speleothems that were modified with single faces (Stone 2005b:215-216). I suggest here that her proposed "intentionally crude aesthetic" model is equally applicable to petroglyph panels throughout the Maya area, such as that found in Slate Cave.

The Slate Cave petroglyph panel resembles the shaft-shaped carved speleothems in multiple ways suggesting that it too was created using the same intentionally crude aesthetic. The panel is on a bulbous stalactite formation flowing out of the ceiling, on the underside of which hangs several curtain formations. Those lower formations grew in such a way that they appear as individual columnar stalactites when looking at the panel head on, and the faces are situated so that most are associated with only one of the curtains (see **Figure 135**). This arrangement suggests that each of the curtains may have been treated as individual objects of worship. The faces are simple and consist of two round, hollowed eye-sockets, and either horizontal bars or other single circular impressions that mark the mouths. Although the carvings collectively cover approximately half of the visible portion of the bulbous stalactite, they are shallow and

are easily overlooked from both near and afar, allowing the formation to maintain its natural appearance, and thus its *lob'* quality (see **Figure 136**). Furthermore, the totality of the panel is chaotic as other unidentifiable geometric shapes and patterns all blend together and novel figures and faces appear and vanish as light is variably raked across the surface, all of which adds to the stone's wilderness character. This transformative effect has also been noted at Actun Kuruxtun in Yucatan indicating that a phenomenological perspective is vital for understanding this art form (Slater 2014a:593-594).

Other recorded petroglyph panels in the Maya area share this chaotic arrangement and overlap of designs. For example, at Actun Uayazba Kab in the Roaring Creek Valley, 14 km east of Pacbitun, the panel wraps around a protruding flowstone formation at the entrance of the cave and contains simple and complex faces, zoomorphic figures, as well as multiple, overlapping curvilinear clusters (**Figure 194**; Helmke and Awe 1998). The carved parietal art in Petroglyph and Waterfall caves in the Caves Branch Valley, 30 km to the northeast of Pacbitun, contain volutes, concentric circles, and glyph-like forms (Stone 1997b:38). Slater (2014:574-575) describes the petroglyph panels of Aktun Kuruxtun and Cenote Ceh' Yax in central Yucatan as complex, riotous palimpsests that were executed in a less refined style than the elite carved stone monuments found throughout the Maya Lowlands. Those panels consist of faces, anthropomorphic and zoomorphic figures, and a wide variety of geometric patterns and shapes (Slater 2014a:574-658). Tancah Cave in Quintana Roo contains a staircase carved into bedrock that is elaborated with faces, and ladder-like and glyph-like elements, which are

described as highly idiosyncratic and difficult to interpret (Rissolo 2005b:80). Nevertheless, the former are found throughout caves in the Yucatan Peninsula, and they typically mark pathways that lead to water (Rissolo 2005b:80). Interestingly, the bulbous formation into which the petroglyph panel in Slate Cave was carved is active during heavy rains, although the water flows only over the unmodified areas. Overall, these similarities indicate that the intentionally crude aesthetic defined by Stone (2005b:218-219) for individual carved speleothems is broadly applicable to most carved Maya cave art and was employed in an effort to enhance the *lob'*-like character of those spaces.

I propose here that the outward appearance of the architectural modifications in the Pacbitun karstscape, all of which date to the late Late Classic period, can be understood as the result of the same intentionally crude aesthetic framework that guided the creation of the petroglyphs. By architecture, I mean any additive modifications made to the karstscape, as opposed to reductive changes such as the removal of speleothems. I employ this broad definition for ease of discussion, but recognize that the constructions served distinct purposes.

Many classes of architectural modifications are present in the Pacbitun karstscape, including: plugged holes, simple alignments, multi-course terraces, buried and surface deposits, an earthen-rubble platform, a staircase, and a small dam. Plugged holes are defined as small, natural portals in cave walls or floors that were in-filled or blocked up with at least one, but often several rocks. These modifications were noted in Actun Lak, Tzul's Cave, and Actun Solbetunich (see **Figures 35, 140, 150**). Simple alignments and terraces were most prevalent in the Nohoch Tunich Bedrock Outcrop Complex (NTC),

Actun Naj Che, and Actun Solbetunich, although the latter modification class was also present in Actun Lak. Simple alignments differ from terraces in that the former are single course frames around unusual parts of the bedrock (see **Figure 111**). Terraces are multicourse constructions with a variety of functions. As discussed earlier, the terrace at the entrance of Actun Lak was a stage for royal ritual to be viewed from outside, but also as a physical barrier that limited access to the cave. Alternatively, the terraces in Actun Ku'uk and Actun Solbetunich appear to have been retaining walls, but also delimiters of internal and external space of the features (see **Figures 3 and 109**).

The Maya buried deposits in Actun Nohoch Tunich and Actun Naj Che but left them unmarked on the surface in any discernable way, even though creating them required extensive excavations (see **Figures 86, 90, 119, 120)**. Their purposeful design is evidenced in the layering noted in the *jute*, chert flakes, and charcoal cache in the former rockshelter discussed in Chapter 5. The small dam is located at the base of the hill between Actun Naj Che and the NTC, and was constructed from uncut, dry-laid boulders, similar to the other documented architectural constructions. The feature was choked up with vegetal debris during my investigations, but would have created a small, shallow pool, and a tiny waterfall during the rainy season. This discussion demonstrates the ubiquity of architectural modifications in the Pacbitun karstscape, but they are typically modest when viewed from the ground surface, and were made using unadulterated materials, particularly uncut rocks, and dirt fill, making them look like natural components of the landscape (see **Figures 3, 109-111**). This use of dry laid, uncut stones for modifications in the karstscape stands in stark contrast to city centers where buildings

were commonly faced with cut and shaped blocks, and then plastered and painted to give them smooth, straight surfaces.

Surface deposit modifications are defined here as clusters of unmodified rock placed on the floors or ledges of karst features. Such modifications were noted in every karst feature investigated, as detailed in Chapter 4, and consist of slate, river cobbles, small limestone boulders, and other unidentified rock. Notable surface deposit modifications are found in Actun Lak Chamber 1, Slate Cave's Crawl passage, and the piled boulders in the Stone Cache. These surface deposit modifications are singled out here as notable because they are concentrated in particular spaces within the features, unlike the others, which are dispersed. In Actun Lak, the surface deposit modification is defined by a calcium carbonate coating that has produced a pavement-like appearance. In Slate Cave, the entire floor of the Crawl passage is littered with limestone rocks, while few other imported stones were encountered anywhere else in the cavern. The Stone Cache located to the southwest of Actun Lak is perhaps the most unusual surface deposit modification encountered throughout the Pacbitun karstscape because the rocks are the only known cultural materials in it, and because no other similar karst features have been documented as being used anywhere in the Maya area.

That this proposed *lob'* aesthetic was included in subterranean modifications is in the details the pre-Hispanic Maya included in artificial and architectural caves. Inclusion of these details indicates what features and characteristics were considered vital components of those landmarks that they mimicked. These underground features were formed through a variety of techniques including enlarging of existing fissures,

excavating into bedrock, and architectural design (Brady 1991, 2004, 2012a; Brady and Veni 1992). Although some are simple tunnels, many tend to meander horizontally and vertically, have multiple dead-end side passages, several levels, and their corridor widths tend to widen and constrict. The known architectural caves have many of the same features, and in addition, their walls and ceilings are commonly constructed from uncut stones, and were unplastered, giving them textured, uneven surfaces, just as their natural counterparts have (Brady 2012a).

As the above discussion indicates, the appearance of the Pacbitun karstscape was largely the result of human endeavors that aimed to construct spaces that conformed to a purposefully crude "wilderness" aesthetic. However, "wilderness" for the pre-Hispanic Maya was not always evil, morally corrupt, and dangerous, it was also the source of beauty and eternal paradise, traits that the Pacbitun Maya may have attempted to accentuate with the architectural modifications in the karstscape, particularly those in and around the NTC (Taube 2004a). More specifically, those modifications may be the result of transforming the NTC into a pleasure park-like place, similar to those commissioned by the Aztec throughout the Basin of Mexico, albeit on a less grandiose scale (Evans 2000; Nuttall 1925; Karl Taube, personal communication 2014). Although our knowledge of the practices and land holdings of Maya royal courts is limited to iconographic representations and discussions in hieroglyphic texts, what was recorded in these sources demonstrates significant overlap with Colonial period accounts of those of the Aztec, indicating that the latter can provide a basis for understanding and interpreting the archaeological remains of the former (Evans 2001:237).

The pursuit of beauty and pleasure shaped Aztec culture just as much as the better-known practices of warfare and sacrifice did, and recent research has demonstrated that they were also central concerns for the pre-Hispanic Maya (Evans 1998, 2000:206, 2001:254; Houston 2014:125-133; Houston and Taube 2001; Taube 1985, 1989, 2004a, 2005b, 2006; Taube and Taube 2009). To that end, gardening and landscape design were choice occupations for Aztec nobles and favored pastimes for kings, the latter of which even developed into status competitions between the rulers of Tenochtitlan and Texcoco (Evans 2000:208, 211, 2001, 2004:46; Nuttall 1925). The result was the establishment of recreational and contemplative pleasure palaces and parks throughout the Basin of Mexico, which were generally referred to in Nahuatl as *xochitla*, flower place, but other, more detailed names for specific types existed, such as imperial retreats, zoos, game reserves, memorials, and horticultural gardens (Evans 2004:46; Nuttall 1925:453). Schooling of noble children in landscape design and architecture, copying of layouts and designs of other lord's palaces, use of tribute networks to obtain exotic plants from distant locations, and laws governing access to them, all attest to the significant amount of time, wealth, and concern that was dedicated to these pursuits (Evans 2001:254). That the Maya had similar appreciations is evidenced in courtly scenes on polychrome vessels, such as K1599 from Dos Pilas where lords inhale fragrance emanating from wrapped flower bouquets, likely harvested from nearby gardens, as well as ancestors depicted as orchard species, and botanical data that affirms that farming practice (**Figure:195**; Houston and Taube 2001:265-273; Morehart 2011:9 Schele and Freidel 1990:221; Turner et al. 2003:370; Turner and Miksicek 1984). Furthermore, archaeobotanical and

ethnobotanical research has demonstrated that Maya cities were garden-like where fruit-bearing trees, shrubs, herbs, root crops, and other produce grew throughout the urban landscape (Fedick 2003, 2010; Gomez-Pompa 1987; Gomez-Pompa et al. 1987; McNeil et al. 2010).

Unfortunately, most Aztec pleasure places were either destroyed by the Spanish or razed and rebuilt to conform to their tastes, and as such, little material evidence of their past splendor remains (Evans 2004:8). Nevertheless, both native chroniclers and the Spanish wrote about them extensively, and those accounts provide a wealth of details that would have been otherwise lost when the *xochitla* were destroyed (Alva Ixtlilxochitl 1975-1977; Cortés 2001; Diaz del Castillo 1956:214; Nuttall 1925; Sahagún 1979). For example, Diaz del Castillo, a Spanish soldier, was especially in awe of the orchard and garden at Iztapalapa on the south shore of Lake Texcoco. He noted that:

> [they] were such a wonderful thing to see and walk in, that I was never tired of looking at the diversity of trees, and noting the scent which each had, and the paths full of roses and flowers, and the many fruit trees and native roses, and the ponds of fresh water. There was another thing to observe, that great canoes were able to pass into the garden from the lake through an opening that had been made so that there was no need for their occupants to land. And all was cemented and very splendid with many kinds of stone {monuments} with pictures on them, which gave much to think about. Then the birds of many kinds and breeds which came into the pond. I say again that I stood looking at it and thought that never in the world would there be discovered other lands such as these [Diaz del Castillo 1956:191].

He further pleads of the gardens of Montezuma that:

> We must not forget the gardens of flowers and sweet-scented trees, and the many kinds that there were of them, and the arrangement of them and the walks, and the ponds and tanks of fresh water where the water entered at one end and flowed out of the other; and the baths which he had there, and the variety of small birds that nested in the branches, and the medicinal and useful herbs that were in the gardens. It was a wonder to see, and to take care of it there were many gardeners. Everything was made in masonry and well cemented, baths and walks and closets, and apartments like summer houses where they danced and sang. There was as much to be seen in these gardens as there was everywhere else, and we could not tire of witnessing his great power. Thus as a consequence of so many crafts being practiced among them, a large number of skilled Indians were employed [Diaz del Castillo 1956:214].

In letters written to the King of Spain, Charles V, Cortés (2001:110) also discusses one of Montezuma's pleasure palaces, although he does not name which. He describes it as very beautiful, having a house with rooms with space enough for two great princes and their courts, balconies overlooking the garden, a room where albinos were sequestered, and pools where a wide variety of domesticated water birds were kept, animals that were cared for full time by three hundred men. He also mentioned that all of the empire's rich citizens had very large, well-crafted houses with flower gardens on upper and lower floors (Cortés 2001:107). Speaking of a game retreat outside of the Tenochtitlan, Cervantes de Salazar notes "[i]n these woods there were fountains, rivers, tanks with fish, rabbit warrens, steep high rocks among which were stags, fallow dear, hares, foxes, wolves, and other similar animals which the Mexican lords hunted much and very often" (quoted in Nuttall 1925:454-455).

Other exceptional Late Postclassic period imperial pleasure palaces and gardens in the Basin of Mexico include Acatetelco, Cerro Cuailama, Huaxtepec, Chapultepec, and Tetzcotzingo, the latter two of which were designed by the famed Texcoco king,

philosopher, poet, and celebrated landscape architect, Nezahualcoatl (Evans 2000:216-217, 225n24, Table 1, 2012; Nicholson 1961; Nuttall 1925:459, 460-462; Townsend 1979, 1982, 1992a, 1992b; Umberger 1996:249-259). The following discussion focuses only on Tetzcotzingo and Chapultepec as examples of the intricacies of these places and how their myriad constructed and natural spaces intersected, but the other pleasure parks in general had similar modifications and meanings, and were used for similar purposes (Nicholson 1961; Nuttall 1925; Umberger 1996).

Nezahualcoatl built Tetzcotzingo park sometime between A.D. 1454 and 1467 as part of a larger elaborate civic effort to bring water to his kingdom (McAfee and Barlow 1946). That feat was accomplished by constructing a massive aqueduct and causeway system starting from springs high on Mt. Tlaloc to the east. It measured 8 km-long, and was built on a solid embankment at times reaching heights of up to 60 meters, and wide enough for a carriage or three persons on horseback to ride abreast (Evans 2000:216; McAfee and Barlow 1946; Nuttall 1925:460; Townsend 1982:50). The park was one of the most elaborate in the Basin of Mexico. It was situated on, and carved into, a tall, conical hill of the same name, located at the foot of Mount Tlaloc that offered a panoramic view of Lake Texcoco, the surrounding plains and agricultural fields, and the mountains beyond them (Nuttall 1925:460). It was a multivocalic place that incorporated components with a wide variety of uses and meanings. It was a royal retreat, a botanical garden, a memorial, an important rain and water shrine, and, a microcosm of the world (Evans 2000:217). The significance of this observation for the present discussion is that although each of these components can be understood separately, a fruitful analysis also

comes from understanding the disparate parts as a whole. Furthermore, these examples demonstrate that ritual concerns were vital components of pleasure parks, that elite activities were regularly pursued in rural settings, and the myriad ways that cultural enhancements were made to appreciate natural places.

Specific components of the park included structures laid out in a cosmological pattern over the entire hill, Netzahualcoyotl's palace, natural and constructed shrines, paved paths, one of which circumscribes the mid-point of the knoll, staircases sculpted into bedrock, bas-relief engravings on rocky outcrops, an aviary, gardens populated with exotic plants, and, most notably, water features including carved and stuccoed channels and aqueducts, pools, and fountains with zoomorphic spouts (Evans 2000:216; McAfee and Barlow 1946:Plate V; Townsend 1979:757-759, 1982:50-59; Umberger 1996:250). The channels and aqueducts guided the water from Mount Tlaloc around the hill, filling up the king's pools, and feeding the botanical gardens below (Townsend 1979:757). Small grooves carved into the rock allowed the liquid to follow the king throughout the park, even as he descended down the sculpted stairs (Schaafsma and Taube 2006:242). Once the water passed through the park completely, it then proceeded down the hill to the towns and villages of Texcoco.

Only structural foundations remain of the architecture, but one of Nezahualcoatl's descendents wrote that the summit contained tower-like houses with roofs and spires made of stone, and the king's castle, which had a massive patio where he would entertain visiting guests, was situated in a grove on the southwestern side of the hill (Alva Ixtlilxochitl, cited in Evans 2000:216; Townsend 1982:Figure7). An archaeological

mapping survey revealed that the botanical gardens were located on the hill below the palace (Townsend 1982:Figure 7). That work also documented two monumental fertility goddess effigies below the western crest of the hill, and a bedrock boulder near one of the summit structures carved with a bas-relief Tlaloc mask suggesting that it may have been used for rain rituals (Townsend 1982:59; Umberger 1996:250). Three pools, all carved into the bedrock and fed through the aqueduct and channel system, were located to the north, south, and west, along the path that circumscribes the hill. Each was accompanied by sculptures, one of which had three frogs, and the other two were accompanied by hieroglyphic names for Tollan and Tenayucan, cities of mytho-historic importance to the Aztec (Alva Ixtlilxochitl cited in Evans 2000:217; Umberger 1996:250). The southern pool was located at the transition point between the residence and botanical garden, and a rockshelter that was destroyed by looters in the nineteenth century was directly below it (Townsend 1979:757; 1982:59). Other sculptures located on the hill included a hieroglyphic representation of its name, a date commemorating the death of one of Nezahualcoatl's good friends, and several others representing the king himself in various guises (McAfee and Barlow 1946:117; Umberger 1996:250).

Collectively, the features of the hill demonstrated the king's power over nature and his role as purveyor of vital life-giving forces. The orchard replicated Tlalocan, a mythological place of creation and eastern paradise (Evans 2000:217). One of the series of stairs runs east to west over the crest of the hill that allowed state events to be coordinated to astronomical phenomenon and seasonal cycles (Townsend 1982:53; Umberger 1996:250). Nezahualcoatl's control over water was expressed symbolically

through the Tlaloc imagery, as well as channeling all of the water from Mount Tlaloc throughout the park, which was then sanctified as he bathed in it (Townsend 1982). More specifically, he became the embodiment of Tlaloc, the Central Mexican rain god, traveling along his water road, the ultimate source of rain and abundance (Schaafsm and Taube 2006:242). Furthermore, one of the bas-relief carvings was of him that he commissioned at the completion of the water system so that everyone would always remember that he was responsible for its construction (McAfee and Barlow 1946:117). The fertility goddess effigies, likely of Tlazolteotl-Cinteotl, are located on a platform near the summit but in a place that had a commanding view of the cultivated fields of Texcoco and the lakeshore below (Townsend 1982:59). In other words, Nezahualcoatl, like the Tlazolteotl-Cinteotl, was the source of agricultural fertility for his kingdom. The discussion of cave symbolism in Chapter 4 suggests that the rockshelter below the southern pool and located near the palace and orchard, would likely have reinforced the water and agriculture symbolism of the hill because those places were considered the sources of rain and sustenance throughout pre-Hispanic Mesoamerica (Townsend 1982:59).

Located on the mainland lakeshore southwest of Tenochtitlan, Chapultepec hill (Grasshopper Hill) has a spring emerging from a cave, becoming the primary source of freshwater for the inhabitants of Tenochtitlan when the third king of the Mexica, Chimalpopoca, built an aqueduct from it during his reign in the early 15th century (Duran 1994:66-67). Nezahualcoatl improved that construction as part of a larger engineering effort, also designing a royal retreat in the mid 15th century (Umberger 1996:253).

Similar to Tetzcotzingo, the Chapultepec royal retreat included a botanic garden populated with ornamental and medicinal plants imported from throughout the empire, but was also a water shrine, and commemorative park (Duran 1994:205n.5; Umberger 1996:253). The water shrine included a Tlaloc figure, a temple along, and other religious sculpture, while healers and midwives sacrificed a maiden on the hilltop during the feast of the eighth month, Huey Tecuilhuitl, a ceremony dedicated to Xilonen, the goddess of tender maize (Duran 1977:439-440, 439n.2; 1994:186n.4, 205n.5; Sahagún 1981:14; Umberger 1996:253). In remembrance of a great famine ending during his reign in 1456, and a desire to be remembered for eternity, the Aztec king, Montecuhzoma I commissioned life-like portraits of himself and his brother carved in the bedrock of Chapultepec hill in the mid 1450s, in addition to dates of conquests and other important events (Heyden 1994:242; Nicholson 1961:380). The image displayed the king in Xipe battle dress, with a staff and shield in hand, and wearing a flayed skin. Thus began a royal custom followed by all subsequent rulers until the Spanish arrived in 1521 (Nicholson 1961:403; Umberger 1996:253).

A common pattern from the Colonial period accounts of gardens, and the description of Tetzcotzingo and Chapultepec presented above is that the Central Mexican lords chose settings for their rural pleasure parks specifically for their natural beauty, and then enhanced them by adding masonry constructions, water features, living quarters, rock art, and importing exotic plants and animals. In other words, these parks were both built and natural places (Evans 2000:206; Nuttall 1925:456). Masonry constructions and a water feature are present in the NTC as mentioned above and detailed in Chapter 5.

Additionally, the geologic character of that area makes it a picturesque and striking place of contrast suddenly emerging from the otherwise gently rolling hill (**Figure 196**). Such areas have often been singled out worldwide as sacred places because they often invoke feelings of awe, power, beauty, and respect (Taçon 1999:36-37). Lastly, a few scattered, low mounds are located near the small dam between the NTC and Actun Naj Che, the only ones encountered in the immediate area. Even though I was unable to excavate them to determine their function, their position between the two karst features, and lack of other known settlement in the area suggests that they were closely affiliated with those karst features.

A second pattern that emerges from the preceding discussion is that the spots where the Aztec kings established their pleasure parks were also renowned for their historic and sacred significance, and their designs were intended to accommodate ceremonial needs related to healing, astronomy, divination, agricultural fertility, rain, and water, in addition to the practical, and pleasure considerations described above (Evans 2004:46-47; Townsend 1979:757, 1992a:132-144, 171; Umberger 1996). This goal was achieved through the construction of temples, shrines, and other ritual spaces, as well as incorporating sacred landmarks such as caves and springs into their designs. As detailed in Chapters 5 and 6, the ceramics and artifacts recovered from the various karst features in the NTC indicate that they were used for ritual purposes throughout the Classic period, and its affiliation with Actun Lak, an important community rain shrine starting the the Late Preclassic period, suggests that the hill itself was a historically significant place for the Pacbitun polity. Furthermore, the presence of the seeds, a round quartz pebble, and

modified ceramic mold in Actun Xtuyul suggests that at least part of the NTC was used for divination.

Even though determining the specific function of each of the created spaces and architectural modifications in the NTC is not yet possible with the current data, their proximity to one another, coupled with the ease of navigating through the outcrop suggests that the modifications marked spaces that were parts of a specific conceptual place, in much the same way as the features of Tetzcotzingo made up Nezahualcoatl's park. Collectively, these characteristics suggest that the NTC outcrop and hillside surrounding it was designed as a garden-like pleasure area for the late Late Classic period Pacbitun Maya. As a final note, this interpretation need not conflict with the current model that understands *ch'eenob* as primarily ritual locations (Kieffer and Scott 2012). As the above discussion indicates, ceremonial spaces were vital components of these of Postclassic period pleasure parks throughout Basin of Mexico, and this appears to be the case for the NTC. Therefore, rather than conflicting with the position of the current paradigm, it allows for maintaining that karst features were used for rituals but expands it by recognizing those spaces as components of larger conceptual places, particularly when found in rural areas, but clustered close together like those of the NTC.

CHAPTER 9

CONCLUSION

This dissertation represents the first long-term, systematic archaeological investigation of the karstscape in the Pacbitun region, but it compliments previous and ongoing work at that site by addressing the social impact of religious expression and experiences there. In particular, I focus on Actun Lak's changing role as the rain shrine for the local community as a case study of place, how the constructed ritual spaces in the karst features collectively reflect a purposefully designed wilderness aesthetic that contrasts with the built environment of the settlement, and lastly how the overall use of the karstscape demarcated a physical territory for Pacbitun, and expressed its position within the socio-political milieu of the Belize Valley and eastern Peten regions. Ceramic cross dating provides the overall framework for this analysis. Specifically, the pottery indicates that karstscape use began in some features in the Late Preclassic period (300-100 B.C.), others in the Terminal Preclassic (100 B.C.-A.D.300) and from then continued uninterrupted until the late Late Classic period (A.D. 700-900), when the most intensive use occurred, and all excavated architectural modifications were constructed. Prior to this, the ceramic evidence is scant, suggesting either that the features were lightly used, or the ritual practices were intensive but did not leave behind many material residues. That the features were lightly used is more likely because cave use elsewhere in Belize

shows similar temporal patterning and affiliated use intensity (Awe 2006; Awe and Helmke 2005, 2007; Moyes 2006a; Moyes et al. 2009).

Actun Lak is the only exception to this temporal pattern of the karstscape features that I investigated. Like the other karstscape features, its most intensive use occurred and all architectural modifications were made in the late Late Classic period, but the recovery of an Altar Orange type bowl cached in a terrace and a radiocarbon assay from the rear of the cave point to a date no earlier than the early ninth century. Nevertheless, a cluster of stalagmitic formations in the center of the cave received extensive ritual attention between A.D. 50 and A.D. 400 as evidenced by the dense concentrations of Hewlett Bank Unslipped pottery surrounding it (Brady et al. 1998:note 9). I propose in this dissertation that Actun Lak was the primary rain shrine for the Pacbitun community, and understanding who used it and for what purposes explains this temporal patterning. Its use as a rain shrine is supported by the pan-Mesoamerican beliefs that columnar dripstone formations, such as the stalagmite cluster in the middle of the cavern, are physical manifestations of the rain god, and that hills are considered water engorged places that breathe out billowing rain clouds from zoomorphic cave mouths (Brady 1999; Taube 2001). Thus, Actun Lak's location directly above Rocky Crab Cave, one of only two natural landscape drains in the Pacbitun region, indicates that the local Maya would have seen it as a primary source of rain for their community.

I suggest herein that the temporal differences in use in Actun Lak represents changing patterns of access based social class. Specifically, the early pottery was crudely made and lacked standardization, indicating household production and thus use by local

populations. Alternatively, a spatial analysis of the late Late Classic period architectural modifications demonstrate that access to it was purposefully restricted to Pacbitun royalty and their ritual retainers at this time, although the ceremonies continued to be focused on rain. These modifications include a roughly constructed staircase connecting Actun Lak to Rocky Crab Cave, a low platform just outside the cave that restricted the size of its entrance, and a small terrace just inside the cavern upon which only ritual performers could be seen from the exterior. I interpret the location of this terrace as a passive reminder that only participants were allowed to enter the cave.

Although the positioning of the terrace indicates restricted access, royal use is indicated by the large quantity of jadeite beads and bead fragments, and pieces of two earspools of the same material. They were recovered in excavations beneath a heavily burned speleothem altar at the rear of the cave, which the radiocarbon assay suggests is likely coterminous with the modifications at the entrance. This find represents the largest concentration of jadeite objects yet found anywhere in the Pacbitun region, including the richest burial in the main pyramidal structure at that site. Furthermore, botanical data and the presence of quicklime from the altar area indicate that the burning event there was unusually intense and produced large volumes of aromatic smoke with raw pinewood for fuel (Parker 2014). Jadeite has symbolic connections to rain and agricultural fertility, and pine resin is commonly burned in rain ceremonies because its billowing smoke replicates the water-filled clouds thought to be exhaled from caves (Taube 2001, 2005a). I submit that this royal appropriation of the rain shrine during the latter part of the Terminal Classic period was necessitated by a sustained drought that impacted the region at this

time, and a lack of local dependable water sources to compensate. A greatly expanded population that needed to be fed exacerbated these issues, all of which alleviating was the purview of the king (Brady 1997a; Brady and Ashmore 1999; Demarest 1992; Inomata 2006a, 2006; Kennett et al. 2012; Lucero 1999a, 2003, 2006a, 2006b; Lucero and Fash 2006; Medina-Elizalde and Rohling 2012; Scarborough 1993, 1998, 2003; Scarborough and Gallopin 1991; Webster et al. 2007). I interpret the symbolism of the jadeite offerings and smoke from the fire as a royal attempt at reanimating Actun Lak so that the rains would return to Pacbitun, but the abandonment of the site only a few decades later indicates that these efforts were in vain (Healy et al. 2004).

My investigations also demonstrate that the Pacbitun Maya created and marked small-scale spaces throughout the karstscape by constructing crude architecture, burying extensive caches, blocking passages, importing, moving, and clustering unmodified local stones such as slate and limestone boulders, and in Slate Cave, carving a poorly executed petroglyph panel on a stalagmitic formation. Ceramics from several of these spaces reveal the modifications were made during the Terminal Classic period. Although I was unable to determine their function, I propose herein that the modifications were designed to reflect a morally charged worldview that differentiated between human and natural spaces, and that the karstscape belonged to the latter. Specifically, all the architecture and petroglyphs appear as crude when compared to Pacbitun's art and architecture, but that they were designed specifically as such for maintaining and enhancing the natural essences of the surrounding areas. The petroglyphs are overall unrefined, and the rocks and boulders used for the constructions, alignments, and blocked passages are all uncut

and dry laid. These traits contrast sharply with the elaborately carved monuments from Pacbitun depicting kings in fine royal regalia, and the cut stone and plastered buildings found in the epicenter of that site.

This discussion adds to the growing recognition that the Maya perceived the wilderness as imbued with two diametrically opposed moral characters. The more commonly held position is that it was evil, morally corrupt, and dangerous (Hanks 1990; Stone 1995:16; Taube 2003a:466). On the other hand ethnographic and iconographic evidence suggests that it was also the source of beauty and eternal paradise, traits that I posit the Pacbitun Maya attempted to accentuate with the architectural modifications in the karstscape, particularly those in and around the NTC (Taube 2004a). Using the Aztec as a model with a particular focus on Tetzcotzingo and Chapultepec I elaborate how such places of beauty were combined with a wide range of constructed and natural ritual sites, including caves and rockshelters, historically significant places, as well as modifications including masonry constructions, water features, and living quarters in the development of pleasure parks, and propose that the NTC may have been specifically designed for a similar purpose (Evans 2000; Nuttall 1925; Townsend 1982; Umberger 1996).

In addition to temporal information, ceramic data gathered through Instrumental Neutron Activation and type-variety stylistic analyses inform about Pacbitun's Late Classic to Terminal Classic period territorial extent and socio-political affiliations with other Belize Valley centers, particularly Xunantunich, and the eastern Peten. I propose a model based on the regular spacing of primary and secondary centers along the northern extent of the Maya Mountains indicate political territories there encompassing 9 km

regions. Results of the chemical analysis of the pottery sampled from the karstscape and other sites within the proposed Pacbitun territory, including its epicenter, the causeway system, and the minor center of Sak Pol Pak, demonstrate that most of the ceramics came from the same few sources, and they differed in statistically significant ways from other sites in the Belize Valley, verifying the model.

Stylistic similarities between Pacbitun karstscape ceramics and those from Xunantunich demonstrate a previously unsubstantiated connection between the two polities. This relationship is demonstrated specifically by the presence of Mount Maloney Black bowls, otherwise poorly represented at Pacbitun, but is closely affiliated with Xunantunich (LeCount 1999, 2010a, 2010b; LeCount et al. 2002). Geographically constrained to the area immediately around Xunantunich, archaeologists working at other nearby sites have documented that communities affiliated with that center used it as to demonstrate that connection (Connell 2000, 2010; LeCount 1999, 2010a, 2010b). Rim modes for this pottery type are fine-grained chronological markers, and the majority recovered from the Pacbitun karstscape date to the rise of Xunantunich (A.D. 670-780) as the primary seat of power in the Belize Valley (Ashmore et al. 2004; LeCount et al. 2002). Chemical analysis of these bowls from the Pacbitun karstscape reveals that they were made locally, and not imported from Xunantunich, thus suggesting that some people at Pacbitun wanted to be identified with that emerging foreign power. Nevertheless, current data are unable to elaborate further on that relationship.

The karstscape ceramic data also reveal that Pacbitun's elites were involved in a variety of late Late Classic period exchange networks with their peers throughout the

Belize Valley and beyond. Participation in these networks is suggested by a ceramic production mold used to make Ahk'utu' molded-carved vessels, and a sherd with a hieroglyphic text chemically attributed to the general Belize Valley, but not originating in Pacbitun. Ahk'utu' molded-carved vessels are unique to the greater Belize Valley region, and their production and distribution was controlled by a person known as Lady Olom who offered them as gifts to her patrons (Helmke and Reents-Budet 2008). Little is known about her, but she rose to power in the region sometime after A.D. 810 and the vessels are found throughout central and southern Belize and adjacent areas in the eastern Peten, indicating that her influence stretched at least that far (Helmke and Reents-Budet 2008). Nevertheless, other production molds of this type have yet to be found, and the one from the karstscape was heavily modified, suggesting that it may have been curated as an heirloom, and thus possibly not used for production at Pacbitun. Its chemical signature indicates that it was produced in the Belize Valley, but it does not match up to any specific site. Furthermore, the iconographic scene does not resemble any of those from this type that have been published, except for one from Lamanai that belongs to a different ceramic type (Graham 1987b:Figure 3d).

Similar to the production mold, the ceramic sherd with the hieroglyphic text is chemically attributed to the Belize Valley, but not to Pacbitun. When the vessel was complete the full text would have been comprised of five hieroglyphs, which I suggest simply read, "This vessel was painted." Considering this simple text, as well as its attribution to the general Belize Valley, and its recovery from Actun Lak, I propose herein someone from Pacbitun came into possession of the piece through participation in

a feasting event. These community-building ceremonial activities are well documented in the Late Classic period Belize Valley, and many sponsoring centers developed their own styles (Reents-Budet 1998, 2000; Reents-Budet et al. 1994). The ceramic sherd discussed here most closely resembles the Altun Ha style from northern Belize, but its attribution by INAA to the Belize Valley rules out this possibility. Although I am unable to determine where this sherd originated, participation in ritual feasts at other sites was a significant life event, and the vessels received for it were highly regarded and treasured objects as evidenced by their inclusion in burials (Ball 1993; Coe 1973, 1978; Stuart 1989). Overall, these data suggest that the Actun Lak sherd may have been acquired by a member of Pacbitun's Late Classic period Pacbitun elite class at a ceremonial feast somewhere in the greater Belize Valley region, or possibly beyond, who curated it as a treasured object. The social significance embodied in the piece suggests that it represents another offering of wealth made in Actun Lak to restart the failed weather system during the last few decades of the Pacbitun settlement.

Lastly, I identified a stepped pattern on Early Classic period basal flanged bowls from the karstscape that is also found at the nearby site of Barton Ramie and Uaxactun in the central Peten, Guatemala. The chemical signature from Pacbitun indicates that they were locally produced. Using textiles as a vehicle to transport information and ideas in the Andes as a model, I posit that the similarity in locally produced ceramic designs over such a large region that encompasses the Belize Valley and central Peten is attributable to a similar exchange of fabrics there (Stone-Miller 1992:337). This phenomenon is widely recognized as a foundational component of the Postclassic period International Style, but

has only recently been identified as a technique employed by the Classic period Maya, including those at Pacbitun (Taube 2010c:150; Houston 2014:35-39).

Implications and Suggestions for Future Research

This dissertation has advanced our understanding of pre-Hispanic Maya perceptions and use of sacred karst landscapes in a number of ways, and from these, emerge several avenues for future research at Pacbitun, the Belize Valley, and Maya archaeology in general. First, although my project is regional in scope, I only visited a small portion of the features within Pacbitun's karstscape, and intensively studied only a fraction of those; therefore, much about it remains unknown, and of the features investigated, several questions about them remain unanswered. For example, faunal material is an artifact class common to cave and rockshelter sites throughout the Maya area, yet with the exception of *jute* snail shells in the NTC, it was all but absent from my excavations. Although not the product of cultural agency, the Pleistocene ground sloth bones from Actun Lak Chamber 2 demonstrate favorable preservation conditions there, indicating other animal remains should be present if the Maya brought them into that cave. Additionally, rockshelters elsewhere in Belize and Guatemala were frequently used for burial locations, but human remains in the study area are also relatively scarce (Glassman and Bonor 2005; Healy et al. 1996; Prufer 2002; Saul et al. 2005; Spenard

2006a). The only excavated human material is the partial cremation from Actun Naj Che, and a few recently disturbed skeletons in Actun Pech and Skeleton Cave (Francis et al. 1995; Healy et al. 1996; Powis 2010a). Therefore, two related avenues for future research are determining if the lack of faunal material and human remains is a pattern of karst feature use at Pacbitun, or simply a sampling error. The lack of human remains in the rockshelters in the Pacbitun karstscape is particularly noteworthy because they are found in large quantities in those features in the nearby Caves Branch River Valley, suggesting differing regional use patterns (Bonor 1989a, 1995; Glassman and Bonor 2005; Hardy 2009; Wrobel et al. 2007). Additionally, later investigations in the Pacbitun karstscape should aim at understanding Slate Cave, specifically why it is the only cavern with parietal art in the region. Upcoming studies would also benefit from elucidating the relationship between Tzul's Cave, the secondary center, Sak Pol Pak on the hilltop above it, and their connection to Pacbitun expressed by the causeway between them. Finally, recovering Early Postclassic period (A.D. 900-1200) ceramics in the karstscape indicates the region remained inhabited through that time, countering a lack of evidence from the center; therefore, additional cave data are vital to understanding the events and aftermath of Pacbitun's Terminal Classic period collapse and presumed abandonment (Healy et al. 2004).

From a regional perspective, reconnaissance revealed a pattern of Late Classic period territorial organization similar to that found in the Belize Valley (Driver and Garber 2004). Even though the landmarks I investigated are relatively close to Pacbitun, the identity of the people using them as members of that polity was only confirmed by the

INAA ceramic study. Further testing of pottery from the unexcavated site of Guacamayo to the west, and the newly discovered center, Barton Creek to the east, in conjunction with subterranean material from within those proposed territories can help ground truth and refine the boundaries between those polities, specifically identifying which landmarks were controlled by each. Extending chemical sourcing to other materials, specifically speleothems, would compliment such a study. In particular, the Maya harvested dripstone formations by the thousands, with careful research elsewhere revealing many ended up in architectural fill and caches within settlements (Brady et al. 2005; Peterson 2006; Tate 1992; Weber and Kieffer 2013). A preliminary compositional study in the Sibun region demonstrates these objects are chemically sourceable to particular caves (Nation et al. 2012). Therefore, compositional studies of cave formations harvested on a regional level, in addition to speleothems gathered from multiple settlement contexts, can identify which caverns' dripstones were being harvested by members of which polity, and on a more local level, determine use by specific local communities and kin-groups.

Finally, for this dissertation, I systematically documented a range of ceremonially used karst features including diminutive landmarks traditionally overlooked by cave archaeologists, greatly expanding our understanding of the concept of *ch'een* beyond caverns, sinkholes, cenotes and large rockshelters. Although their individual functions remain elusive, my investigations documented several preliminary differential use patterns that sustained future excavations in the Pacbitun karstscape can further illuminate. Furthermore, I have demonstrated the utility of situating all karst features

within a broader landscape framework, understanding them simultaneously as individual, bounded sites, and as components of larger conceptual places, specifically including areas outside of their drip lines, all impacted by external social and natural forces. These findings also suggest that even intensively studied cave regions in the Maya area, such as the Roaring Creek Valley, and Sibun-Manatee karst in central Belize, as well as adjacent regions in Guatemala such as the Petexbatun and Cancuen areas are likely filled with a wealth of previously undocumented karstscape sites, vastly outnumbering the large caverns and rockshelters there (Awe 2006; Awe et al. 2005; Brady 1997; Brady et al. 1997; Peterson 2006; Spenard 2006a; Woodfill 2010). Furthermore, these data offer a means for testing whether Maya populations living in areas lacking large hills and caverns, such as northern Belize and the northern Maya Lowlands practiced "cave" rituals. Specifically, the use of such diminutive features in the Pacbitun karstscape indicates that size did not equal sacredness, and considering most of the pre-Hispanic Maya lowland area is located on a karstified limestone shelf, "caves" were everywhere.

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APPENDIX A

FIGURES

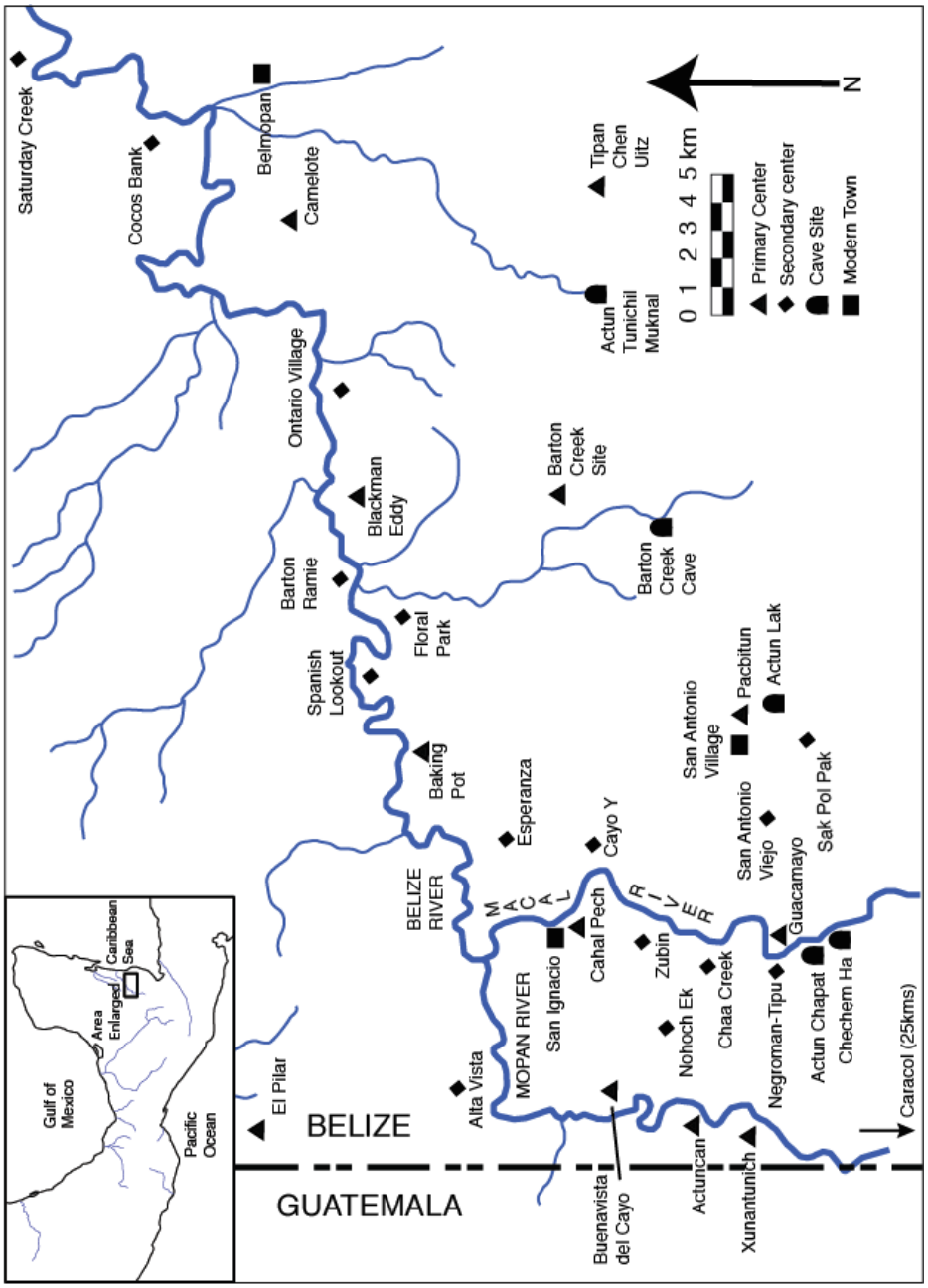


Figure 1. Map of Belize Valley (after Chase and Garber 2004:2).



Figure 2. Remains of hillside architectural modification beneath boulder below Actun Lak.



Figure 3. Cobble wall in entrance of Actun Ku'uk.



Figure 4. Map of the Maya area with Belize Valley highlighted (after Sharer and Traxler 2006).

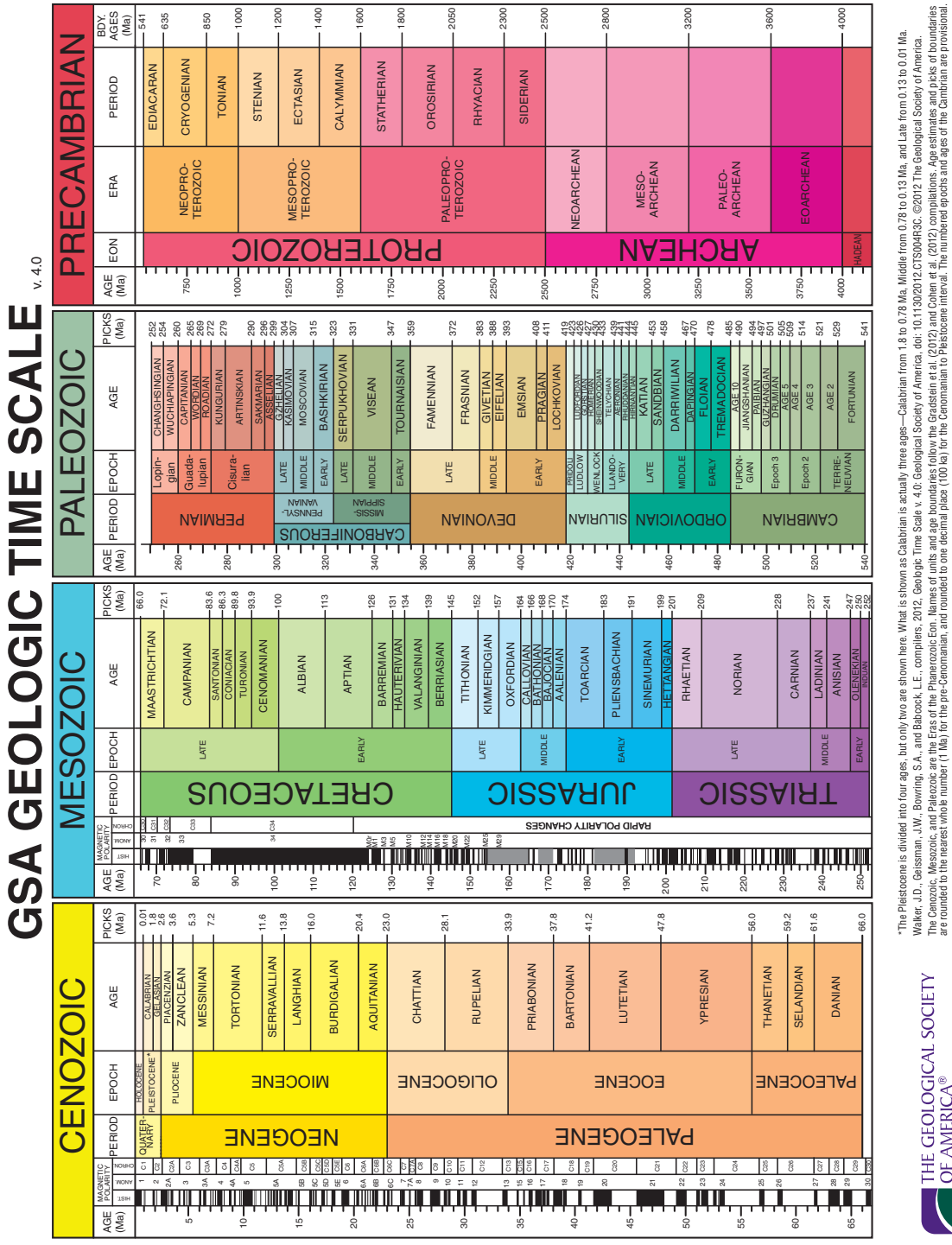


Figure 5. Geologic timescale (from http://www.geosociety.org/science/timescale/).

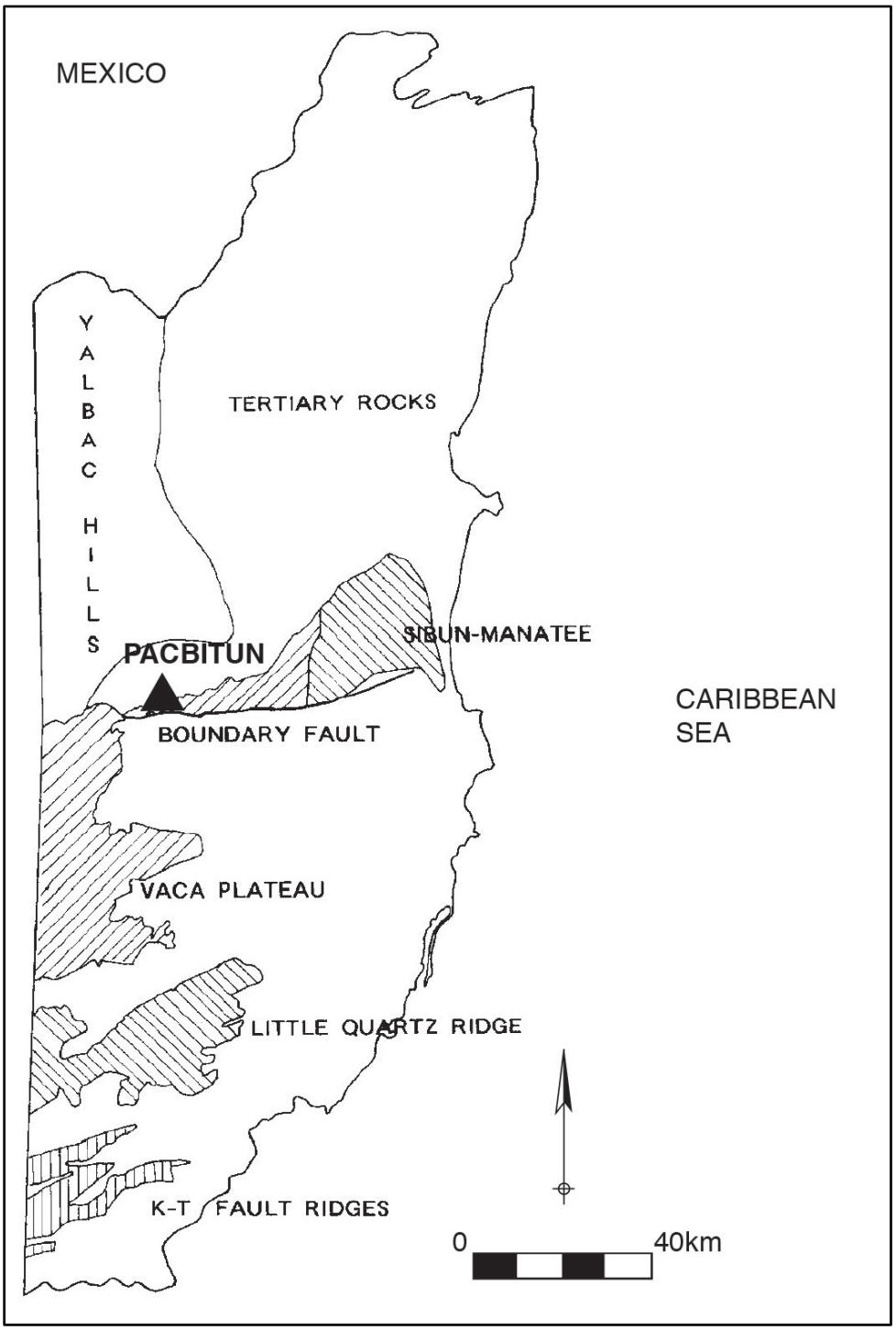


Figure 6. Karst regions of Belize (after Miller 1996:Figure 4).



Figure 7. Example of cockpit karst, San Francisco Hills, Guatemala.

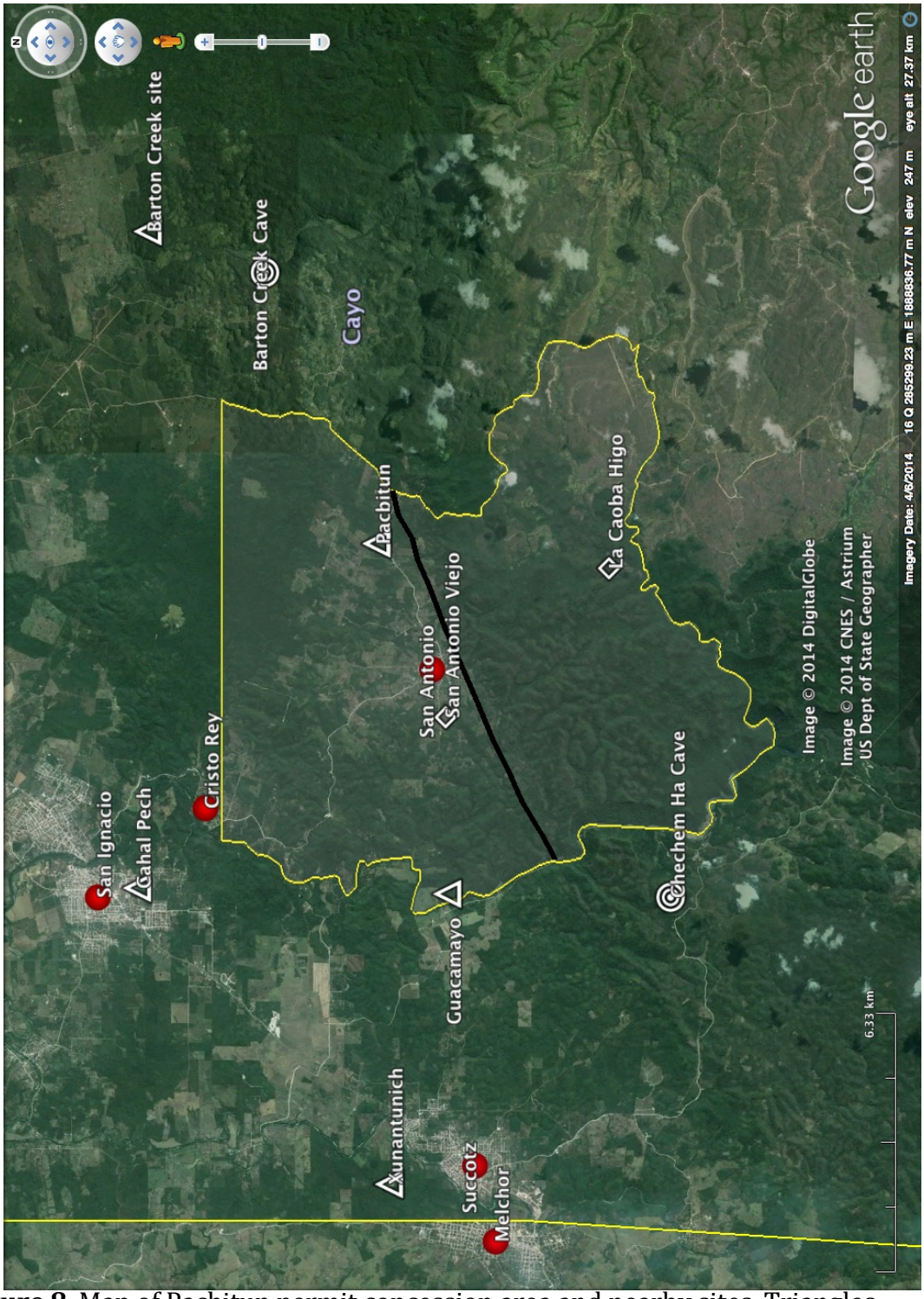


Figure 8. Map of Pacbitun permit concession area and nearby sites. Triangles indicate primary centers; diamonds secondary centers; circles are known, protected caves; and red dots are modern settlements. Black line dividing area is approximate location of the Northern Boundary Fault.



Figure 9. Panorama of Pacbitun region showing Maya Mountains rising from the gently rolling plains of the Belize Valley, facing southeast.

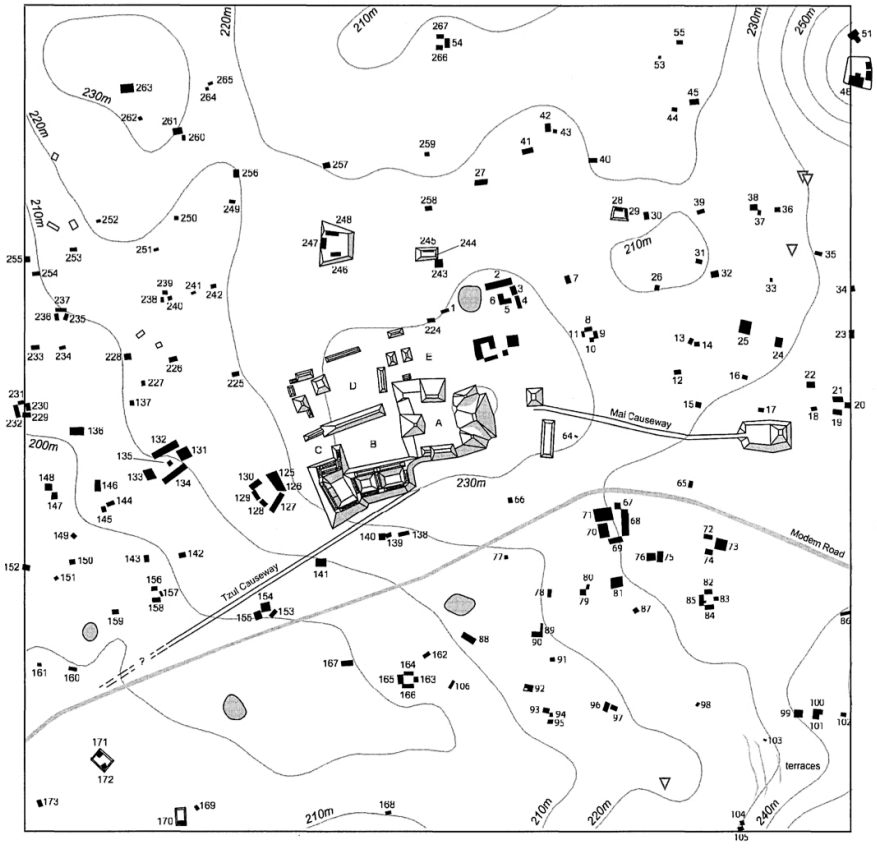


Figure 10. Map of Pacbitun Core Area (after Healy et al. 2007:Figure 7).

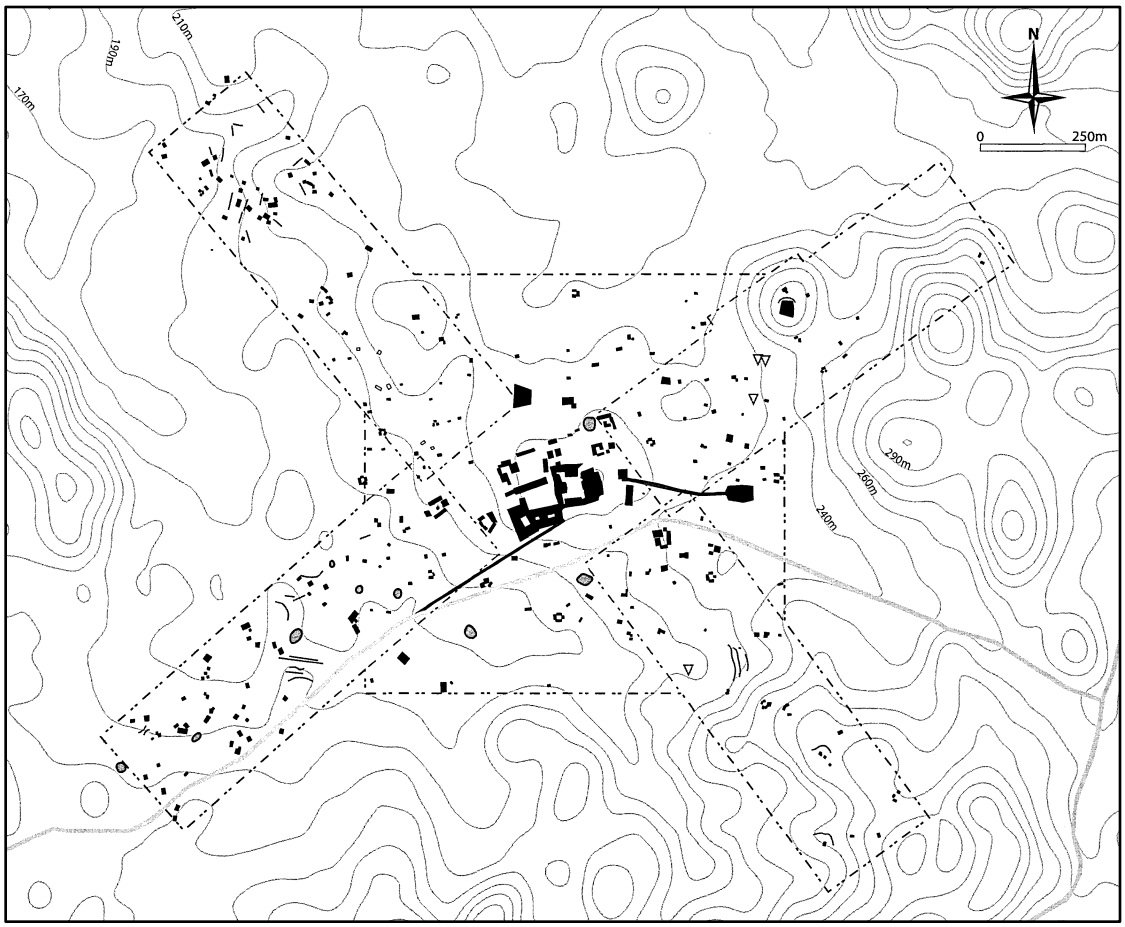


Figure 11. Settlement map of Pacbitun. Dark area in the center is the Epicenter, central region bounded by the large box is the Core Zone, and the areas beyond, the Periphery zone (after Healy et al. 2007:Figure 3).



Figure 12. Sak Pol Pak hill. Note its isolated position in the ridgeline, and arrow pointing to slight bump in forest cover on Structure 1.

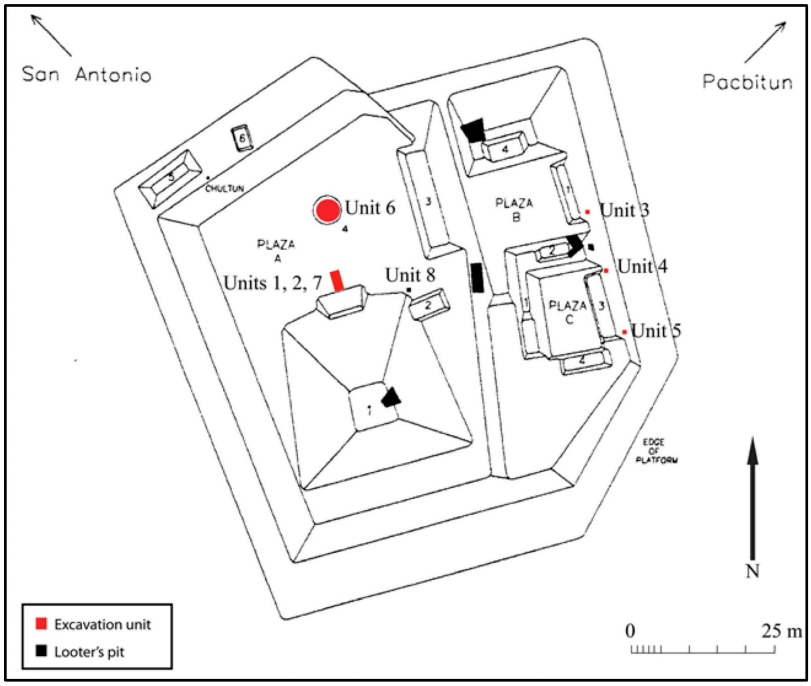


Figure 13. Map of Sak Pol Pak. Excavations highlighted in red, looter pits in black (after Conlon 1999:Figure 1).



Figure 14. Figurine whistles from Pacbitun Eastern Court (photo courtesy of Kong Cheong).



Figure 15. Late Classic period polychrome vessel showing two styles of palanquins. (www.mayavase.com K5456 © Justin Kerr)



Figure 16. Music and drinking on Late Classic period polychrome vessel. (www.mayavase.com K1453 © Justin Kerr)

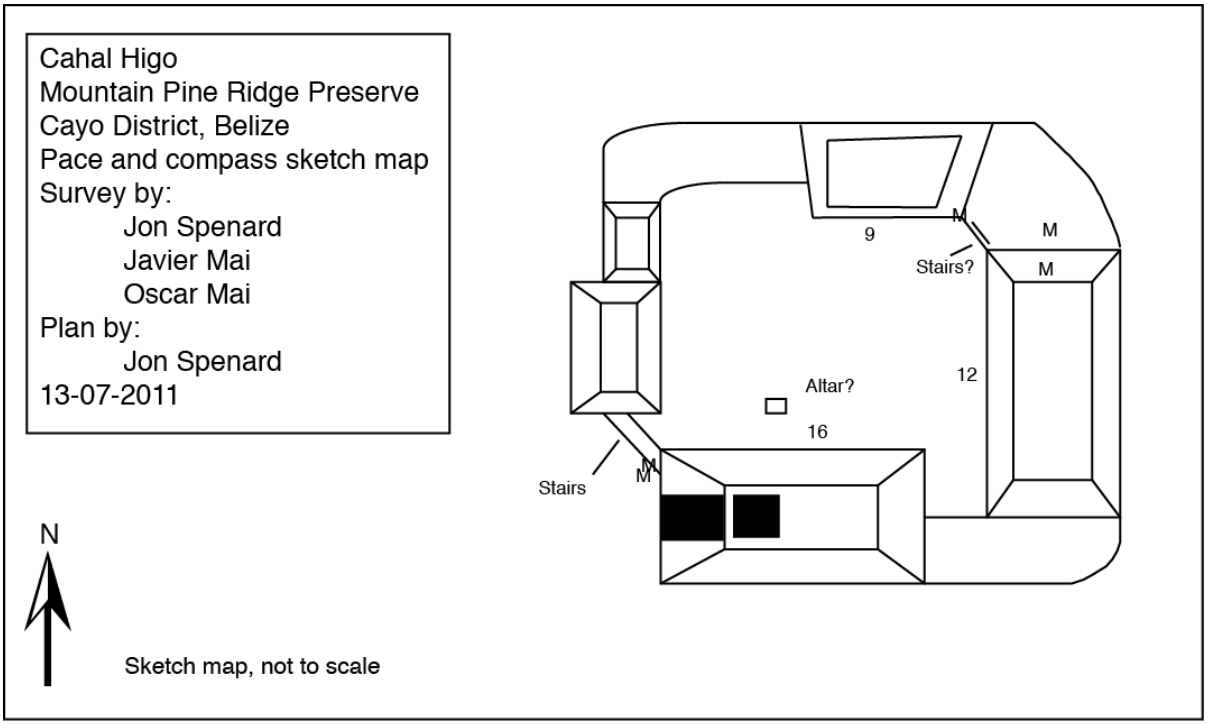


Figure 17. Pace and compass sketch map of Cahal Higo. "M" indicates granite mano on surface.



Figure 18. Granite manos on floor of Actun Hayach Naj. Dark rocks in image center are manos.

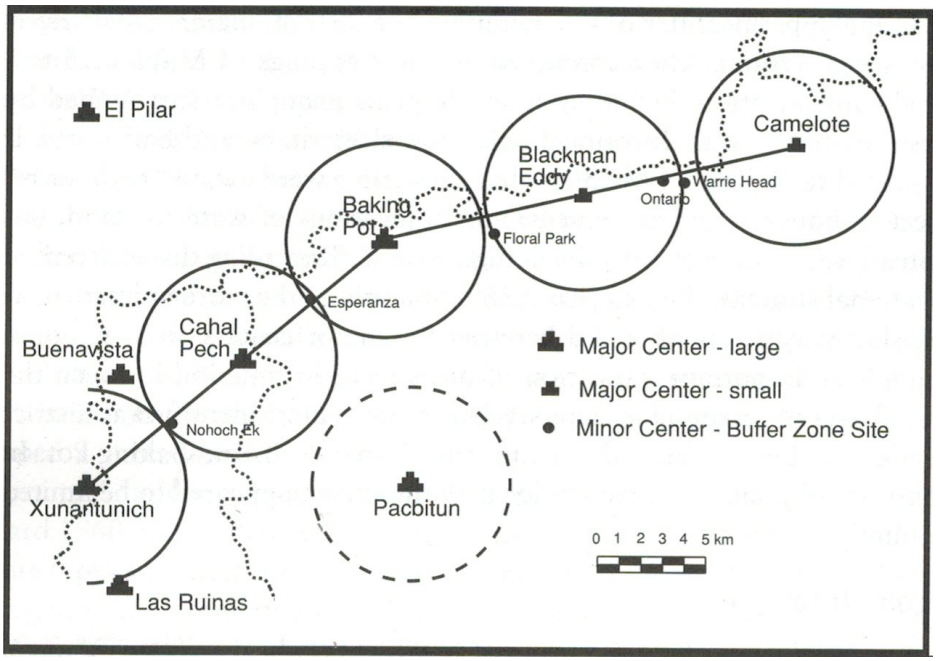


Figure 19. 9.9 km territorial boundaries for primary centers along Belize River (after Driver and Garber 2004:290).

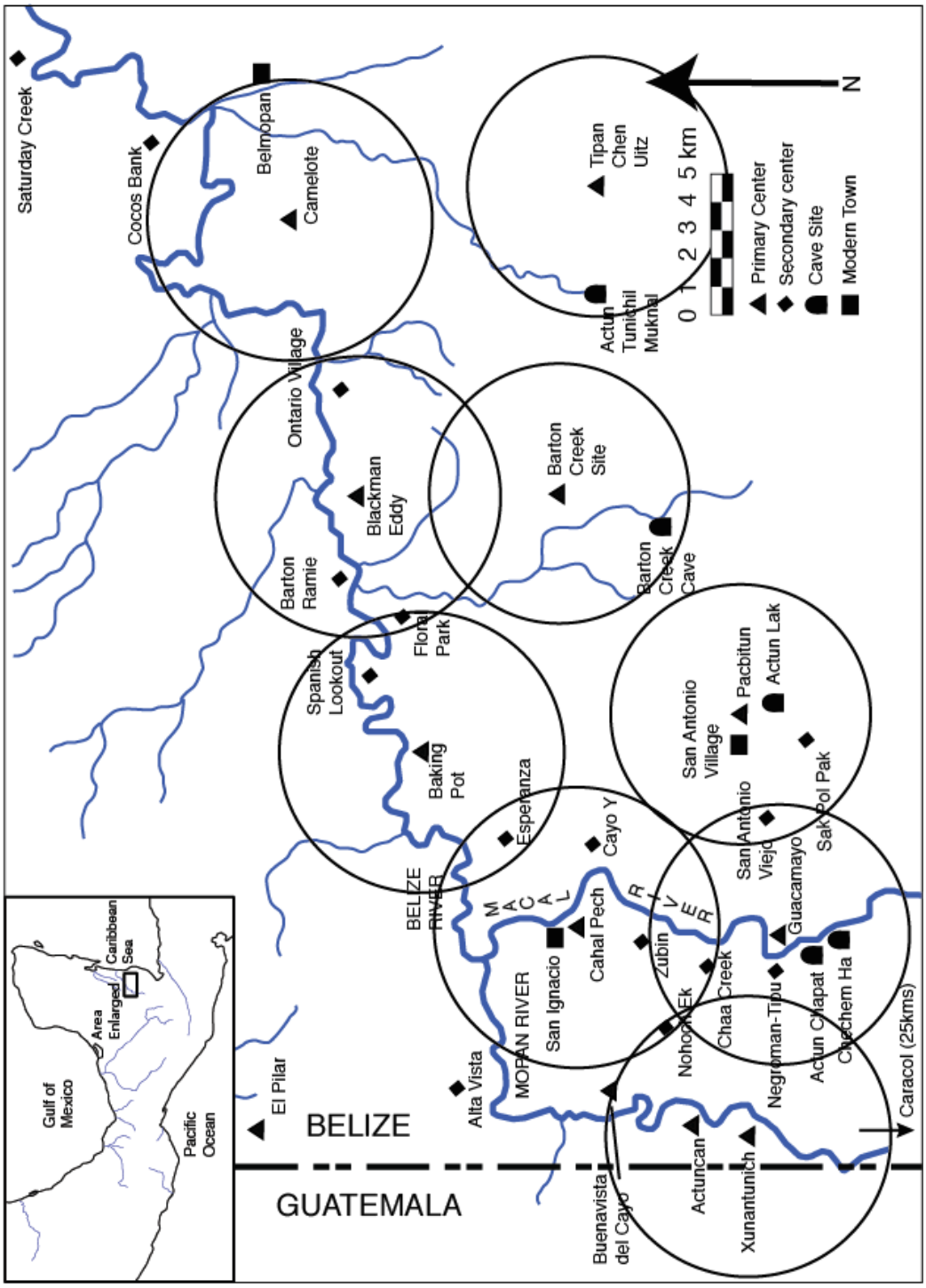


Figure 20. Map showing 9 km buffer regions around the Northern Boundary Fault polities, and 9.9 km buffer regions around Belize Valley polities. Note that San Antonio Viejo falls directly between Guacamayo and Pacbitun, and the newly discovered center at Barton Creek is nearly equidistant to Pacbitun and Tipan Chen Uitz, as predicted.



Figure 21. Map showing visual relationship between Pacbitun and San Antonio Viejo. The red line crosses the centers of the primary structures of San Antonio Viejo, intersecting the southern portion of Pacbitun's epicenter, following Tzul's Causeway.

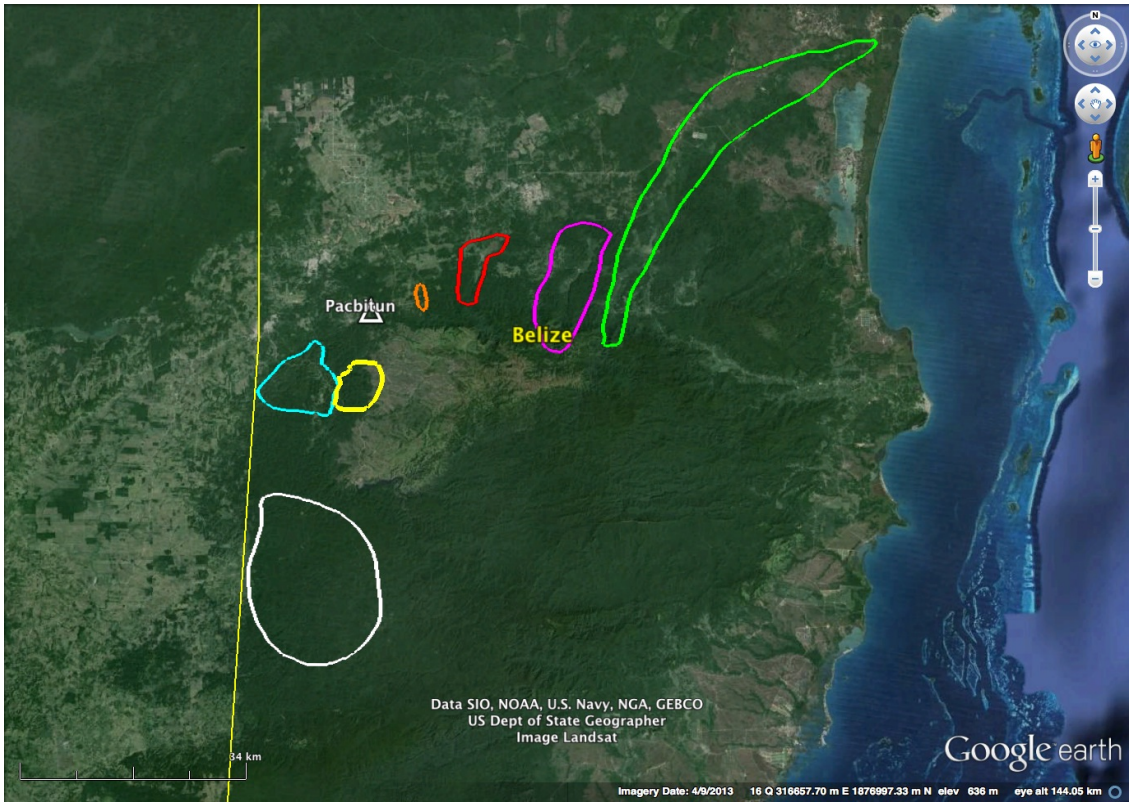


Figure 22. Previously investigated cave rich-regions in the greater Pacbitun area. Orange is Barton Creek Valley, white is Caracol-Chiquibul, purple is Caves Branch, yellow is Rio Frio-Mountain Pine Ridge, red is Roaring Creek Valley, green is Sibun-Manatee River Valley and karst, and blue is northern Vaca Plateau.

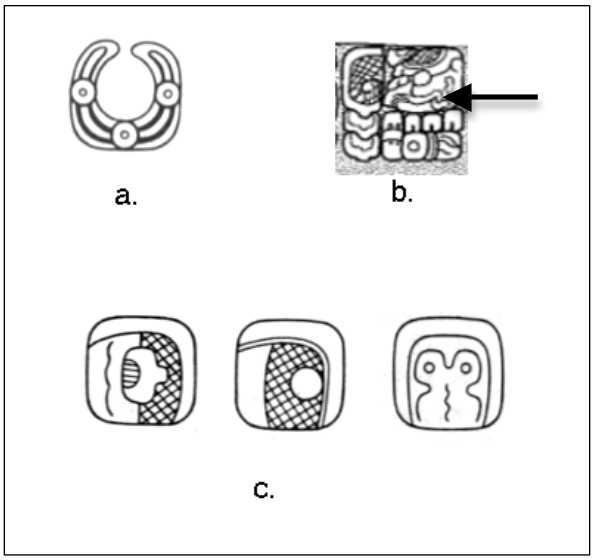


Figure 23. Maya karstscape hieroglyphs: a) Cenote (after Thompson 1962:218); b) ?*izit* (hilltop) (after Houston and Taube 2012:41); c) **CH'EEN** (cave) (after Thompson 1962:198, 223, 224).

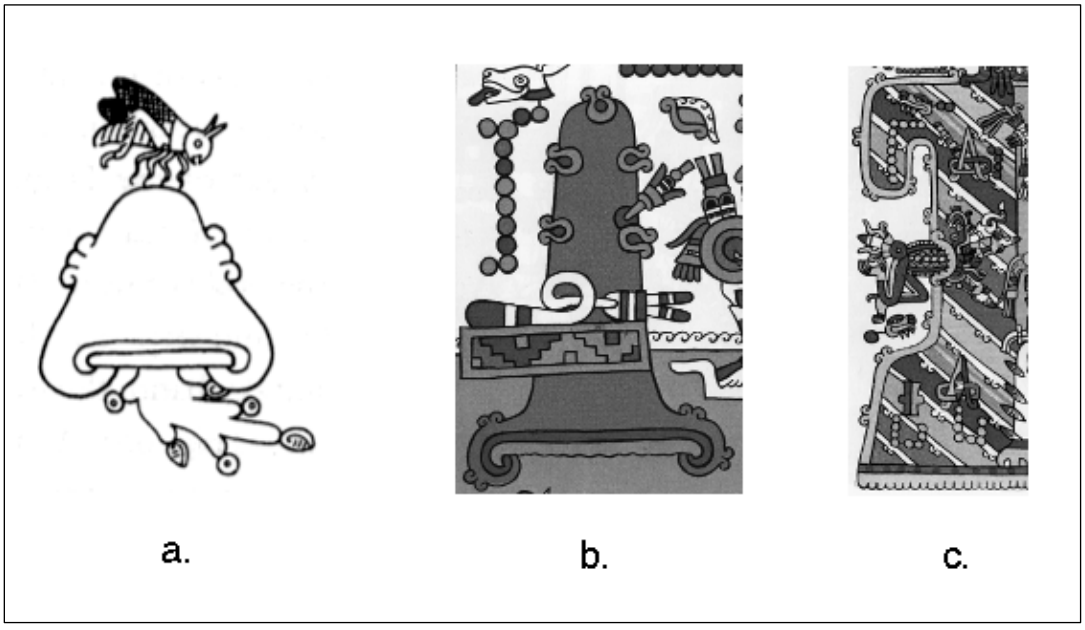
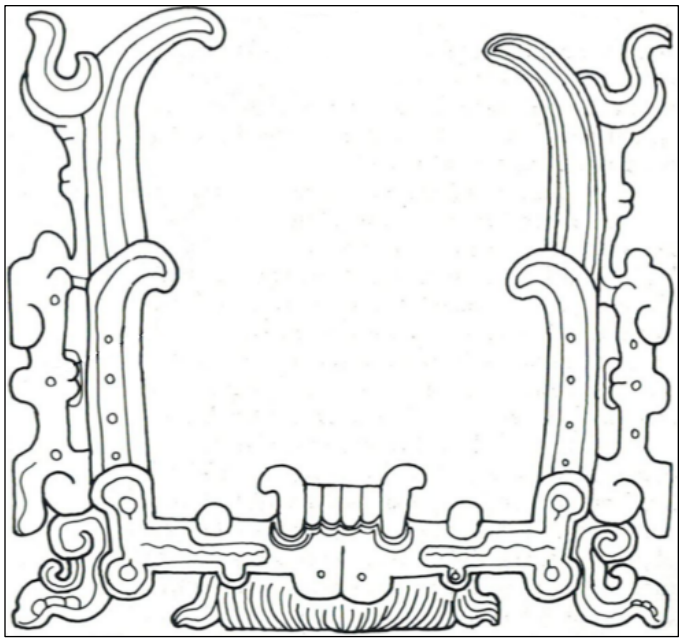


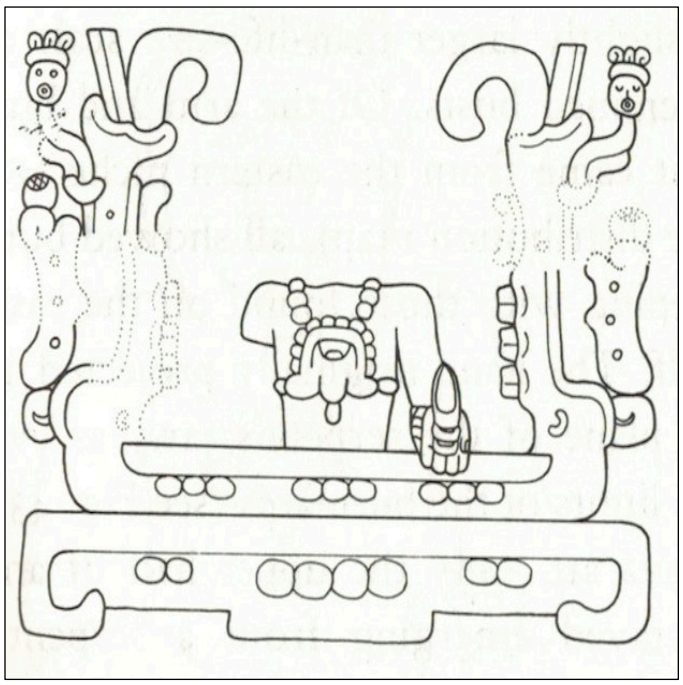
Figure 24. Central Mexican cave motifs: a) water flowing from cave in the base of Chapultepec hill (after Boone 2000:53; b) island hill showing Ω-shaped caves in Codex Nuttall (Nuttall 1975:75); Fire serpent Yahui entering mouth-like cave in Codex Nuttall (Nuttall 1975:19).



Figure 25. Late Classic period polychrome vessel displaying ceramic vessel-filled quatrefoil and possible falling rain (www.mayavase.com K1485 © Justin Kerr).



a



b

Figure 26. Skeletal centipede jaws as symbolic caves: a) from Pakal's sarcophagus, Palenque (from Schele and Miller 2001:Figure 111); b) stone mosaic sculpture from Copan structure 9N-82 (from Fash 1989:Figure 41).



Figure 27. Late Classic period polychrome vessel showing Chahk, the rain god holding court from a Γ-shaped zoomorphic mountain temple (www.mayavase.com K530 © Justin Kerr).

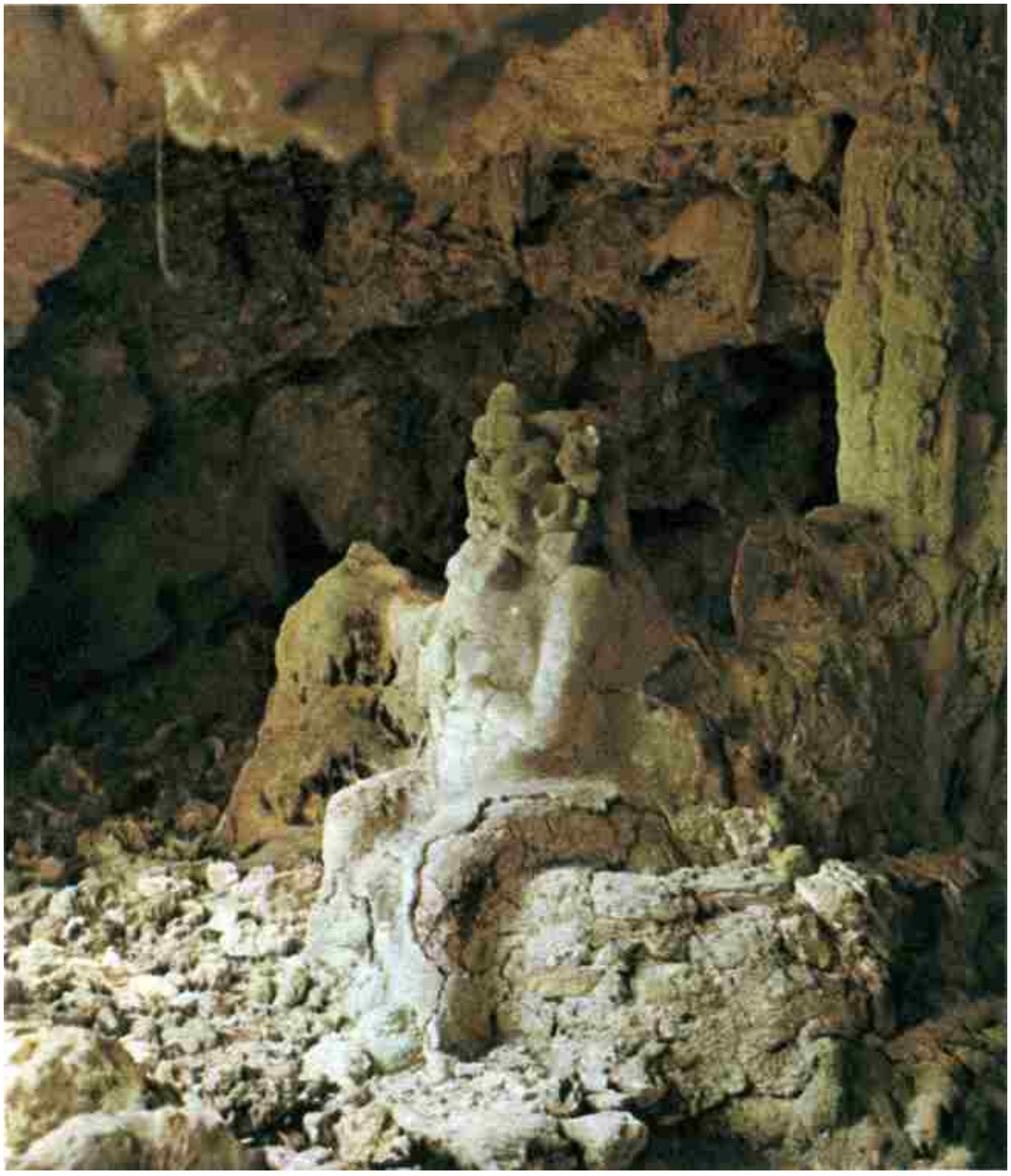
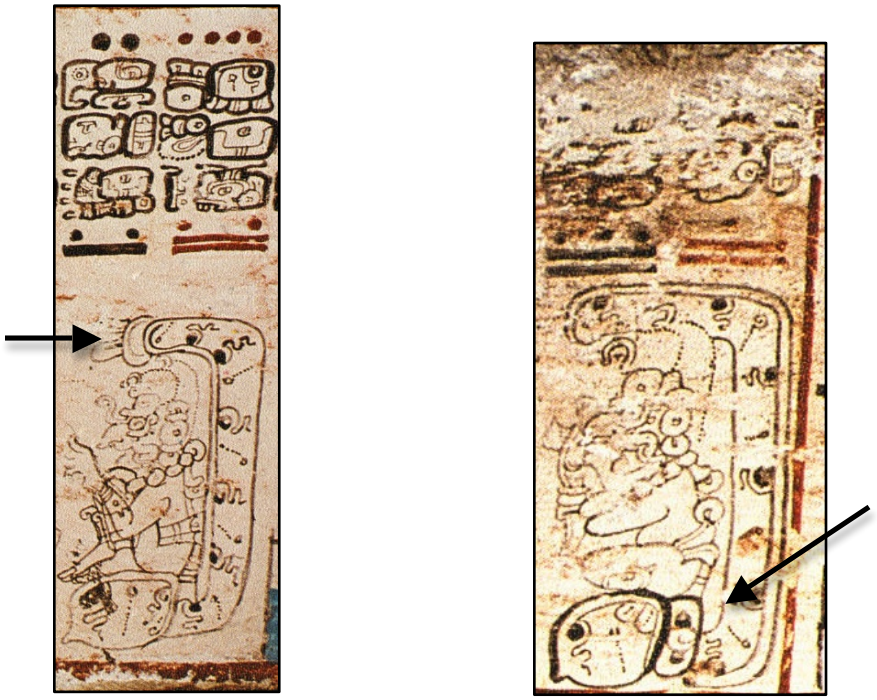


Figure 28. Stucco sculpture of Chahk sitting on throne in front of columnar formation, La Pailita Cave, Guatemala (Stuart and Stuart 1977:53).



Figure 29. Late Classic period polychrome vessel showing the Maize god rising up from a crack in the turtle shell earth (www.mayavase.com K1892 © Justin Kerr).



a **b**

Figure 30. Chahk caves in the Dresden Codex: a) "saskab" mine, p. 67; b) "its kab cave," p. 30 b). Arrows point to ***sak*** and **-*yu*** syllables.

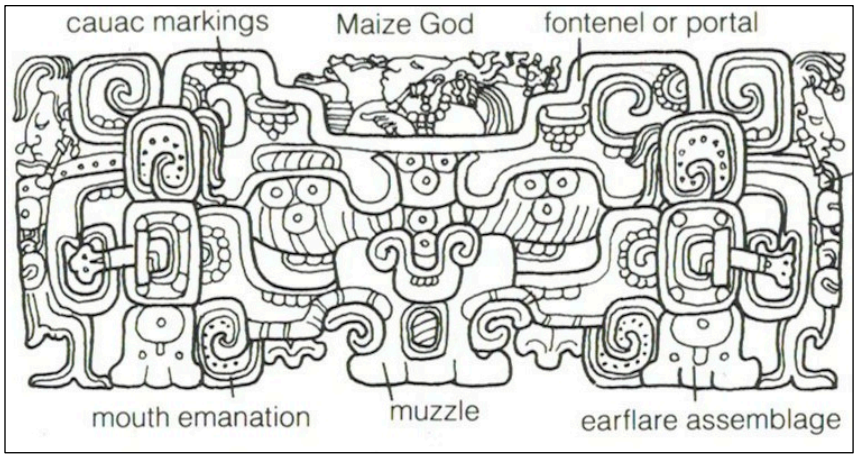


Figure 31. Kawak markings on zoomorphic mountain (from Schele and Miller 2001:Figure 23)

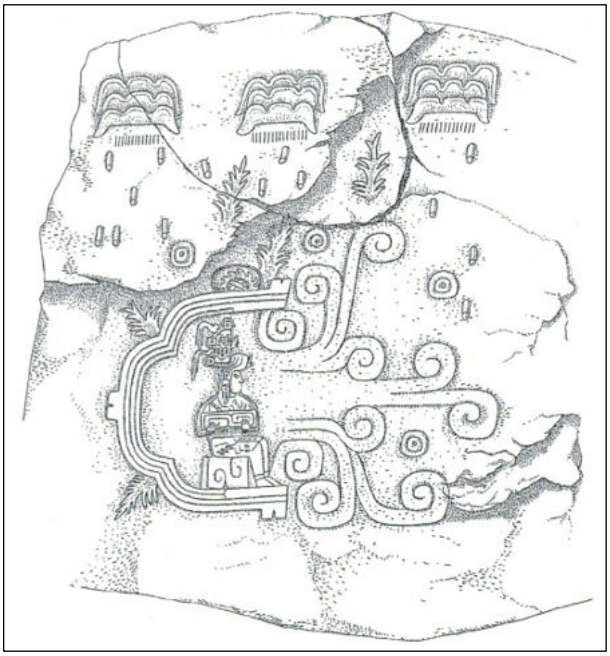
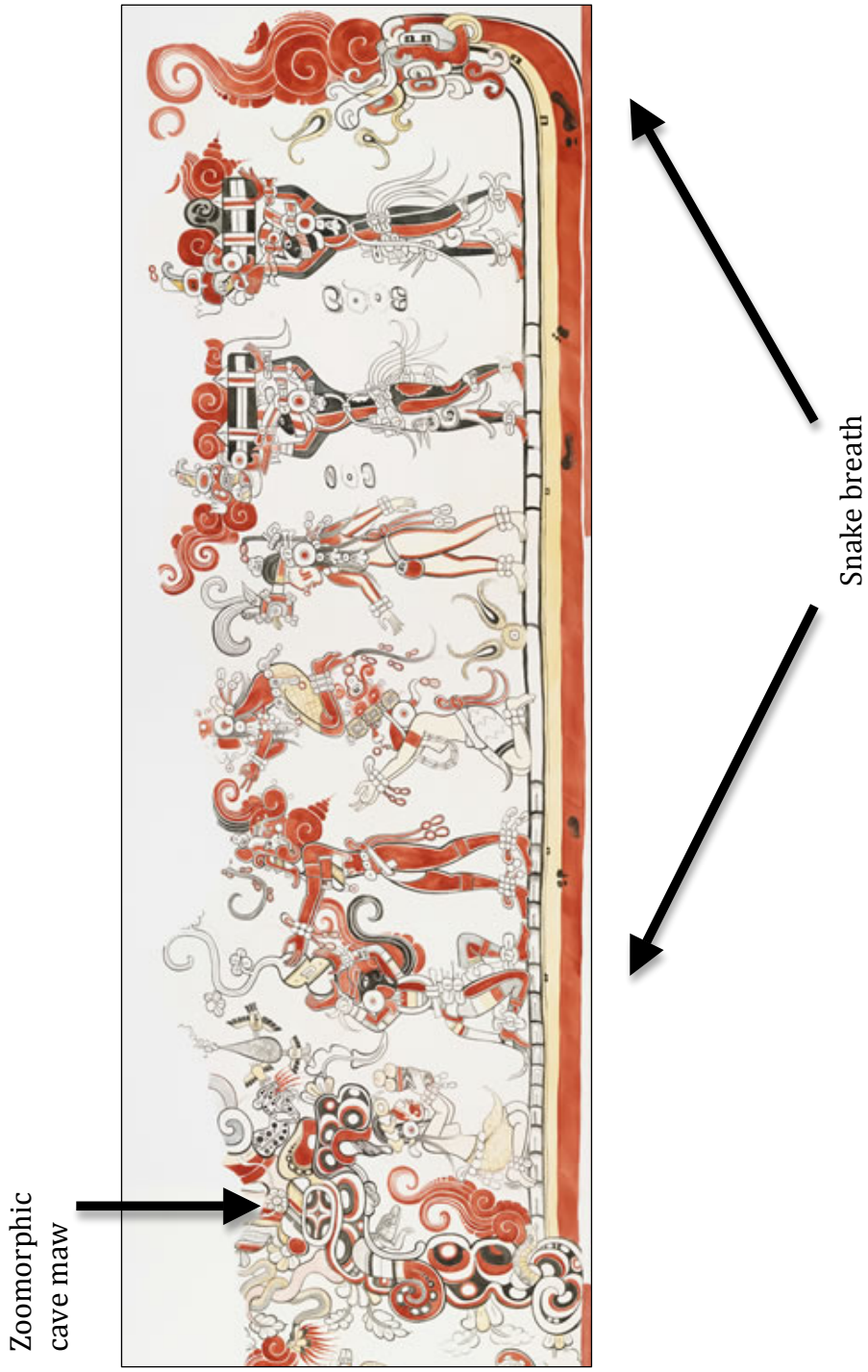


Figure 32a. Breathing caves in Mesoamerican iconography: Chalcatzingo, Monument 1, Morales, Mexico (from Diehl 2004:Figure 125).



b.

Figure 32b. Breathing caves in Mesoamerican iconography: San Bartolo North Wall mural (Drawing by Heather Hurst in Saturno et al. 2005).

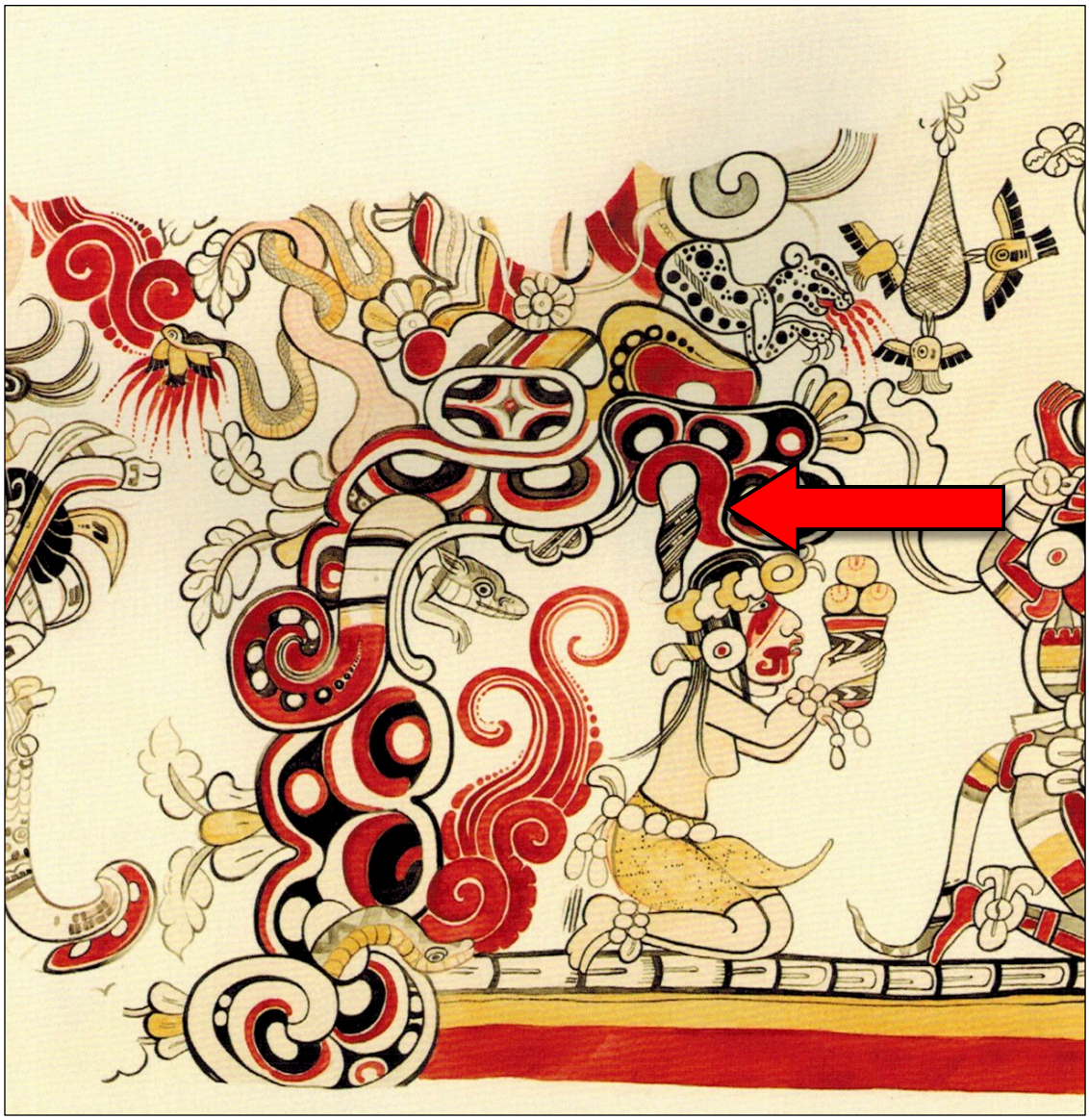


Figure 33. Close up of zoomorphic cave on San Bartolo North Wall mural. Note the creature's fang is a stylized stalactite (Drawing by Heather Hurst in Saturno 2009:26)

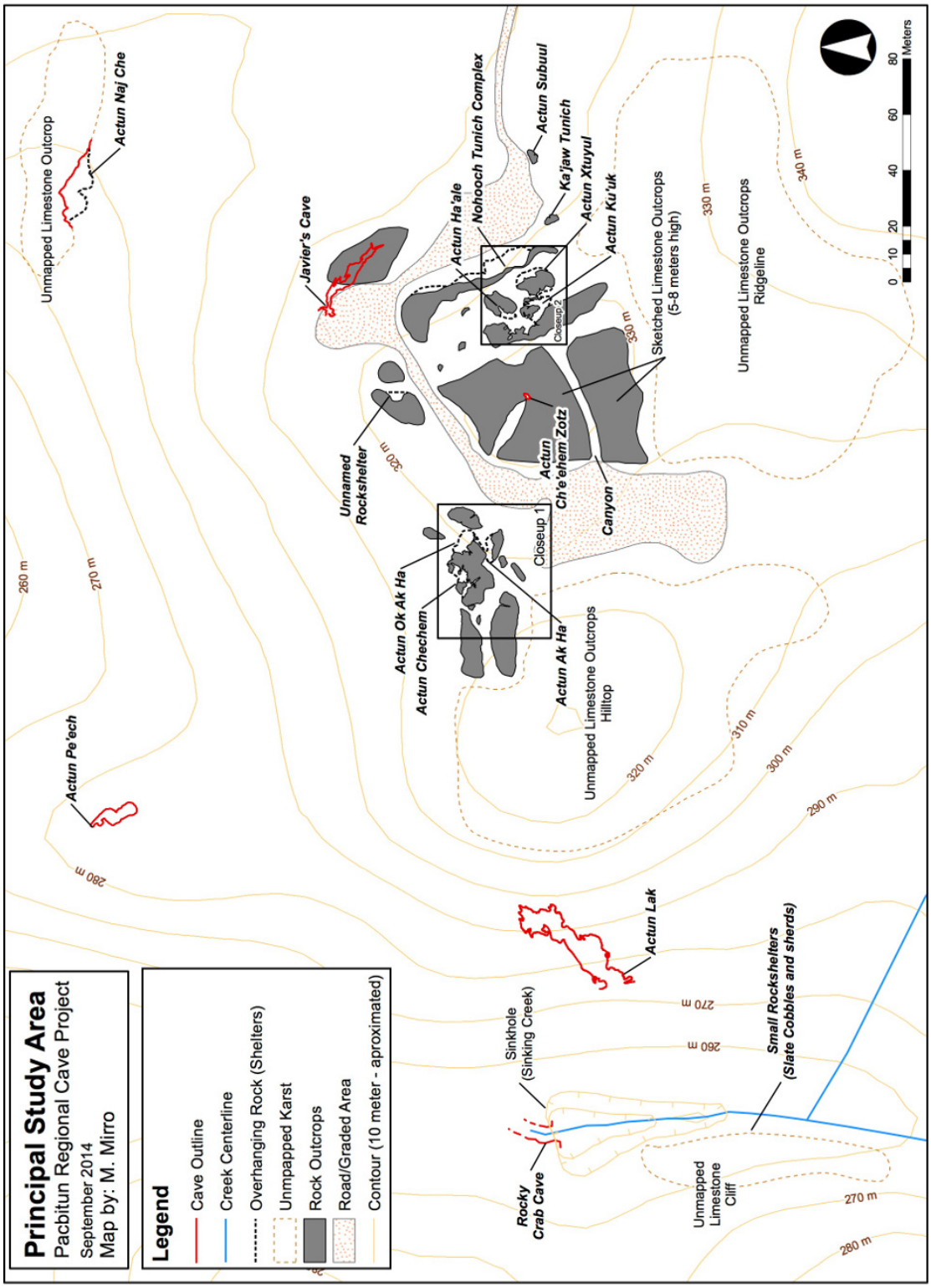


Figure 34. Regional map of primary study area. The NTC comprises the gray shaded regions and sketched outcrops in the map's center and right.

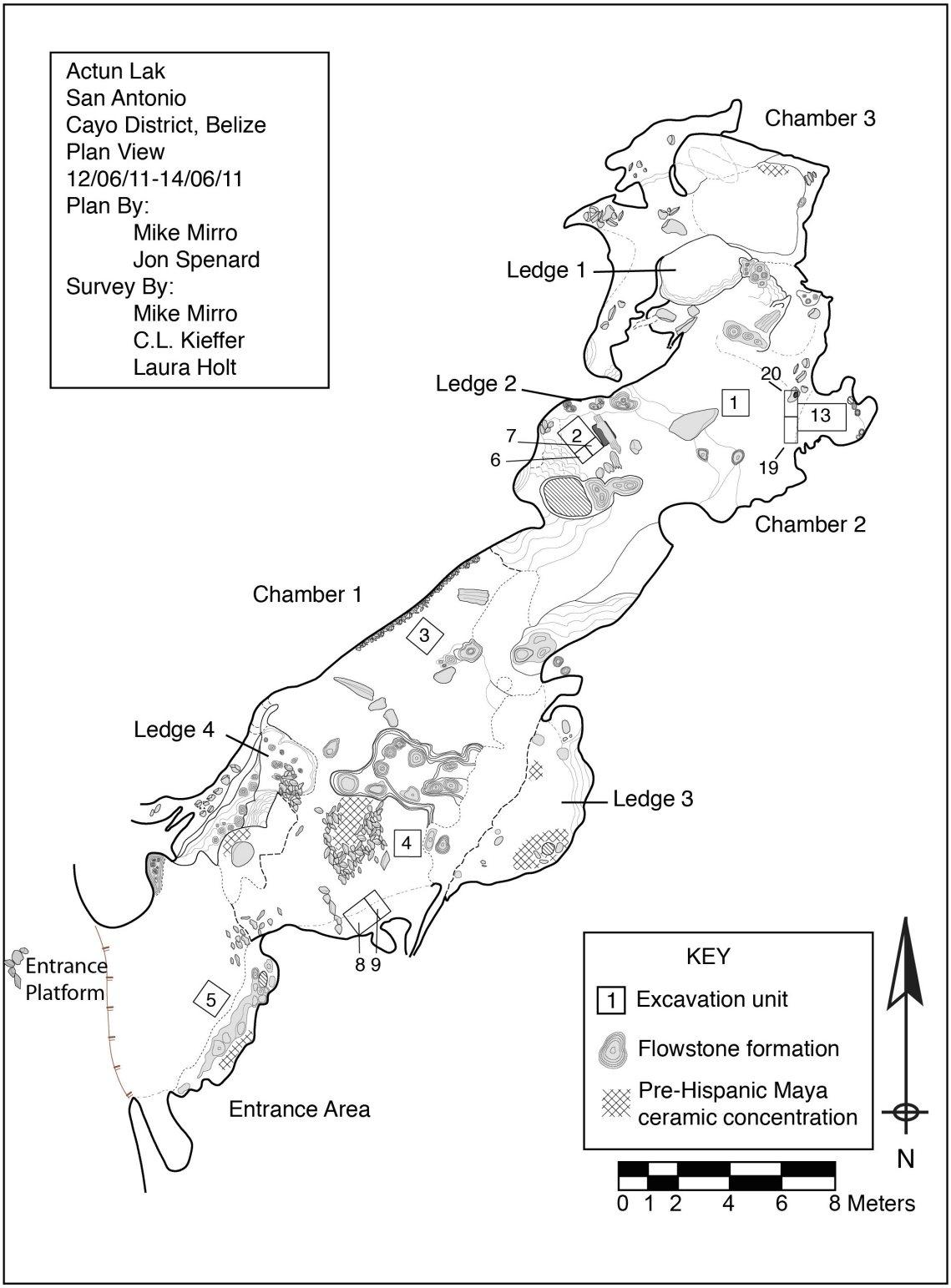


Figure 35. Plan view map of Actun Lak showing locations of interior excavation units.



Figure 36. Ceiling in Actun Lak Entrance Passage showing extensive pre-Hispanic formation breakage, and possible slate step below massive boulder, circled.



Figure 37. Example of entrance of elevated passage in Actun Lak partially blocked by two limestone boulders.



Figure 38. Modified hillside below Actun Lak showing remnant wall under lip of large boulder and line highlighting where the hillside architecture remains.



Figure 39. Overview of Actun Lak modified hillside excavations with Unit 17 in foreground, 12 adjacent to boulder, and Entrance Platform in upper center.



Figure 40. Actun Lak hillside close up of Unit 17 showing exposed bedrock and remaining architectural fill in upper corners of unit and beneath boulder.



Figure 41. Exposed terminal phase architecture Pacbitun Structure 3. Compare to Figures 5.8 and 5.10.



Figure 42. Actun Lak Unit 12 showing exposed hillside architecture, facing north.



Figure 43. Surviving corner of Actun Lak Entrance Platform (shaded) defined by fronting stones and retaining wall joining at right angle in upper center of image, cave entrance is to the right.



Figure 44. Overview of platform excavations in front of Actun Lak. The yellow shaded box is Unit 10, the unshaded area to its left is Unit 11. Unit 14 is shaded green, and Units 15 and 16 are shaded blue.



Figure 45. Actun Lak, Entrance Platform, Unit 10 showing location of unit in relation to cave entrance. Note the intersection of the end of the platform fronting stones and unit wall in the bottom left of the image.



Figure 46. Bottom of Unit 10, Entrance Platform, Actun Lak, showing large boulders in foreground, Unit 11 in upper left corner of image. Photo facing east.



Figure 47.Beginning of excavations in Unit 11, Actun Lak, Entrance Platform. Note that unit began as a 0.5 m by 1 m extension of Unit 10, continuing off photo on right.



Figure 48. Center line slate cache Unit 11, Feature 2 Actun Lak, Entrance Platform. Compare location of cache with large boulder in center of unit in Figure 5.16.



Figure 49. Boulder fill exposed beneath Actun Lak, Entrance Platform Feature 2 slate cache.



Figure 50. Platform Trench, Units 14–16, Actun Lak Entrance Platform. Unit 14 is at top center above orange flagging tape, Unit 15 is between flagging and string crossing center of photo, and Unit 16 is in the foreground. Equipment in top right is sitting on the Entrance Platform.



Figure 51. Tree roots dislodging Entrance Platform fronting stones in Unit 15.



Figure 52. Oblique view of Actun Lak, Unit 14 before excavations showing Entrance Platform's north retaining wall intersecting with emerging rock face of cave entrance. Rocks crossing lower center of image are the platform's fronting stones.



Figure 53. Actun Lak, Unit 14, top of Level 2 showing exposed retaining wall in left of image (red shaded) and ballast fill in center and right. Entrance Platform fronting stones are just beyond bottom of image.



Figure 54. Actun Lak, Unit 15 before excavations showing Entrance Platform's northwest corner.



Figure 55. Actun Lak entrance. Note toothed, gaping maw-like appearance.



Figure 56. Yaxchilan Stela 31, a carved speleothem (photo by author).



Figure 57. Terrace 1, Actun Lak.



Figure 58. View of Actun Lak interior from Terrace 1. Terrace 1 is in bottom right of image, and the curtain formation in image center blocking views of Chamber 1 below.



Figure 59. View from Actun Lak Entrance Platform of two individuals standing on Terrace 1.



Figure 60. Actun Lak Unit 5 during investigations, showing location of unit in relation to terrace retaining wall on top of image. (IMG1139).

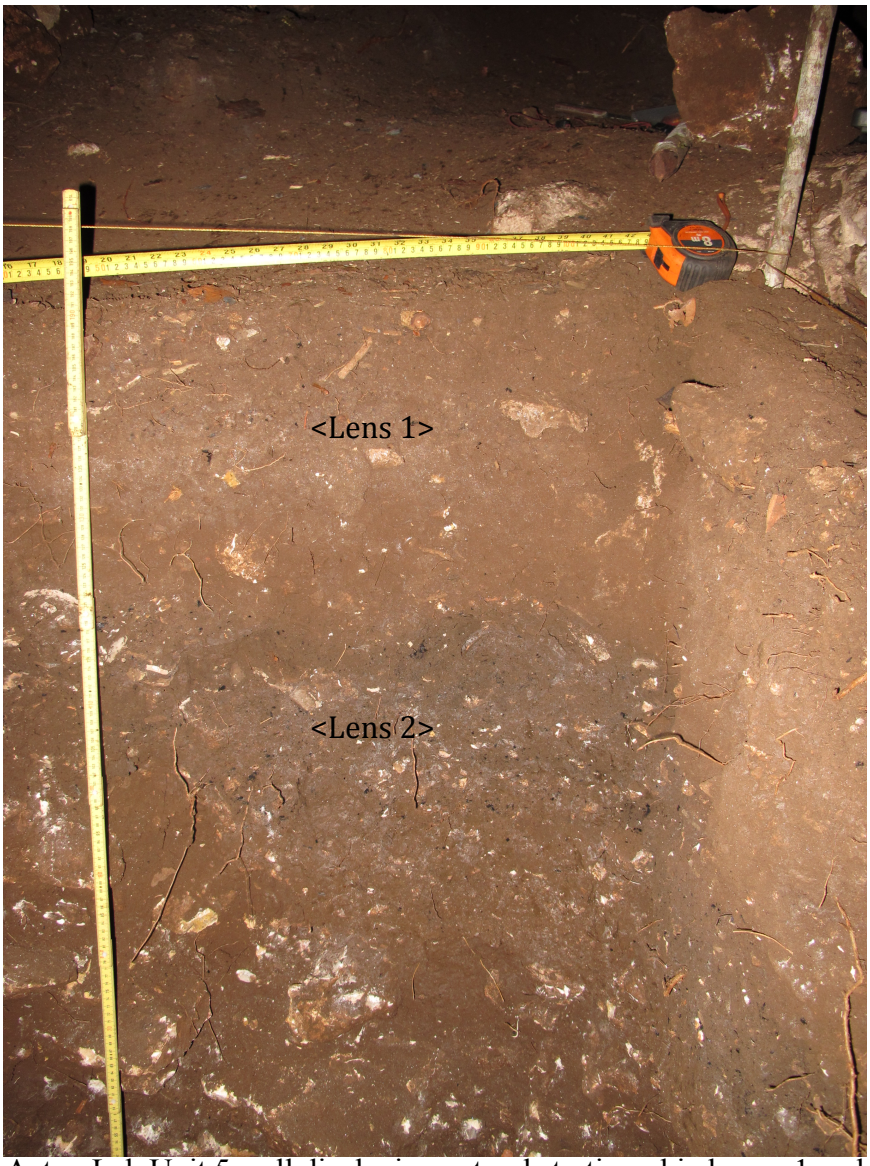


Figure 61. Actun Lak Unit 5 wall displaying natural stratigraphic lenses 1 and 2.

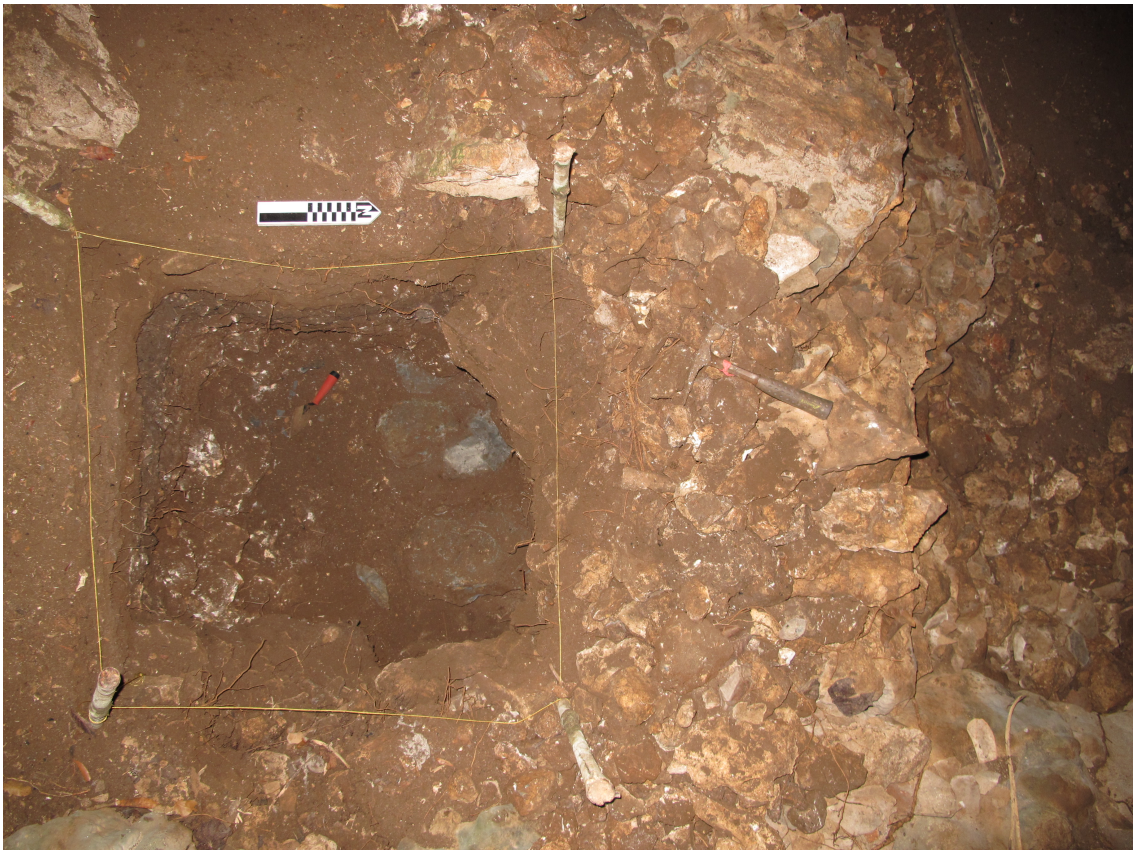


Figure 62. Buried slate pavement in Terrace 1, Unit 5, Actun Lak.



Figure 63. Large filled in bedrock crack below Terrace 1, Actun Lak. Bracketed area measures approximately 2.5 m tall.



Figure 64. Modified stalagmitic cluster, and abutting calcified cobble and speleothem pavement, Actun Lak, Chamber 1.



Figure 65. Terrace 2, Actun Lak Chamber 1.



Figure 66. View from Terrace 2 facing rear of Chamber 1, Actun Lak showing sloping stepped passage on top of massive ancient ceiling collapse to Chamber Two on the top right, and "cleaning" piles lining northwest wall center to bottom left of image.

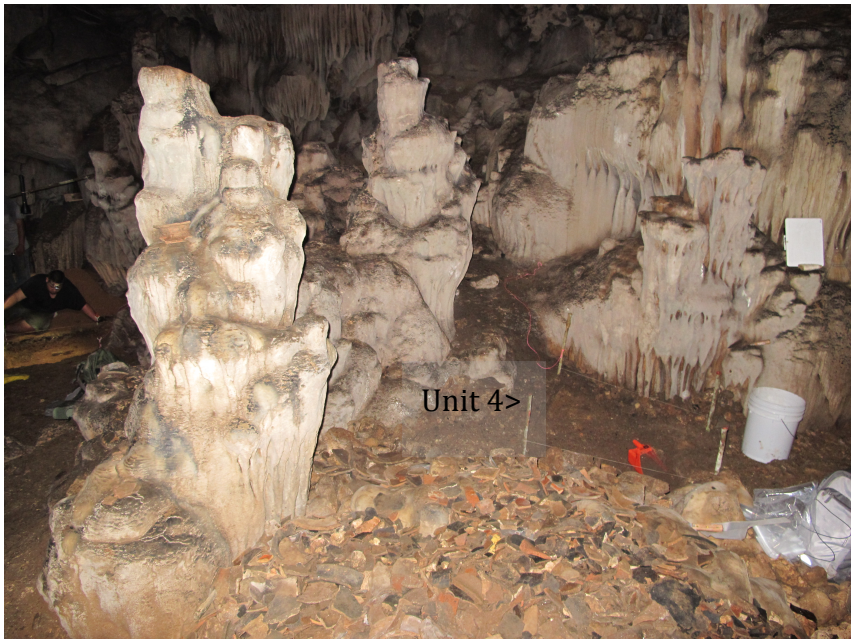


Figure 67. Image showing Actun Lak, Unit 4, in relation to central stalagmitic cluster and cobble pavement.



Figure 68. Close-up of Actun Lak, Unit 4 west wall profile showing density of ceramic material encountered in matrix.



Figure 69. Overhead view of ongoing excavations in Actun Lak Units 8 and 9. A PRAP student in black shirt is excavating in Unit 8, and the central cobble pavement is on the bottom center left to bottom left of image (photograph by C.L. Kieffer).



Figure 70. Hewlett Bank Unslipped two-vessel cache, Actun Lak, Units 8 and 9, Feature 1.



Figure 71. Flowstone shelf dividing Actun Lak Chamber 2 into high and low areas. Image taken from low area, facing high area, chamber entrance located in gap to left of the bucket, and corner of Unit 1 is in left foreground.



Figure 72. PRAP members and student sit below broken cave formations in entrance to Sloth Alcove with feet in looter pits.



Figure 73. Speleothem altar bottom center of image, and charred walls, Actun Lak, Chamber 2.



Figure 74. Overhead view of Actun Lak speleothem altar showing curtain formation tabletop and speleothem supports.

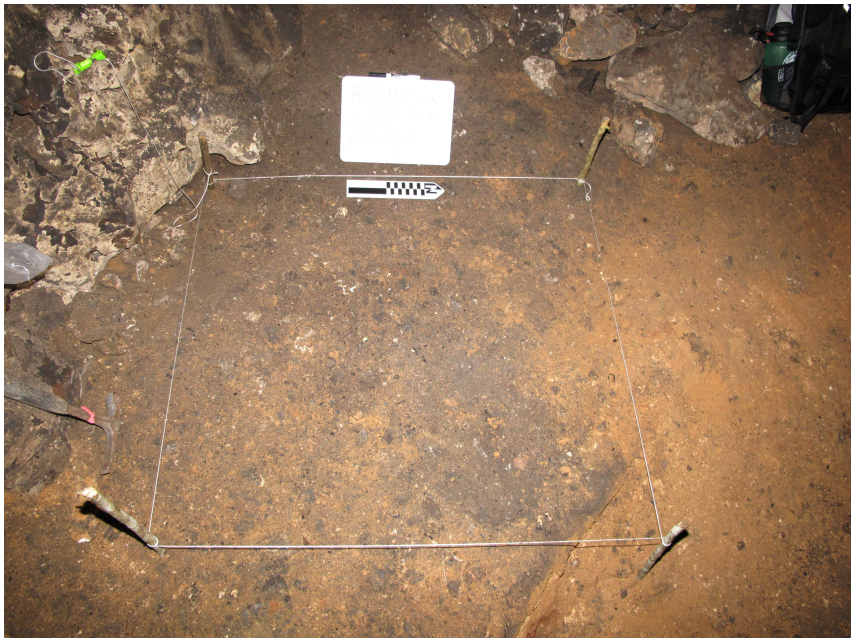


Figure 75. Actun Lak Unit 1 at start of excavations. Note that bottom right corner of unit is in large looter pit, and bedrock on upper left is flowstone formation dividing Chamber 2 in half.



Figure 76. Excavated bedrock cupule, Actun Lak Chamber 2. The cupule is to the right of the stone pile, and behind the stalagmite. Excavations revealed a small, concealed opening at the base of the formation.



Figure 77. PRAP caver, C.L. Kieffer, mapping Actun Lak Ledge 2.

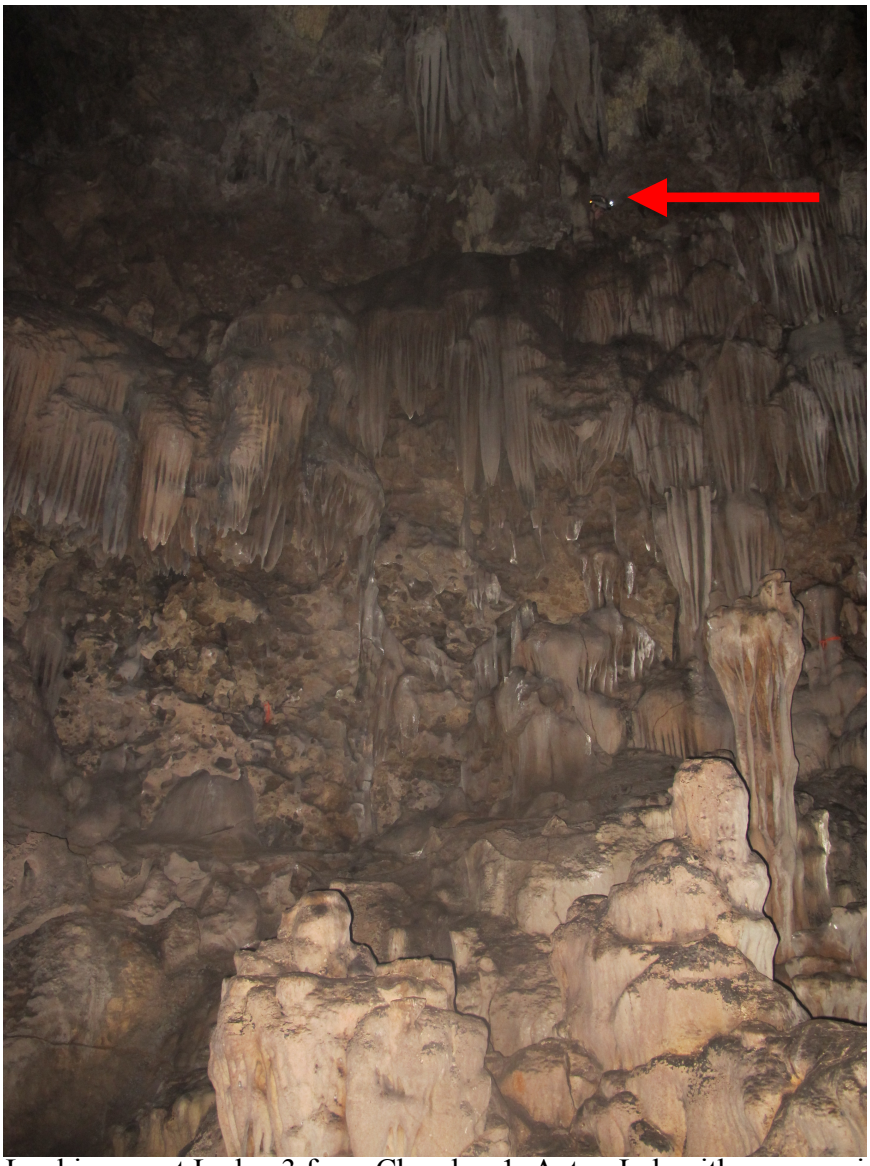


Figure 78. Looking up at Ledge 3 from Chamber 1, Actun Lak with arrow pointing to caver's headlight.



Figure 79. Ceramic and speleothem cluster on Actun Lak, Ledge 3 (photograph by C.L. Kieffer).



Figure 80. Rocky Crab Cave entrance (Photo by Mike Mirro).



Figure 81. View of Rocky Crab Cave entrance from inside cave. Dots in the image are camera flash reflected by high humidity and water vapor (photo by C.L. Kieffer).



Figure 82. Imported slate and limestone boulders on ledge in Rocky Crab Cave (photo by Mike Mirro).

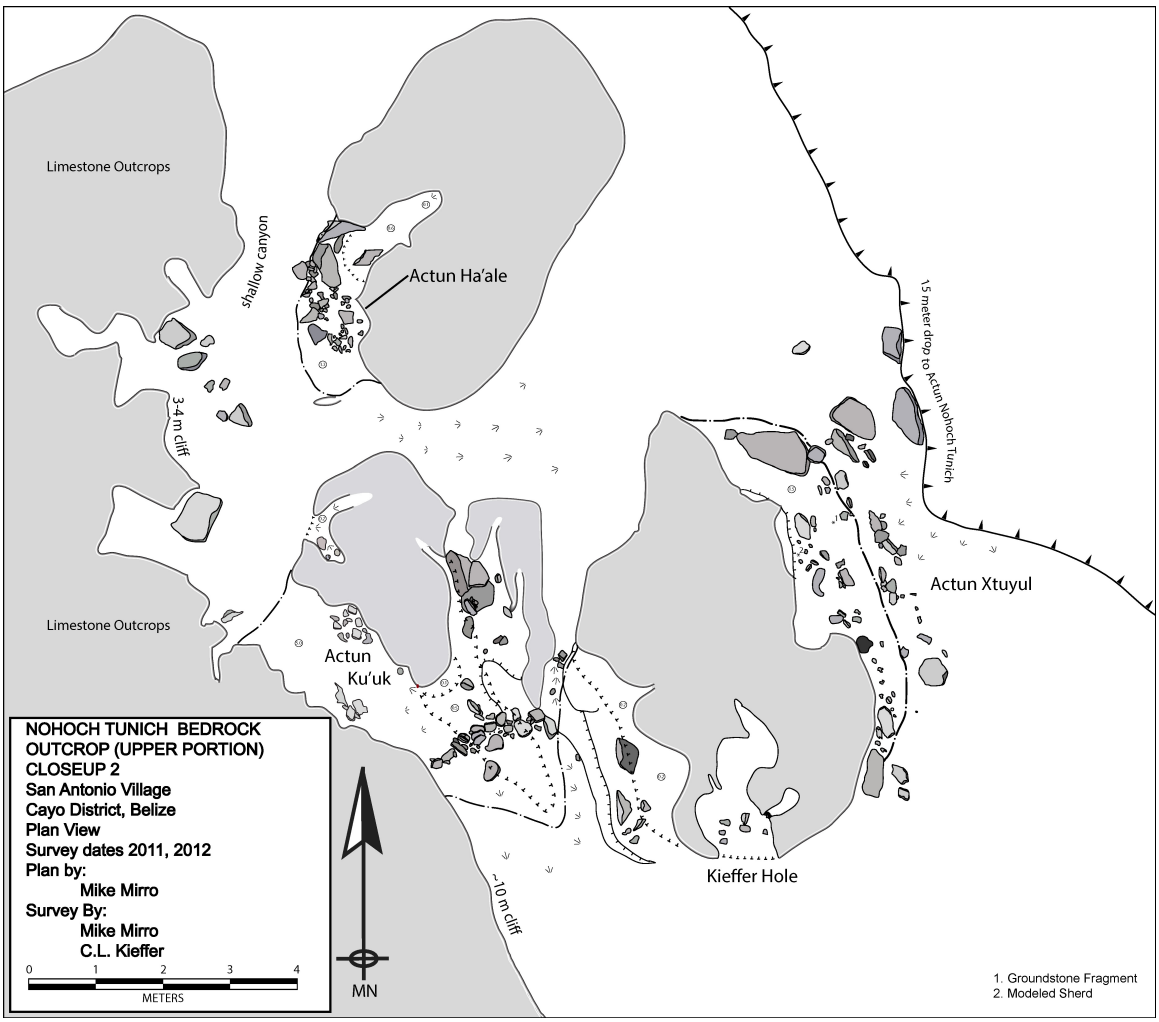


Figure 83. Plan view map of primary karst features above Actun Nohoch Tunich.

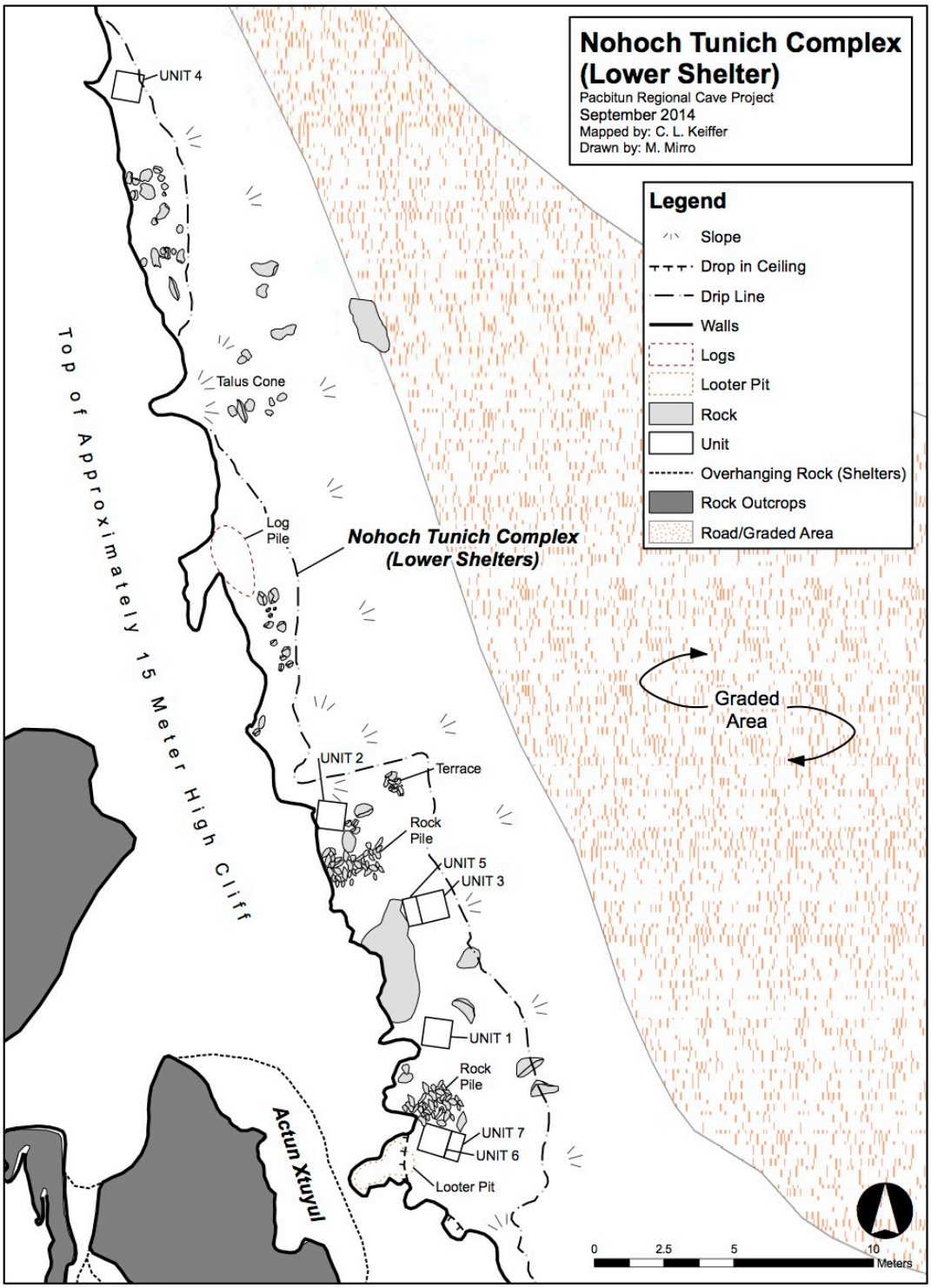


Figure 84. Plan view map of Actun Nohoch Tunich.



Figure 85. Overview of Actun Nohoch Tunich. The PRAP staff and student in the foreground work in the North Section, the Middle Section is in the photo center, and PRAP members are standing in South Section, center left.



Figure 86. Actun Nohoch Tunich South Section. The bedrock bench is located center right, and the rock pile from the looted alcove is in the image center.



Figure 87. Actun Nohoch Tunich looted alcove. The character on the board is a cave-dwelling spirit called Alux, discussed in Appendix C.



Figure 88. Actun Nohoch Tunich North Section. Note possible pavement at base of outcropping.



Figure 89. Photograph showing location of Actun Nohoch Tunich Units 1, 3 and 5 with PRAP staff and student excavating Unit 1, and areas of others shaded.



Figure 90. Actun Nohoch Tunich Units 3 and 5 limestone rocks capping *jute* snail shell and chert flake cache.



Figure 91. Fully exposed *jute* snail shell and chert flake cache in Actun Nohoch Tunich Units 3 and 5. White spots in center are shells, and gray areas are charcoal and ash matrix.



Figure 92. Composite image of possible floor in Actun Nohoch Tunich North Section.



Figure 93. Actun Nohoch Tunich Middle Section, showing location of Actun Xtuyul.



Figure 94. Actun Xtuyul showing location of Units 1 in upper right and Unit 2 in upper center.

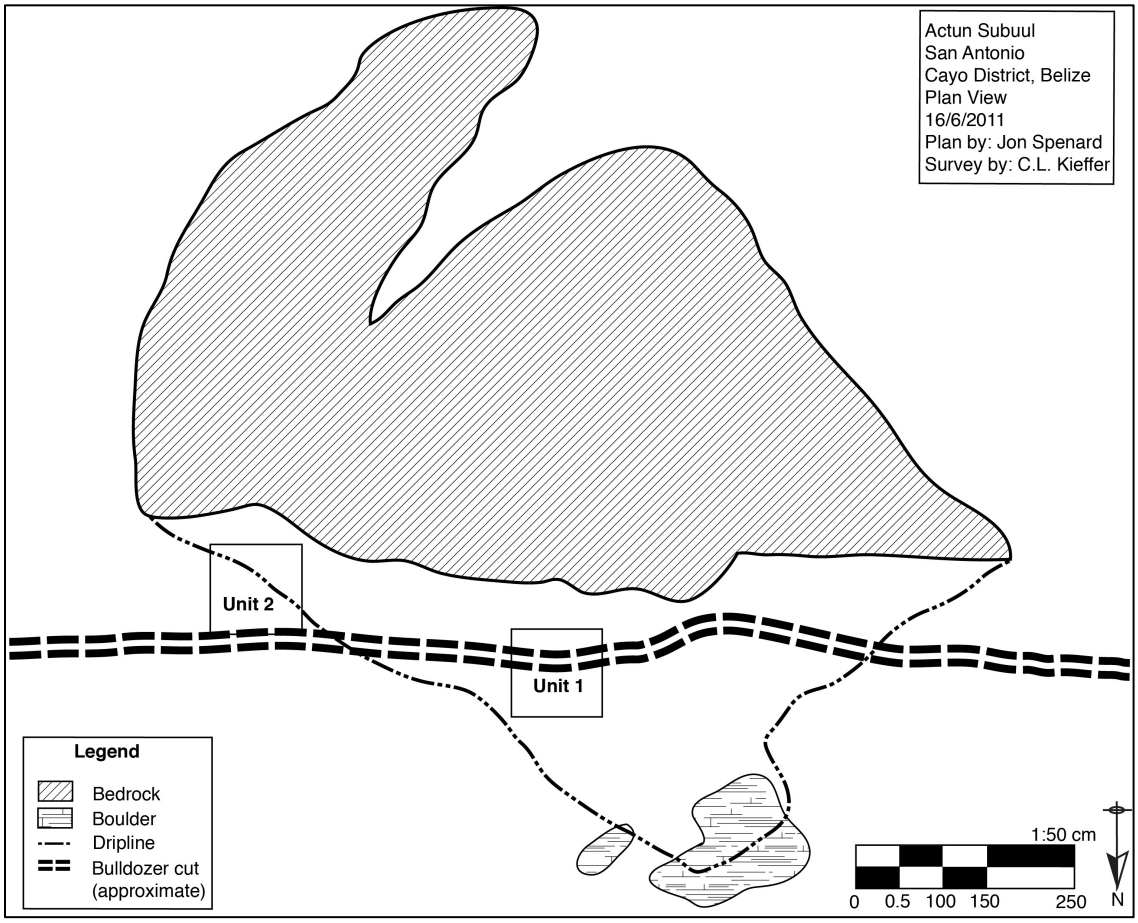


Figure 95. Plan view map of Actun Subuul showing unit locations and extent of landowner's bulldozer cut.



Figure 96. Overview of Actun Subuul from June 2011.



Figure 97. Actun Subuul after bulldozing, from June 2012. Compare to Figure 96.



Figure 98. Bulldozed and cobble paved road in front of Actun Subuul as it appeared June 2013. Compare to Figures 95 and 96.

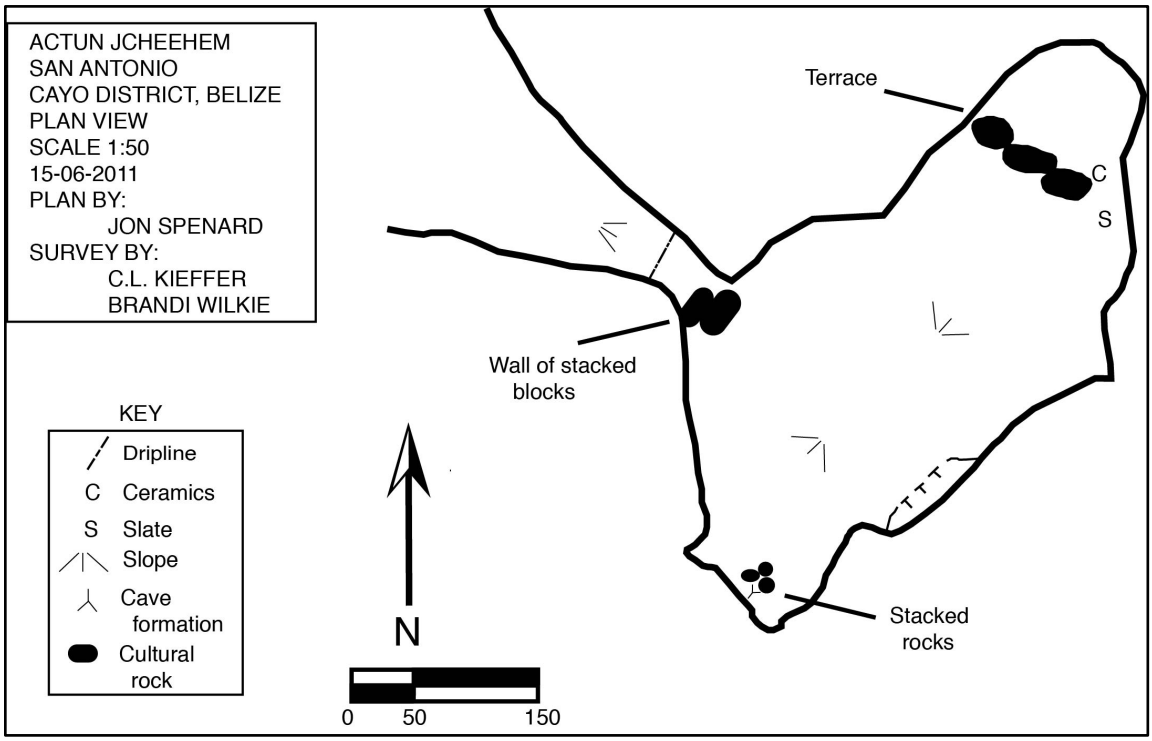


Figure 99. Plan view map of Actun Ch'e'ehem Zotz.



Figure 100. Actun Ch'e'ehem Zotz entrance (photo by C.L. Kieffer).



Figure 101. Architecture in Actun Ch'e'ehem Zotz entrance from inside cave (photo by C.L Kieffer).

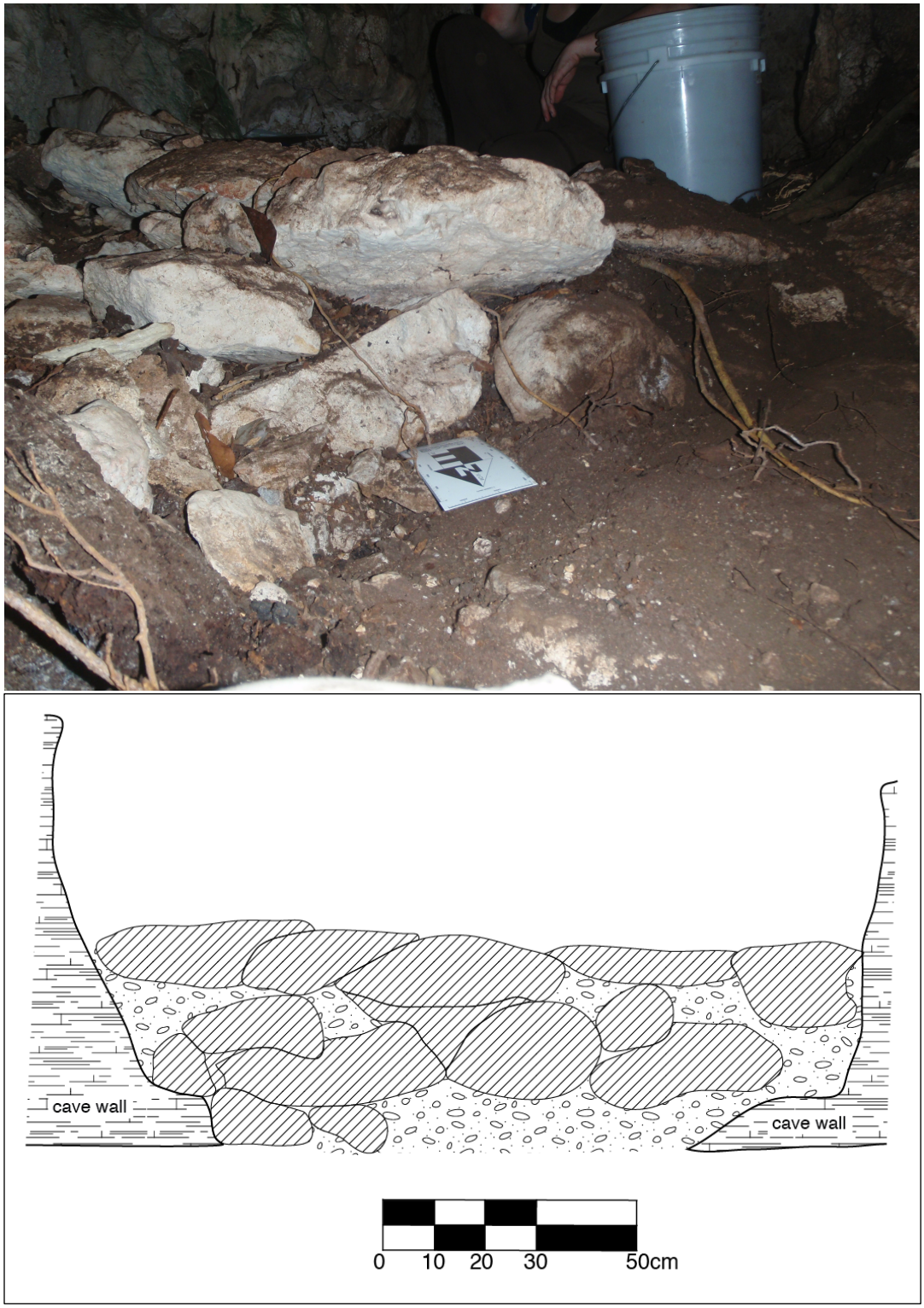


Figure 102. Photograph and profile drawing of terrace in rear alcove, Actun Ch'e'ehem Zotz.

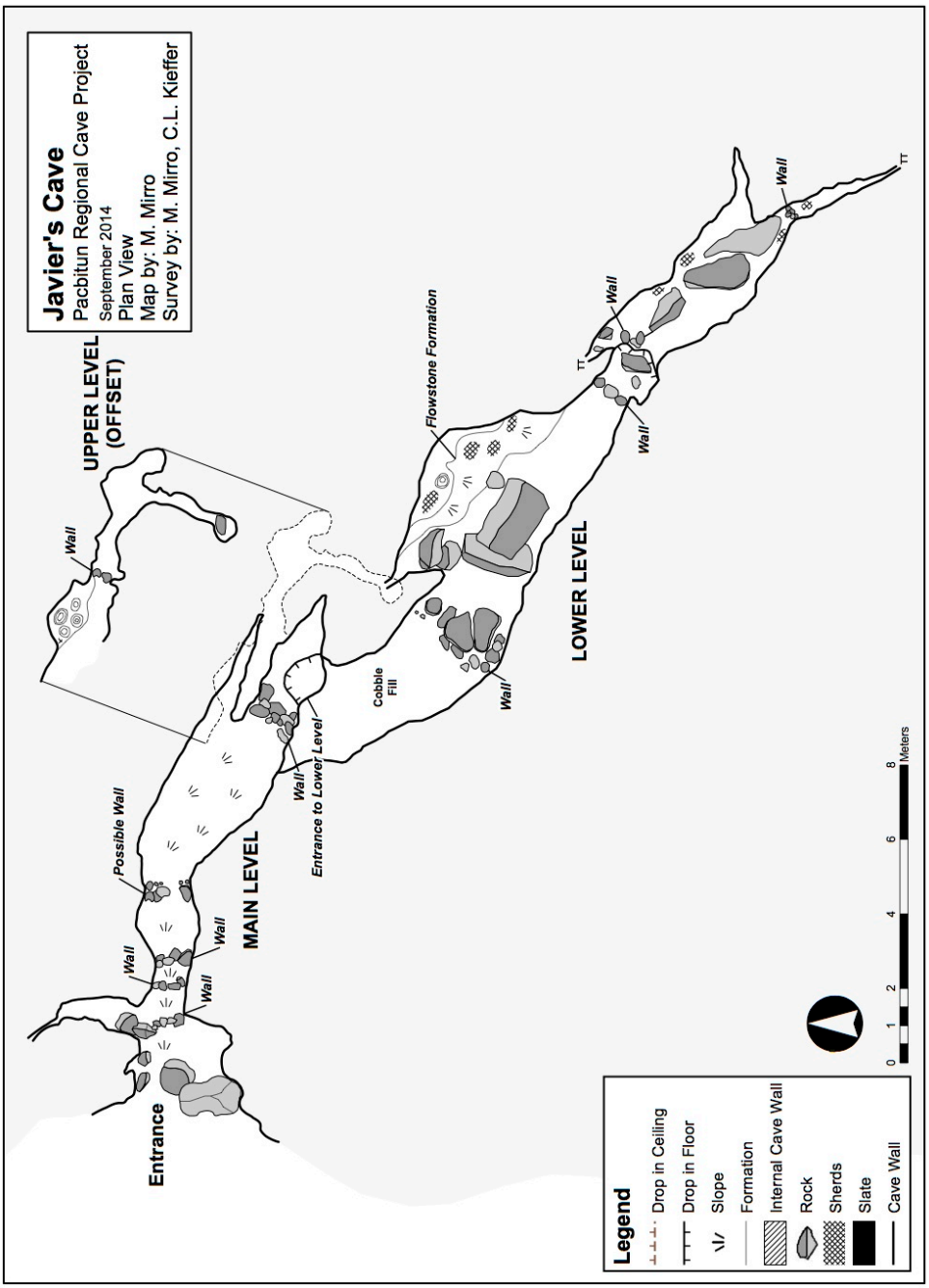


Figure 103. Plan view map of Javier's Cave



Figure 104. View from inside Javier's Cave, looking up towards partially modified entrance (photo by Mike Mirro).



Figure 105. Example of small architectural modification and ceramic sherds in Javier's Cave (photo by M. Mirro).



Figure 106. Composite image detailing stone alignments in Actun Ha'ale.



Figure 107. View of massive V-shaped boulder collapse in Actun Ku'uk, looking at Entrance 4. Series of small rockshelters begins on right side of image, and line of stones at center bottom is top of wall shown in Figure 3.



Figure 108. Plan view map of the karst features in the southwest corner of the NTC.



Figure 109. Architectural construction bounding Actun Ak Ha's western entrance.



Figure 110. Low architectural wall between two outcrops to the west of Actun Ak Ha (photo by Mike Mirro).



Figure 111. Cracked bedrock face resembling miniature cave outlined remnants of by small, square boulder platform (photo by M. Mirro).



Figure 112. Actun Chechem northern entrance showing two main chambers with tubular ledge emerging above western room, viewer's right.



Figure 113. Detail of limestone boulder alignment and imported slate cobbles, Actun Ok Ak Ha (photo by Mike Mirro).



Figure 114. Looking through the cave-passage-like Crevasse in the NTC (photo by Mike Mirro).

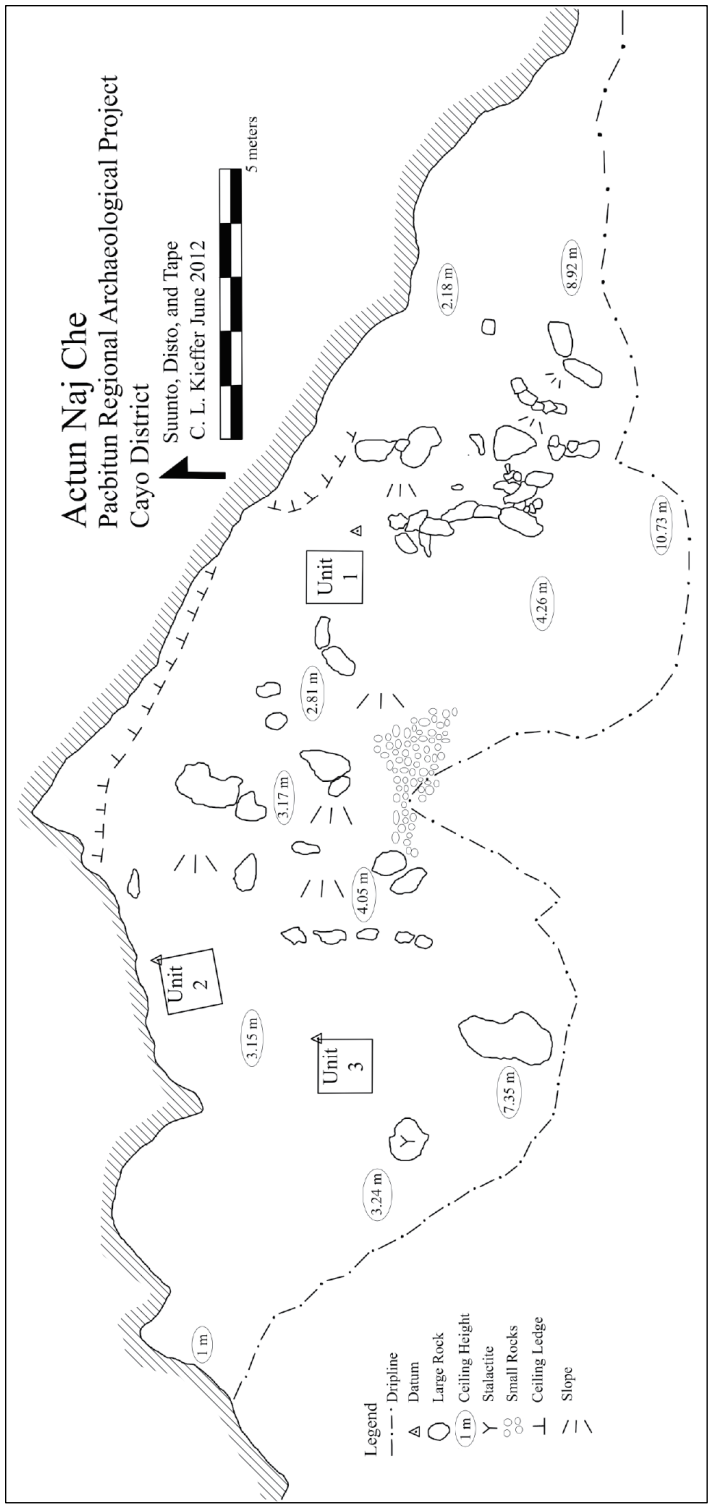


Figure 115. Plan view map of Actun Naj Che



Figure 116. Overview of Actun Naj Che showing three main areas. PRAP students and staff in foreground in Lower Level, students sitting in image center in Middle Level, and two individuals behind vines are mapping Upper Level.



Figure 117. PRAP students excavating Actun Naj Che Unit 1 in the Middle Level, while Upper Level begins above their back packs in image right (photo by C.L. Kieffer).



Figure 118. PRAP students and staff working Actun Naj Che Lower Level. Unit 3 is just behind the student standing in image center, and student adjacent to wall is excavating Unit 2.

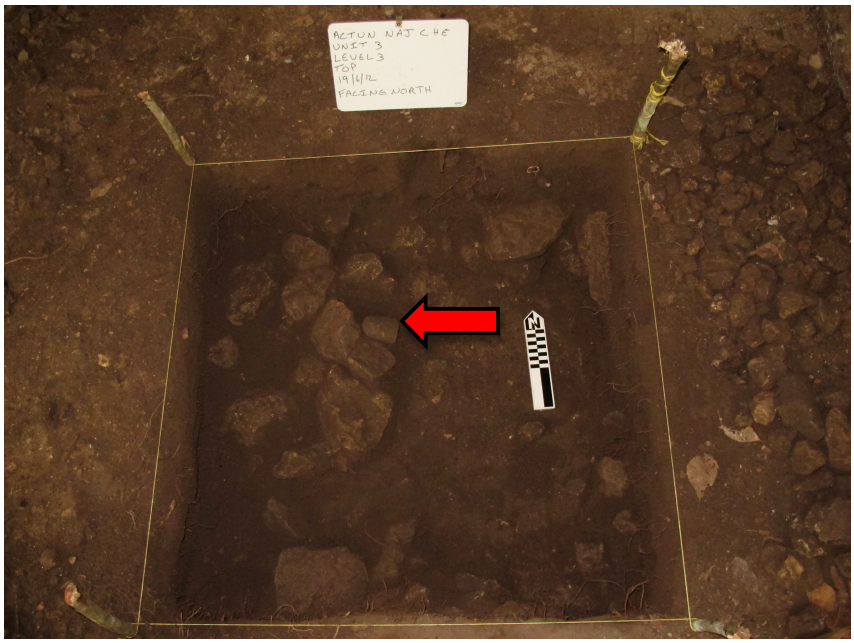


Figure 119. Granite mano placed on top of deeply buried rock alignment at the bottom of Actun Naj Che Unit 3, Level 2.



Figure 120. East to west running rock alignment at the top of Actun Naj Che Unit 3, Level 4.



Figure 121. PRAP project foreman, Javier Mai exiting Actun Pe'ech.



Figure 5.122. Interior view of Actun Pe'ech showing low ceiling and extensive formation breakage (photo by C.L. Kieffer).



Figure 123. Panoramic overview of Actun K'oxol rockshelter.



Figure 124. Stone Cache karst feature. Note gps unit in bottom center providing scale.



Figure 125. Stalactites growing along structural cracks in bedrock in ceiling of Crystal Palace (photo by C.L. Kieffer).



Figure 126. Possible speleothem stela in rear chamber of Crystal Palace (photo by M. Parker).

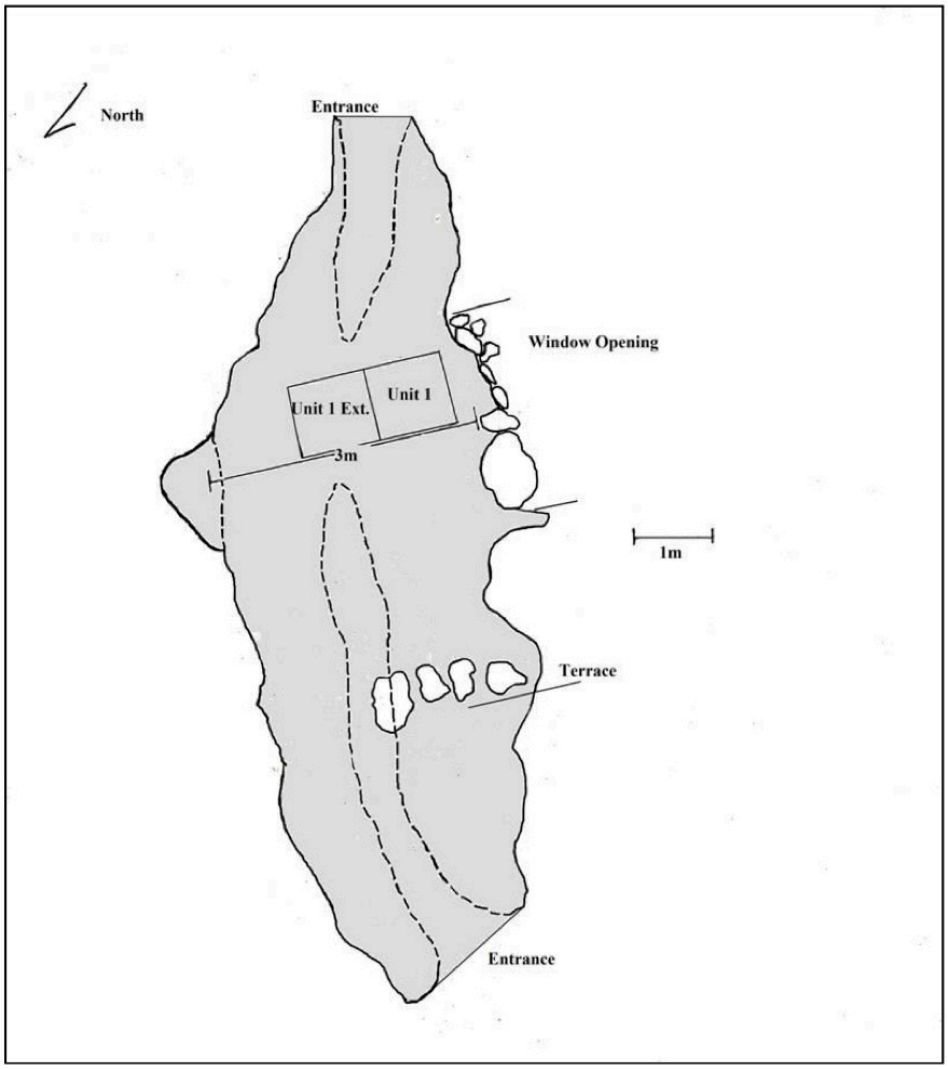


Figure 127. Plan view map of Chaan Hol rockshelter (after Lee and Valdez 2012.Figure 3; courtesy of the Pacbitun Regional Archaeology Project).



Figure 128. View of Chaan Hol rockshelter from south entrance (after Lee and Valdez 2012. figure 4; courtesy of the Pacbitun Regional Archaeology Project).



Figure 129. Modified window in Chaan Hol rockshelter (after Lee and Valdez 2014. Figure 8; courtesy of the Pacbitun Regional Archaeology Project).



Figure 130. Platform construction in Actun Yax Tunich, Chamber 1.



Figure 131. Cayo Unslipped two-jar cache in Actun Yax Tunich, Chamber 2. The rim of the second vessel is exposed, while the remainder is buried.

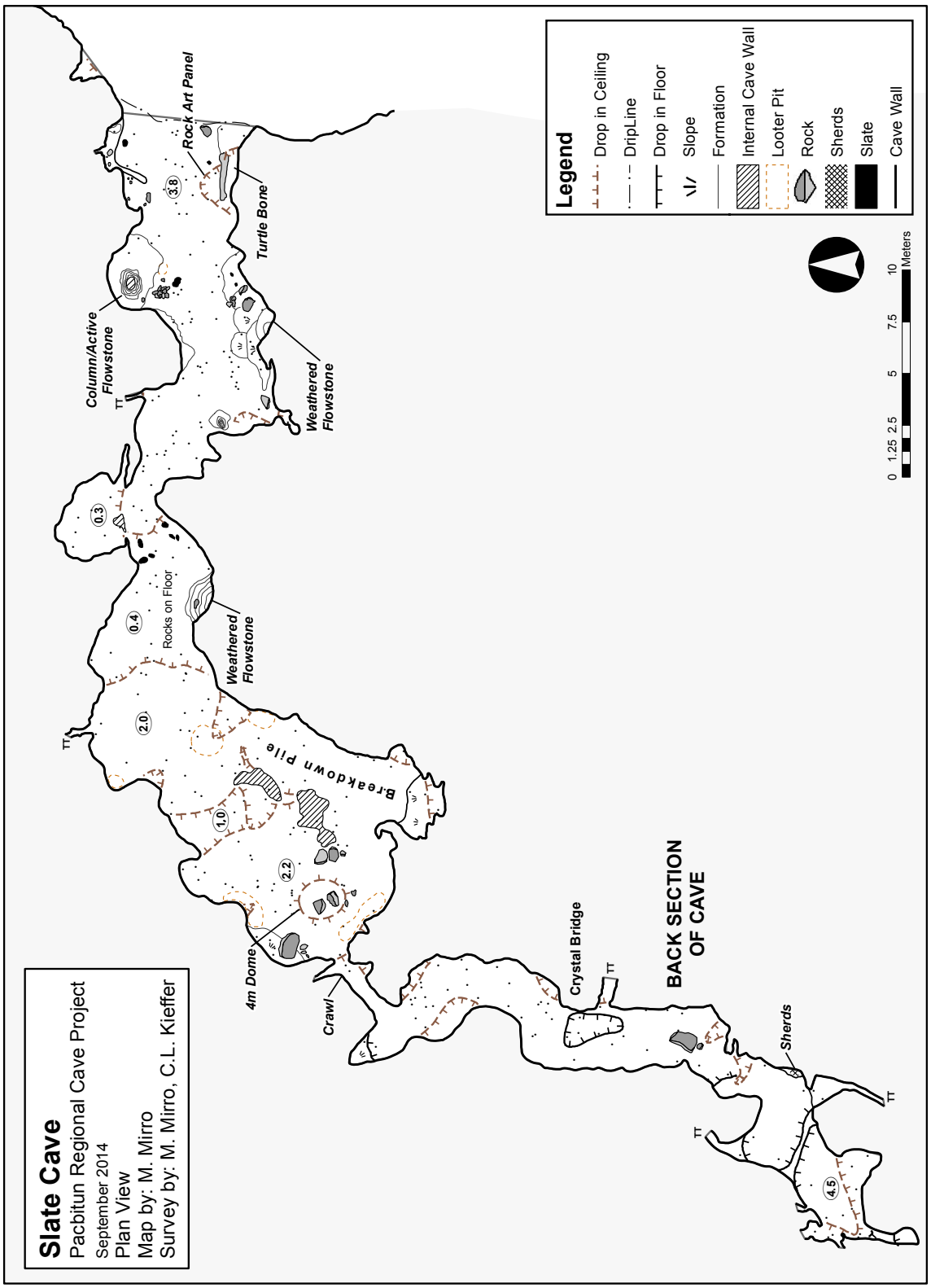


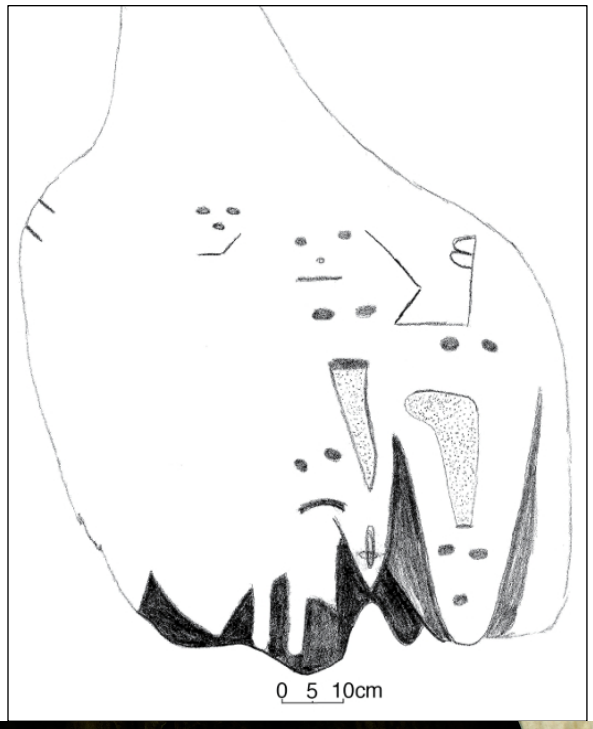
Figure 132. Plan view map of Slate Cave.



Figure 133. Semi-circular rock alignment near Slate Cave entrance.



Figure 134. Project caver, Mike Mirro holding a biconically drilled slate cobble, and laying on dense, imported limestone boulder concentration in The Crawl" passage, Slate Cave (photo by C.L. Kieffer).



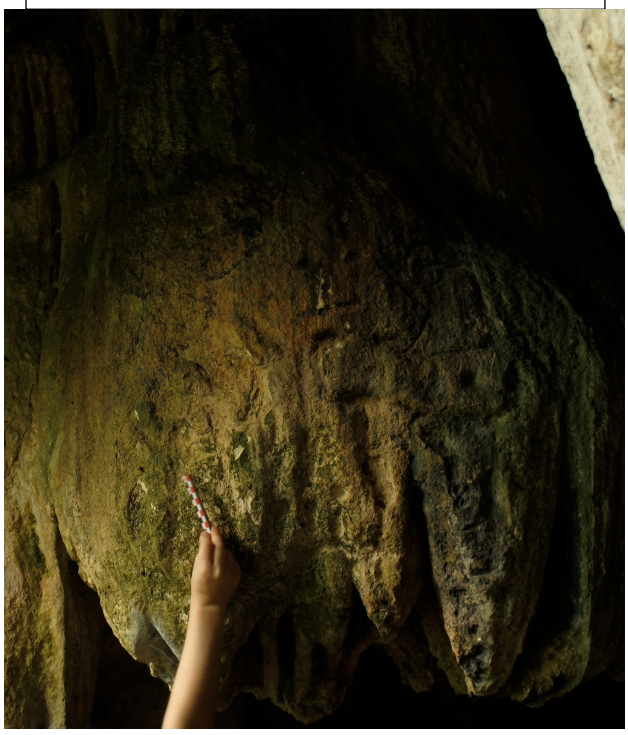


Figure 135. Field sketch and photo of Slate Cave petroglyph panel (drawing by C.L Kieffer and the author).



Figure 136. Slate Cave entrance showing location of petroglyph panel.

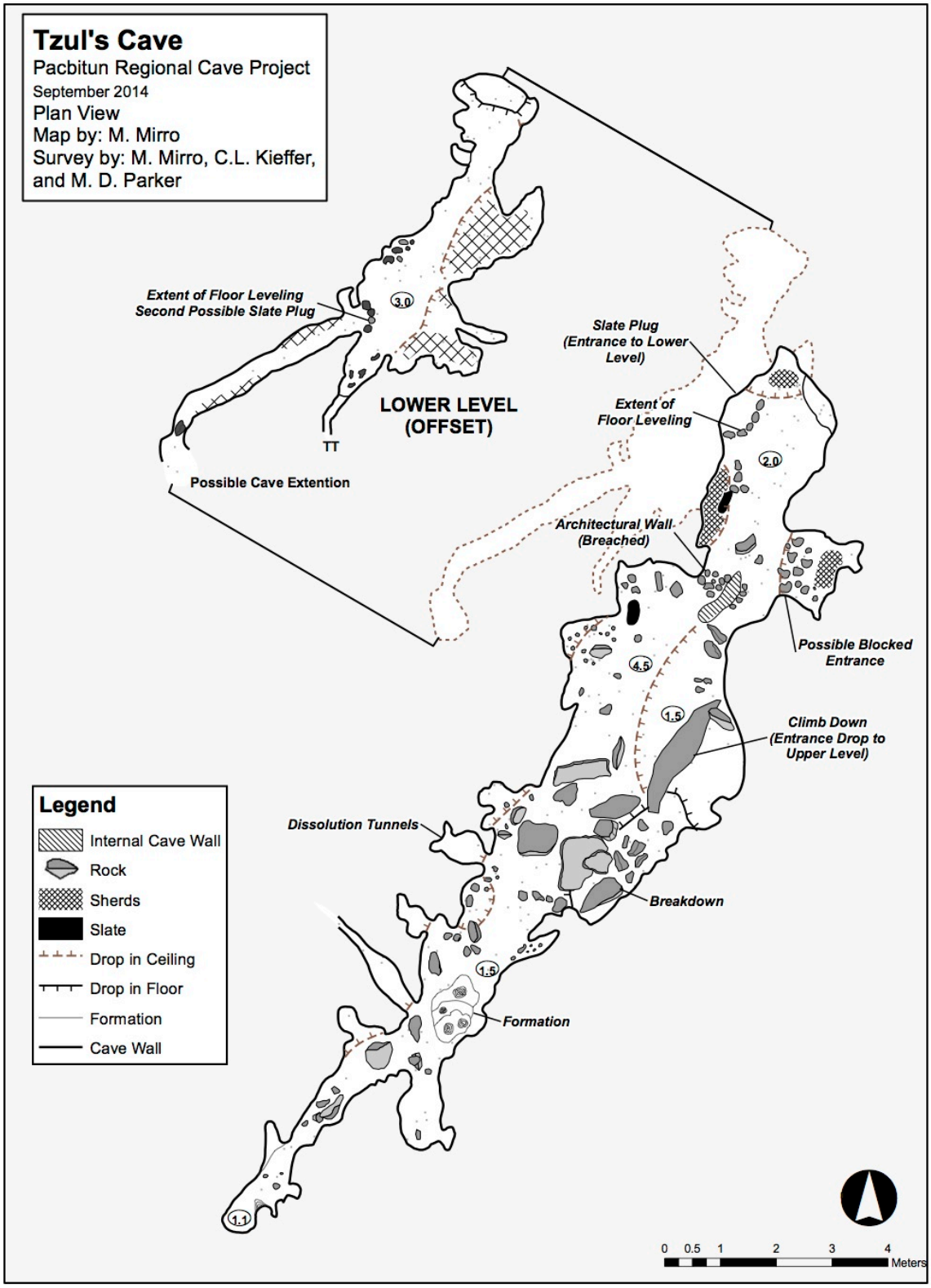


Figure 137. Plan view map of Tzul's Cave.



Figure 138. Possible scribal tool fragment, Tzul's Cave Room B.



Figure 139. Limestone boulders filling in small entrance to Tzul's Cave.



Figure 140. Composite image of alcove with slate plug, and affiliated artifacts, Tzul's Cave Room C. Slate plug has been reset to original position, note the hollow space beneath leading to drop into lower chambers.



Figure 141. *In situ* whole and partial vessels, Tzul's Cave Room E, including inverted Mount Maloney Black bowl on jar rim.



Figure 142. Mount Maloney Black bowls inverted on top of massive jars, Chechem Ha Cave (photo by author, used by permission of Jaime Awe and Holley Moyes).



Figure 143. Triangle-shaped slate plug, covered in plaster, originally found blocking Room F from D, Tzul's Cave



Figure 144. Boulder fill used for leveling Room D seen from Room F.



Figure 145. PRAP foreman, Javier Mai providing scale for massive Alexanders Unslipped jar he found in entrance to Actun Sinan.



Figure 146. Entrances to Actun Kacha Shana. Entrance 1 is located upper center left of photo, while a tree grows from Entrance 2.



Figure 147. Cayo Unslipped sherd stack in Actun Kacha Shana, with light from Entrance 2 shining image right center.



Figure 148. Entrance to Actun Hayach Naj.



Figure 149. Aguila Orange miniature tripod with broken feet and sidewall recovered from Actun Hayach Naj.



Figure 150. Panoramic image of Solbetunich 2 semi-circular wall feature, facing up-sloping hillside with rockshelter behind.

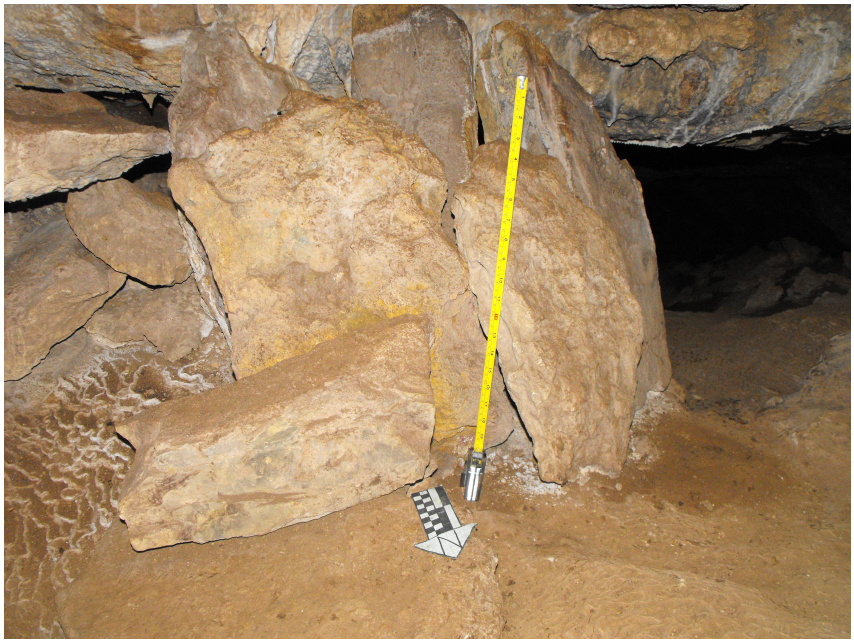


Figure 151. Series of set limestone slabs blocking a passage in Actun Solbetunich.



Figure 152: Chunhuitz ceramic group: a) Chunhuitz Orange; b) Xunantunich Black-on-orange; c)Benque Viejo-polychrome.



Figure 153: Problematic Benque Viejo-polychrome partial vessel.



Figure 154. Hewlett Bank Unslipped cache Vessel #1 from Actun Lak Units 8 and 9.

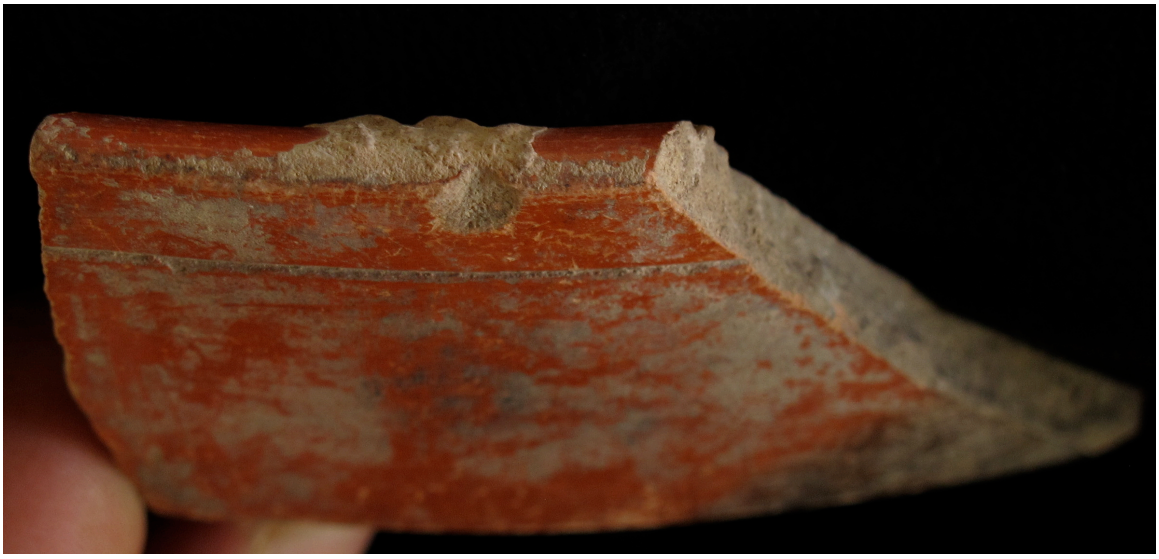


Figure 155: Rosario Incised sherd showing rim chipping after being coated in calcium carbonate.



Figure 156: Dos Arroyos lid identified by INAA originating from Tikal-Uaxactun region.



Figure 157. Ceramic Box fragment A, view of bottom showing nubbin feet.



Figure 158. Ceramic Box fragment B, view of bottom showing remaining nubbin foot and rounded corner of vessel.



Figure 159. Ceramic Box fragment C, view of outer wall and base (lines added).



Figure 160. Example of square polychrome ceramic vessel (www.mayavase.com K5113 © Justin Kerr).

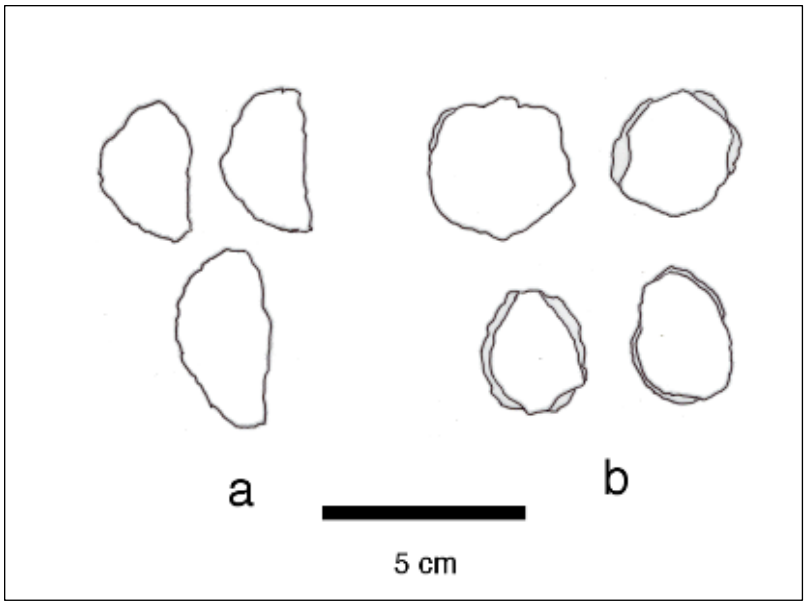


Figure 161. Modified sherd shape classes: a) crescents; b) discodials and teardrop.



Figure 162. Large disk from Mount Maloney Black globular jar, Lak 2-1.



Figure 163. Composite image of modified Early Classic period Peten Gloss ring base, possible jar lid, Actun Nohoch Tunich surface collection adjacent to Unit 7.



Figure 164. Composite photograph of front and back of Ahk'utu' Molded-carved pottery mold, Actun Xtuyul.



Figure 165. Photograph and line drawing of Actun Xtuyul ceramic mold.



a



b

Figure 166. Detail of feathers on Actun Xtuyul mold with overlapping line drawing: a) proposed beaded feather cluster beneath individual's forearm; b) feather cluster abutting ankle showing tips of feathers.

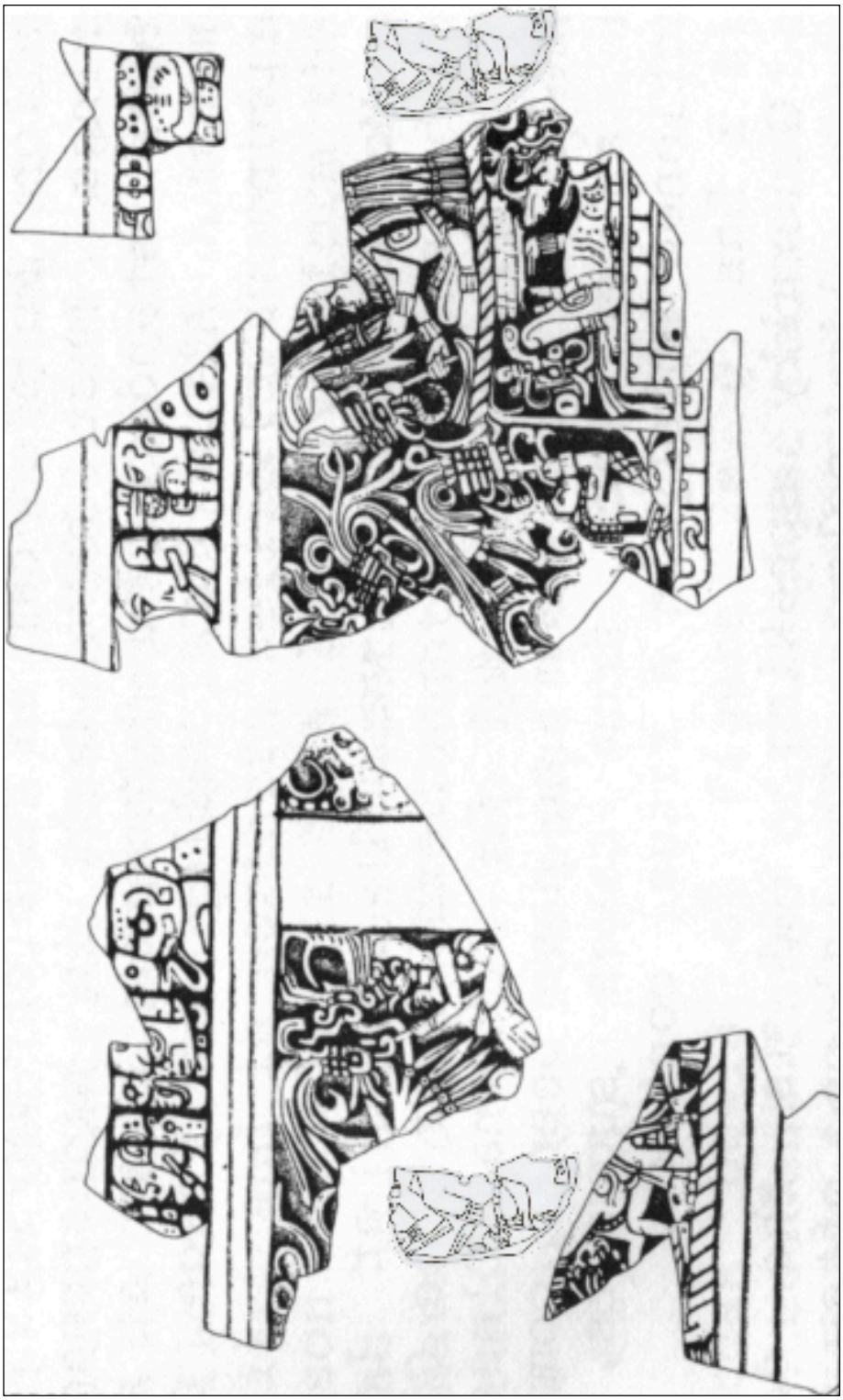


Figure 167. Line drawing of Molded-carved vessel recovered from Lamanai, including possible locations for Actun Xtuyul mold iconographic program (adapted from Graham 1987:Figure 3d).



a b c d

Figure 168. Biface fragments from Pacbitun karstscape: a). Naj 2-1; b) Naj 2-2; c and d) ventral and dorsal sides, Ant 5-2.



Figure 169. Composite image of granite mano, Actun Subuul Unit 2 Level 3.



Figure 170. Granite mano from Actun Naj Che Unit 3. White spot on objects left is light reflecting off heavy polish.



Figure 171. Jadeite objects recovered from speleothem altar area, Actun Lak.



Figure 172. Jadeite bead with burned residue, possibly copal or pine sap.

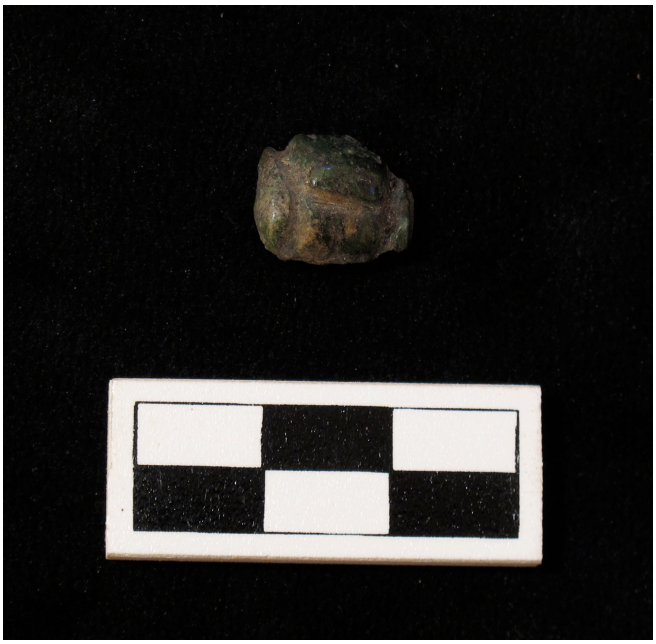


Figure 173. Carved jadeite bead, Actun Lak Unit 6, Level 1.



Figure 174. Jadeite earspool fragments from speleothem altar area, Actun Lak.



Figure 175. Polished jadeite pebbles from speleothem altar area, Actun Lak.



Figure 176. Limestone celt-like object, Actun Naj Che, Unit 1 Level 2.



Figure 177. Composite image of "Yalbac" limestone spindle whorl, Actun Nohoch Tunich Unit 7, Level 3.



Figure 178. Obsidian blades from Pacbitun karstscape. From left to right, Actun Lak 5-6, 17-1, 11-2-feat. 2; Actun Naj Che 1-2, Unit 1, north wall.



Figure 179. Samples of slate collected from Mountain Pine Ridge showing material's color range.



Figure 180. Soda straw speleothem beads, Actun Lak Unit 3, Level 2.



Figure 181. Possible quartz *sastun*, Actun Xtuyul surface collection.



Figure 182. Massive proximal quartzite flake, Actun Hayach Naj.



Figure 183. Indeterminate large concretion associated with cremation burial, Actun Naj Che, 1-3.



Figure 184. Imported, mano-like igneous rock, Actun Ch'e'ehem Zotz surface collection.

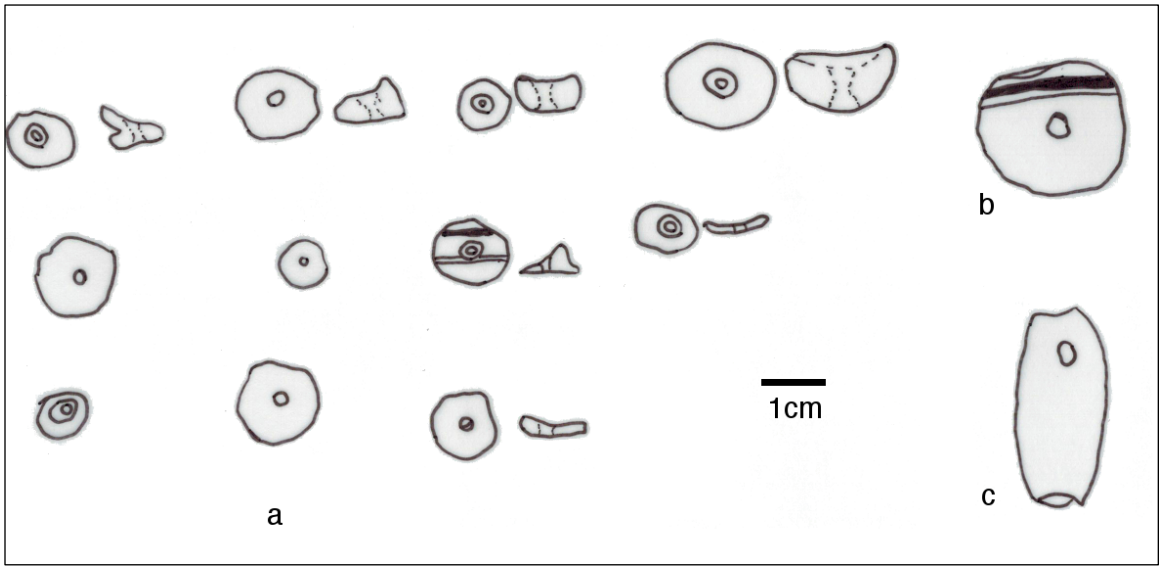


Figure 185. Line drawings of shell beads from the Pacbitun karstscape: a) disk beads; b) irregular bead; c) olivela tinkler.



Figure 186. Sample of jute snail shells recovered from buried cache in Actun Nohoch Tunich.



Figure 187. *Nephronaias* sp. (pearly mussel) shells from Actun Nohoch Tunich Unit 2, Level 3, interior view.

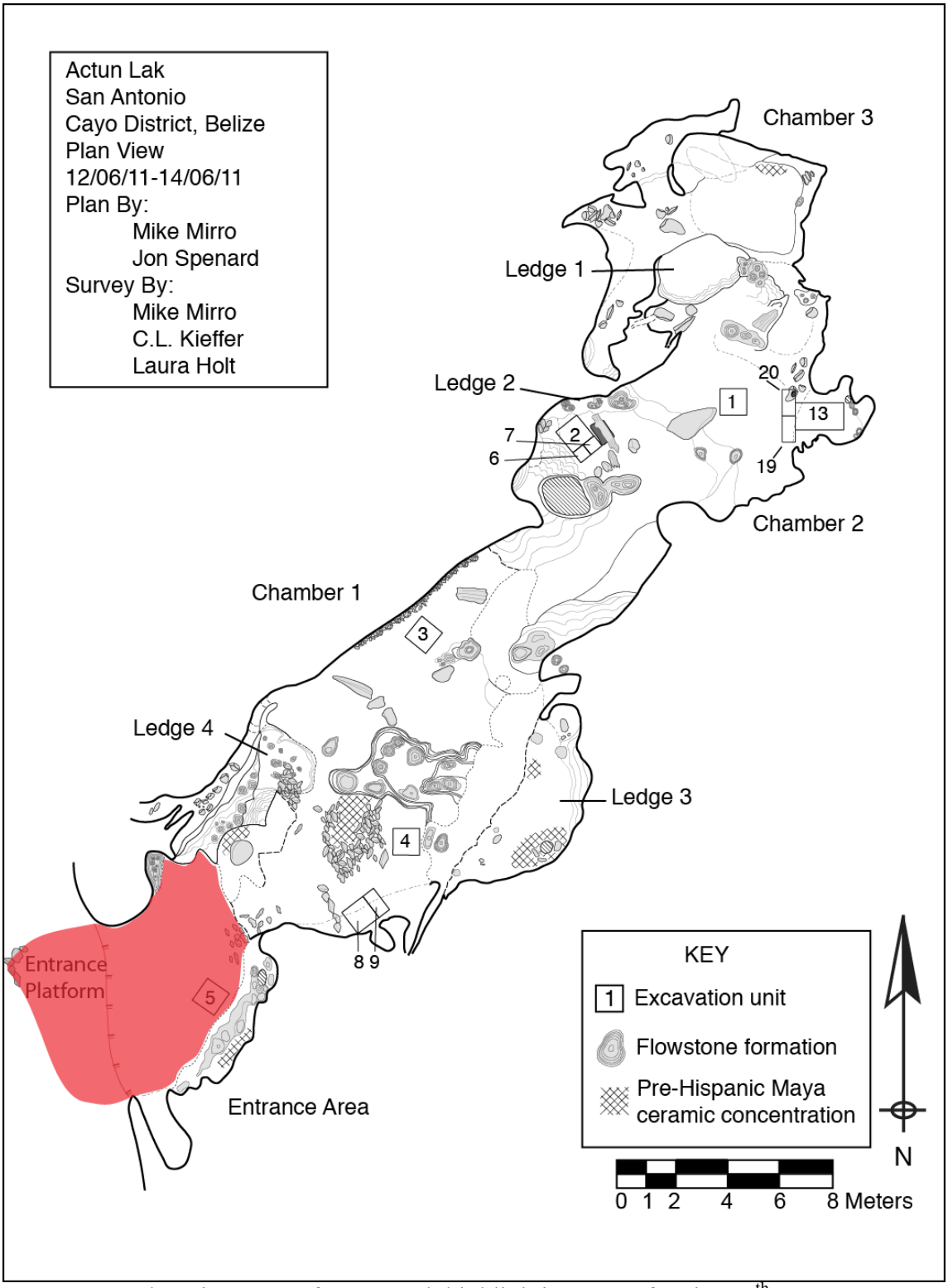


Figure 188. Plan view map of Actun Lak highlighting area of major 10th century A.D. architectural modifications.

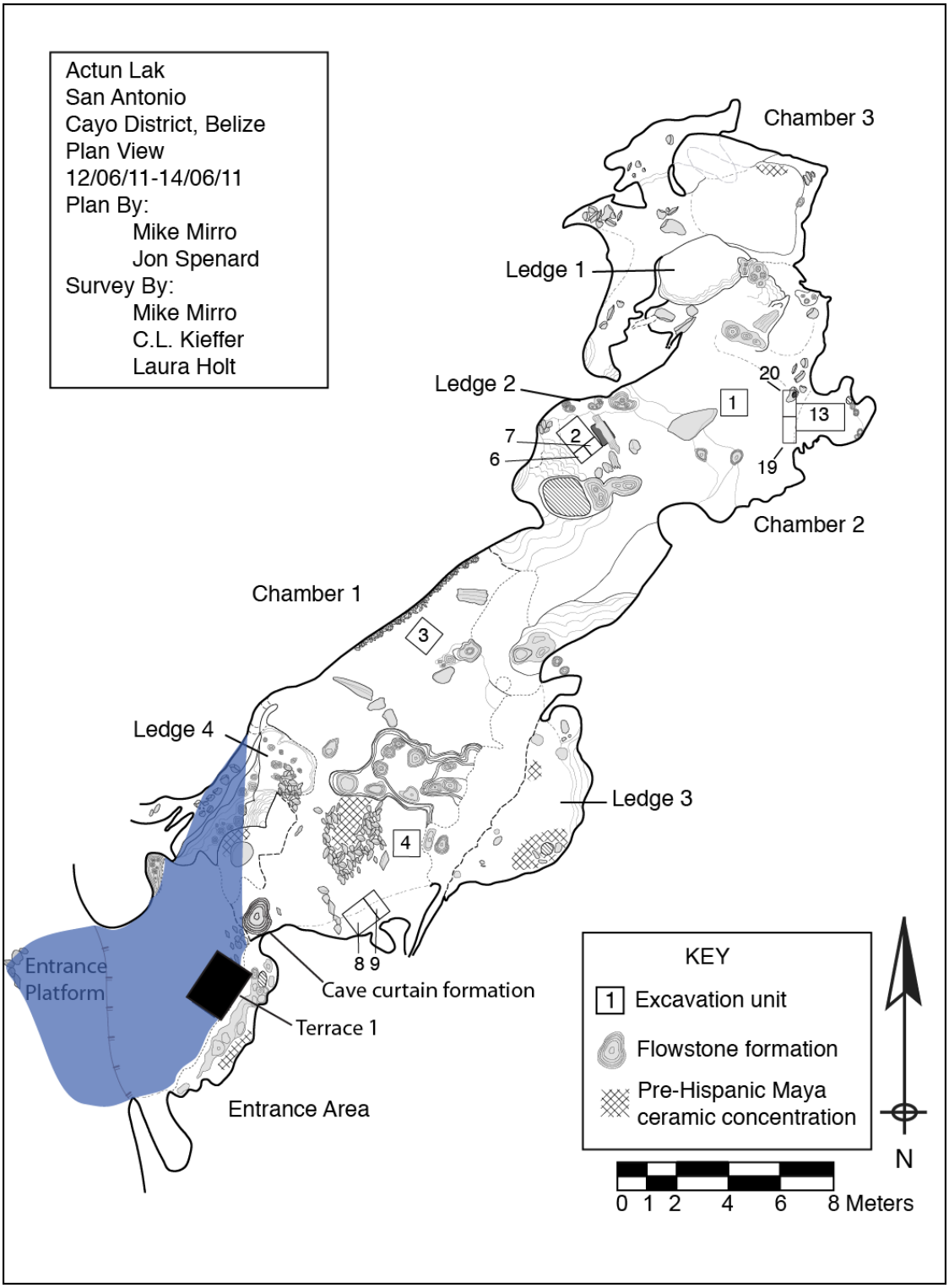


Figure 189. Approximate visibility of Actun Lak Terrace 1. Note that the cave curtain north of the terrace blocks most views from inside the cave.

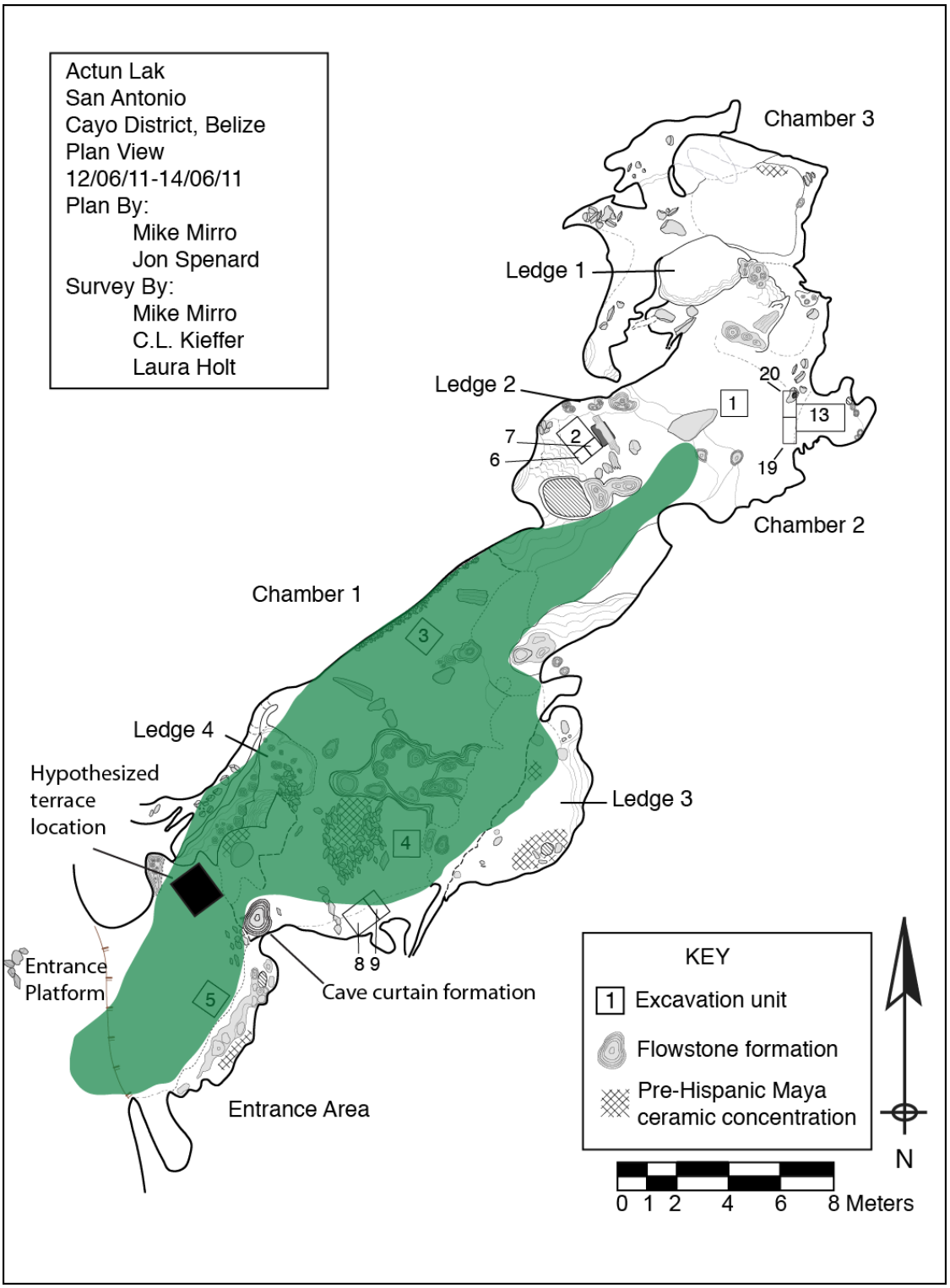


Figure 190. Visibility of hypothesized alternate position for Terrace 1. Note that the curvature of the cave wall and low ceiling at the entrance (not depicted) prohibits any sizeable audience from watching from outside.



Figure 191. Pacbitun Altar 3 and Stela 6 (from Helmke and Awe 2012:Figure 8; Helmke et al. 2006:Figure 2).



Figure 192. Cave Kiva in Bandelier National Monument, New Mexico.



Figure 193. Outcrops used for settlement in Bandelier National Monument, New Mexico (above), and Wukoki pueblo, Wupatki National Monument, Arizona (below).

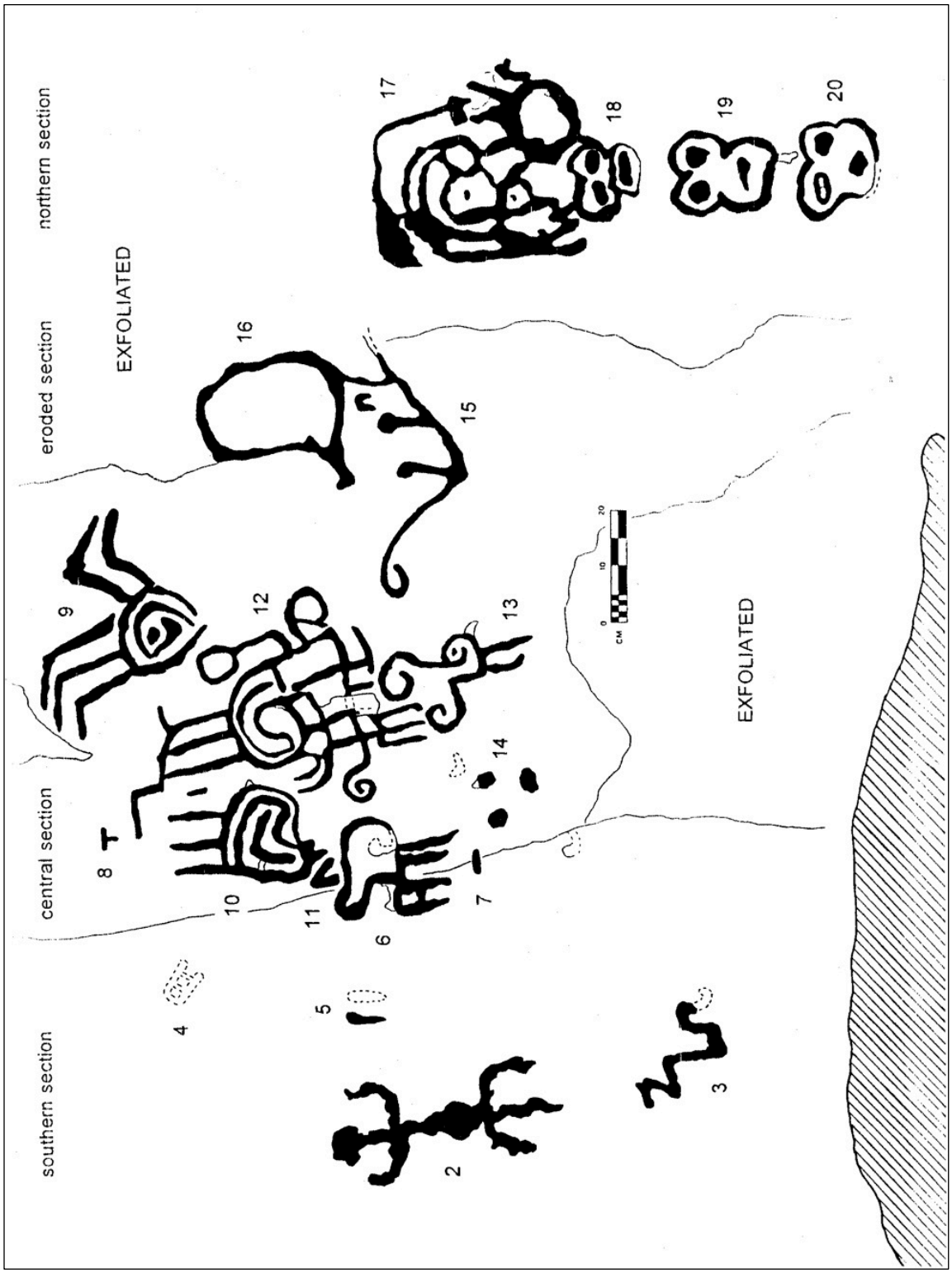


Figure 194. Petroglyph panel from Actun Uayazba Kab, Roaring Creek Valley, Belize (from Helmke and Awe 1998:Figure 5).



Figure 195. Polychrome vase from Dos Pilas showing individuals on left smelling and holding flower bouquets (www.mayavase.com K1599 © Justin Kerr).



Figure 196. Example of massive bedrock boulder common to the Nohoch Tunich Bedrock Outcrop Complex.

APPENDIX B

EXCAVATION UNIT MAPS

The unit plan and profile maps in this appendix are ordered as the discussion of excavations in Chapter 5; however, a brief note for clarity is in order before continuing. Cave and rockshelter matrices are largely devoid of cultural and natural features, leaving nothing to map. In lieu of multiple empty maps, only those unit walls and levels with significant archaeological data or stratigraphy are presented.

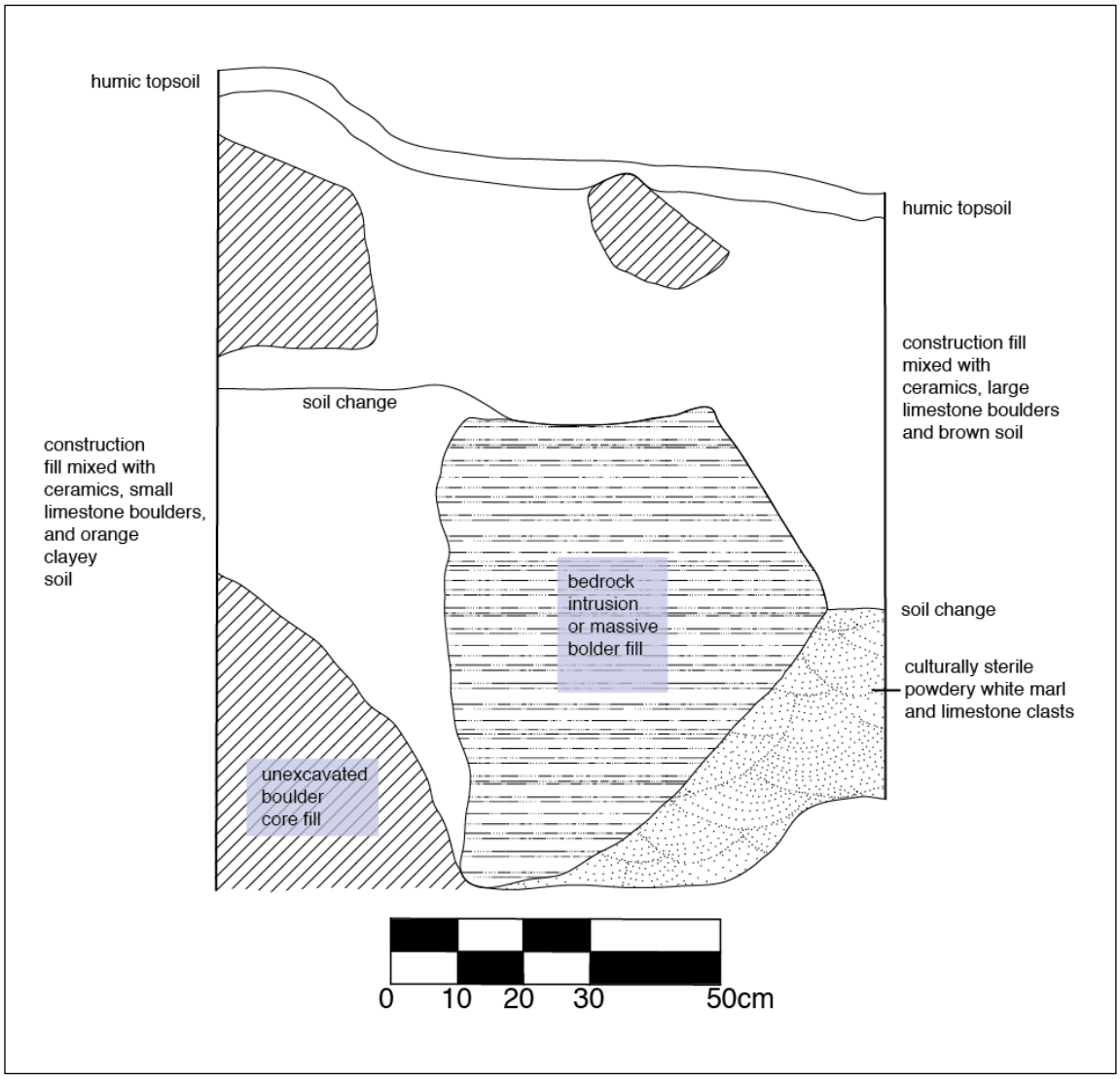


Figure B1. Actun Lak Unit 10 south wall profile.

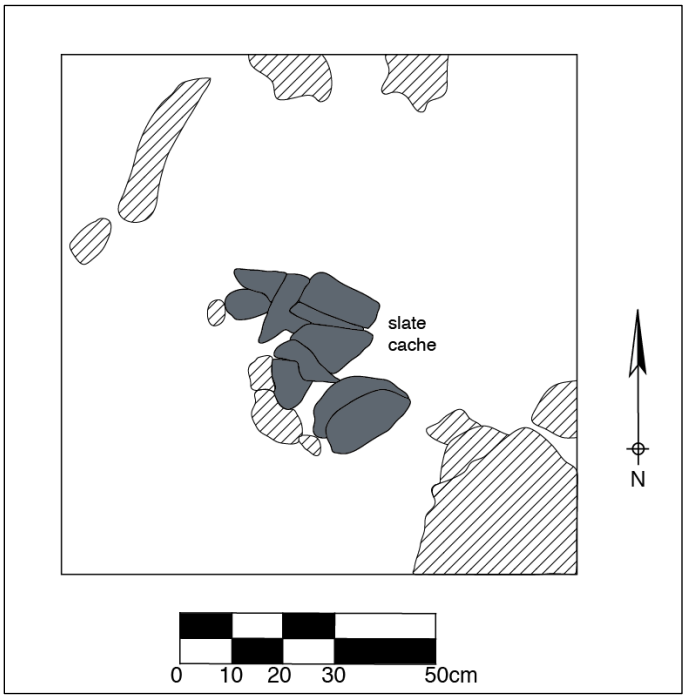


Figure B2. Actun Lak Unit 11 Level 2, plan view of centerline slate cache.

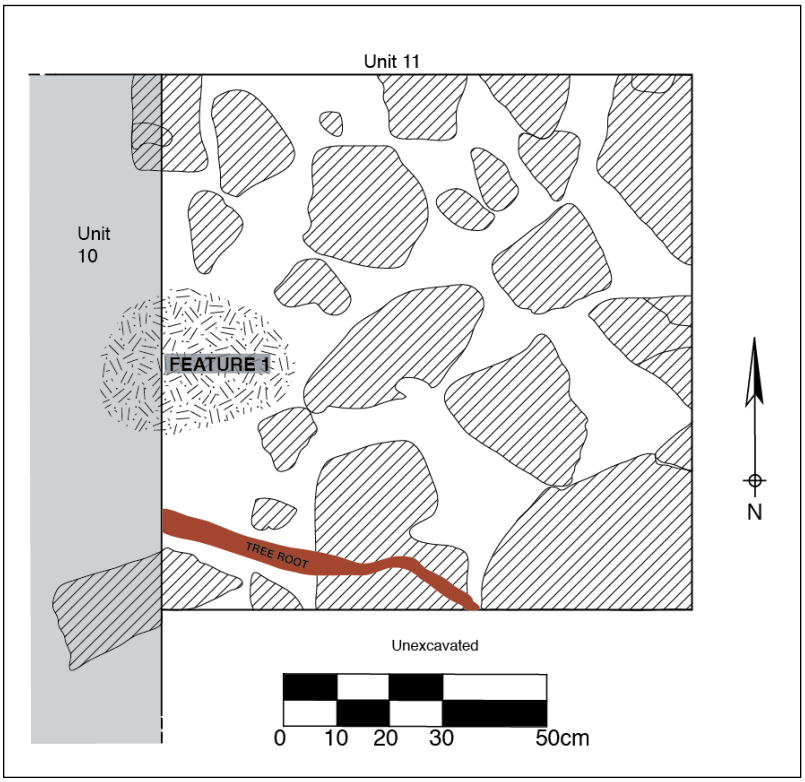


Figure B3. Actun Lak Unit 11 top of Level 3, plan view.

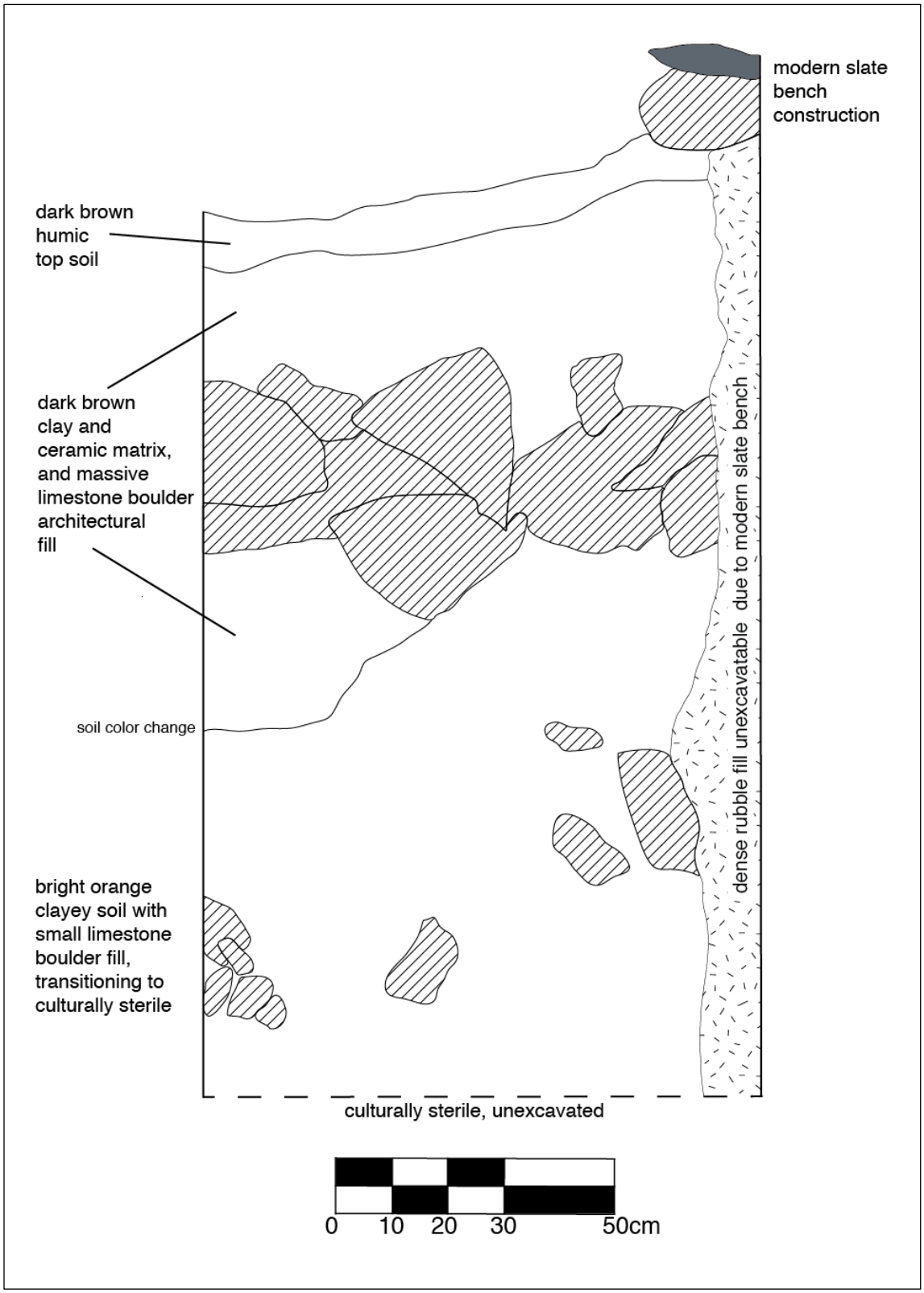


Figure B4. Actun Lak Unit 11 east wall profile.

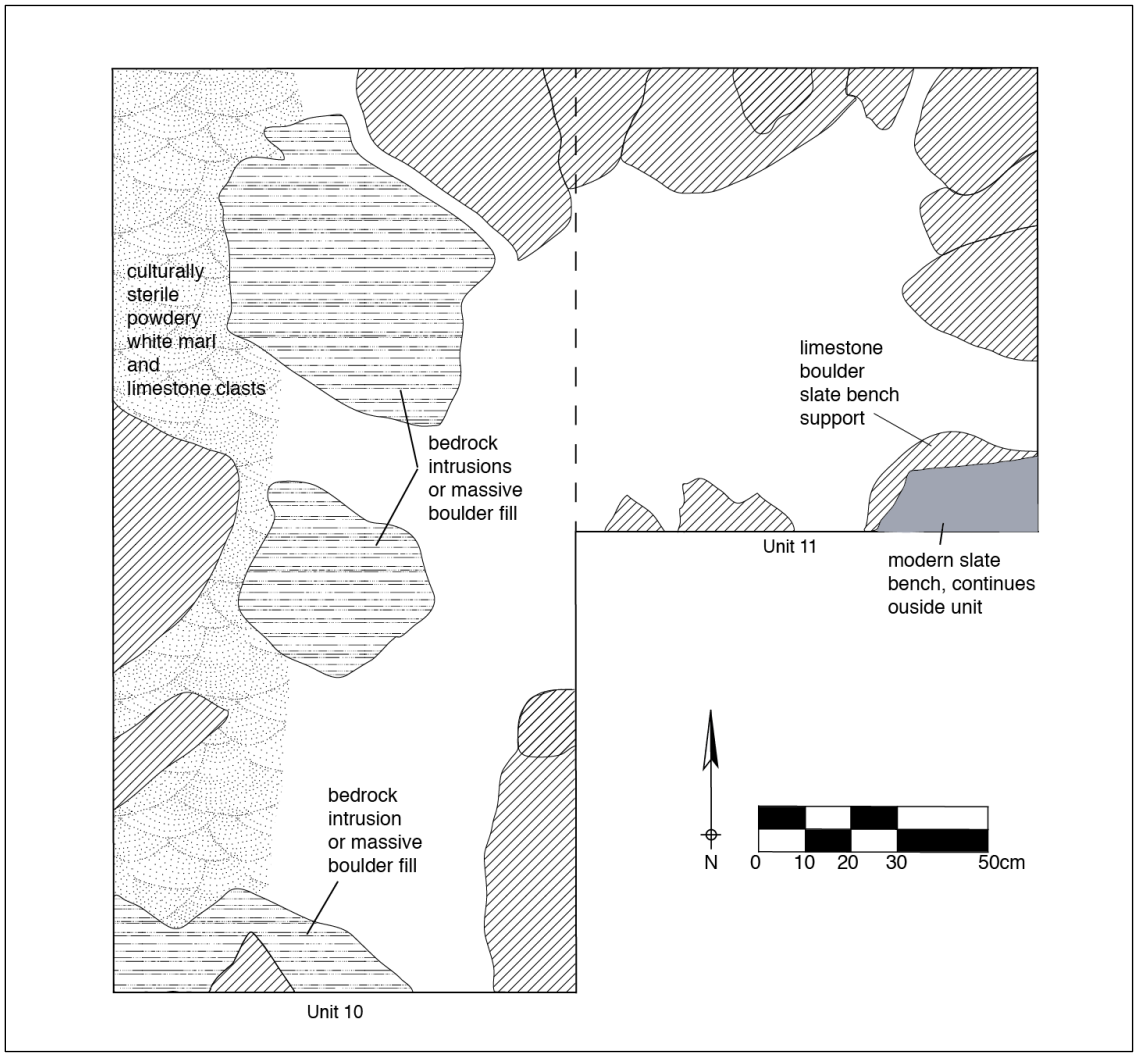


Figure B5. Actun Lak Units 10 and 11 plan view of bottom of excavations

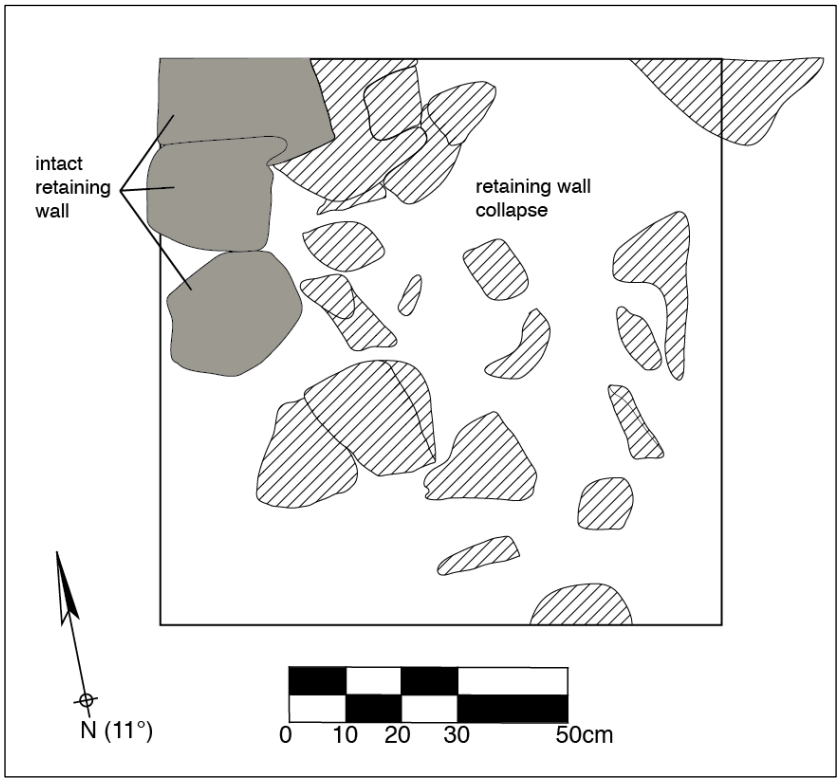


Figure B6. Actun Lak Unit 14 plan view of top of Level 2.

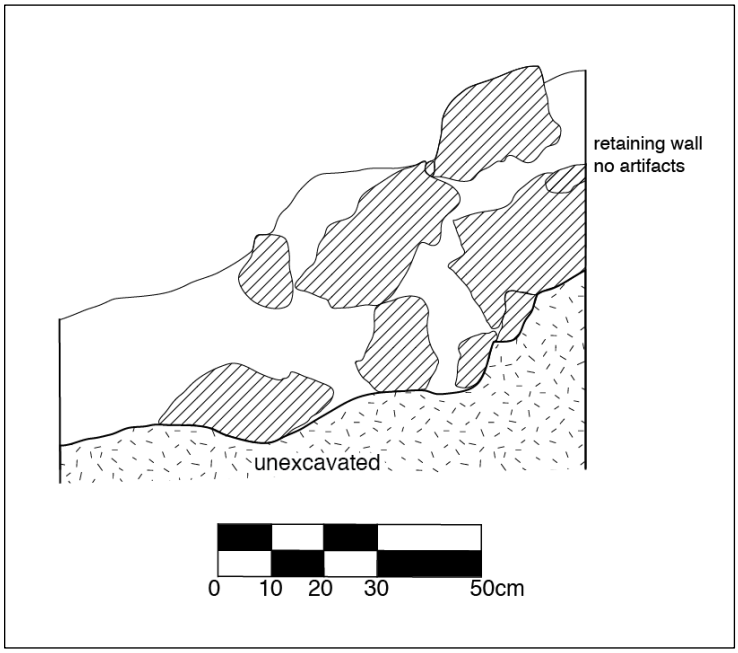


Figure B7.Actun Lak Unit 14 north wall profile.

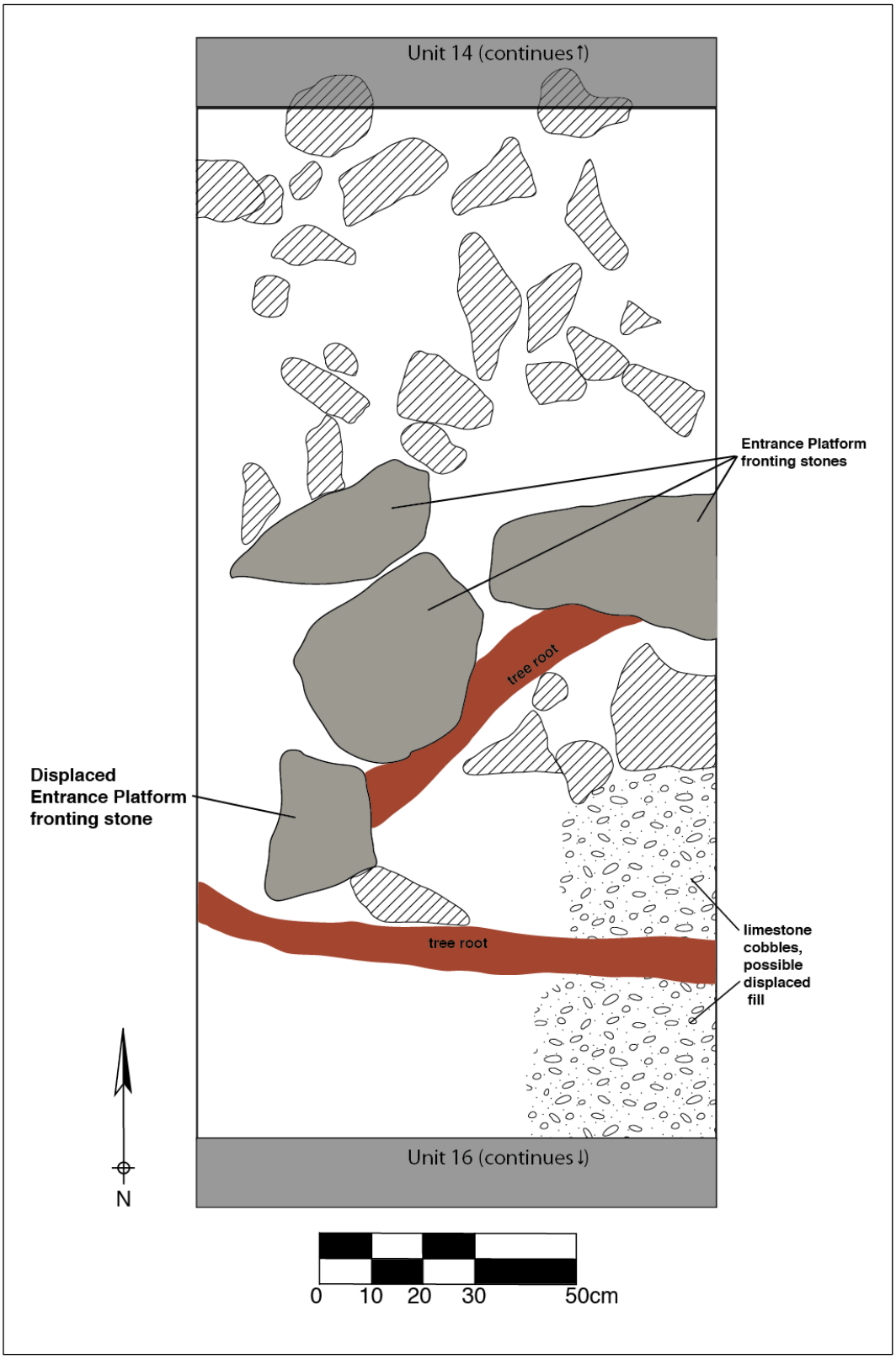


Figure B8. Actun Lak Unit 15 plan view of Level 2 top.

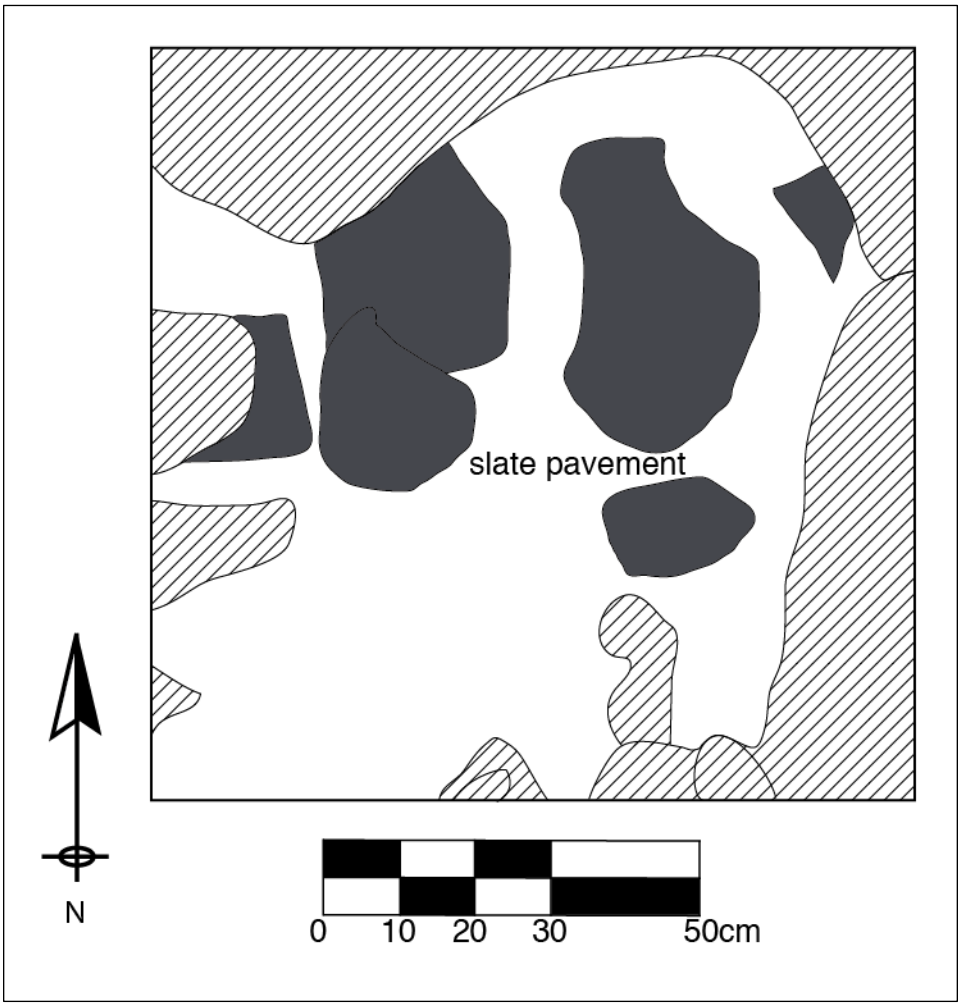


Figure B9. Actun Lak Unit 5 Level 5 plan view of slate pavement. Note that the rocks protruding from the unit walls are construction ballast from higher levels.

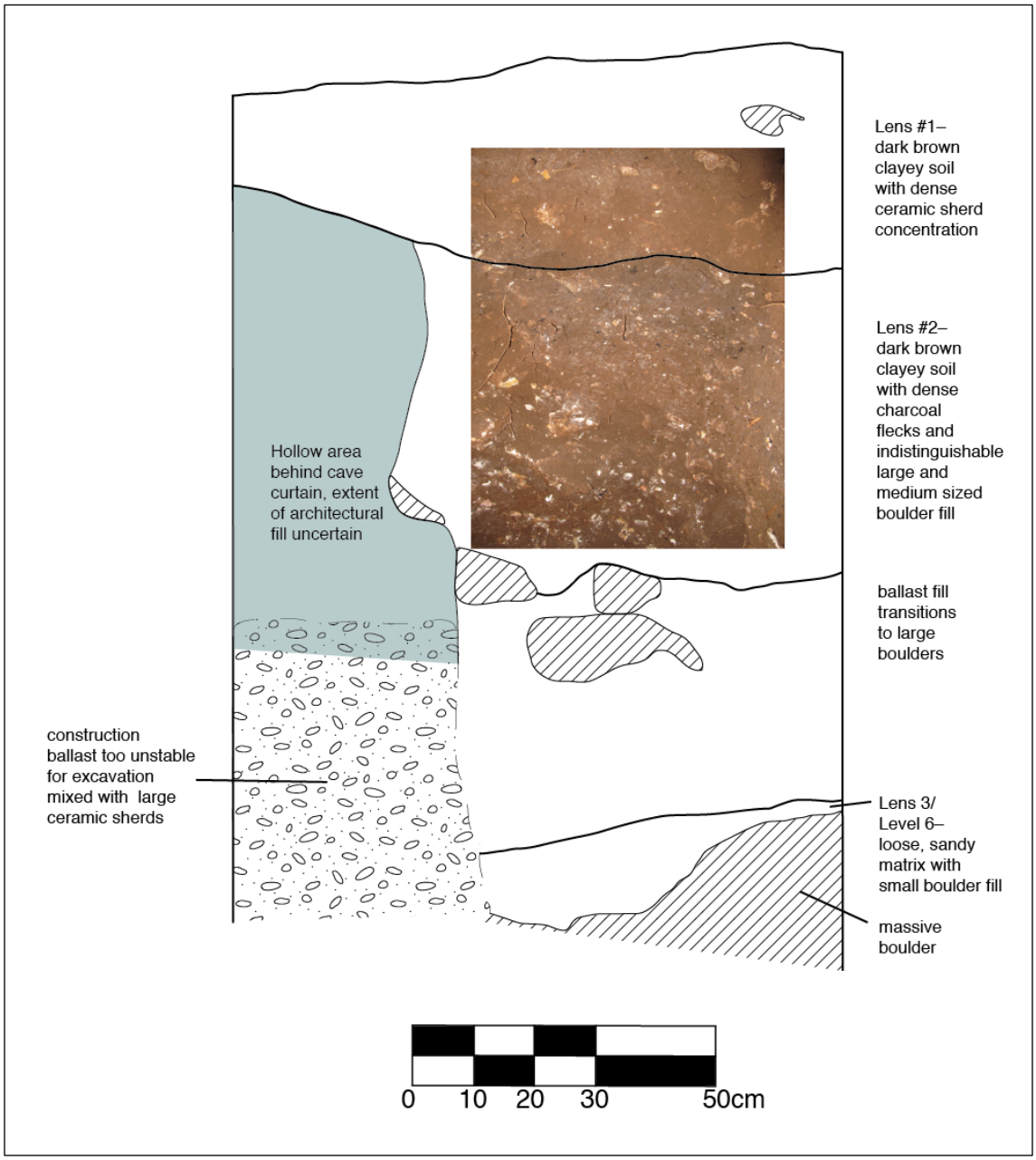


Figure B10. Actun Lak Unit 5 south wall profile.

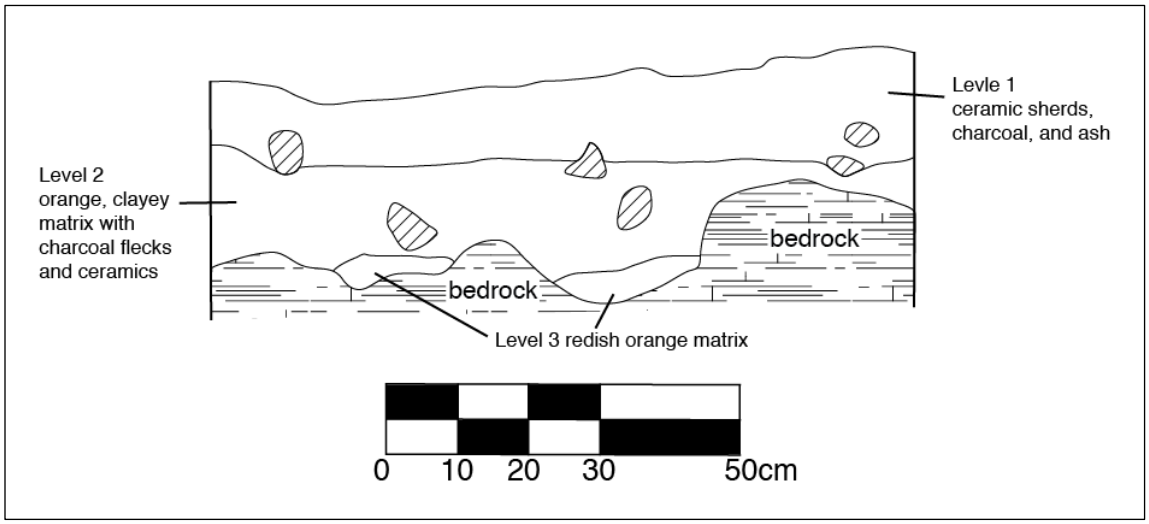


Figure B11. Actun Lak Unit 4 west wall profile.

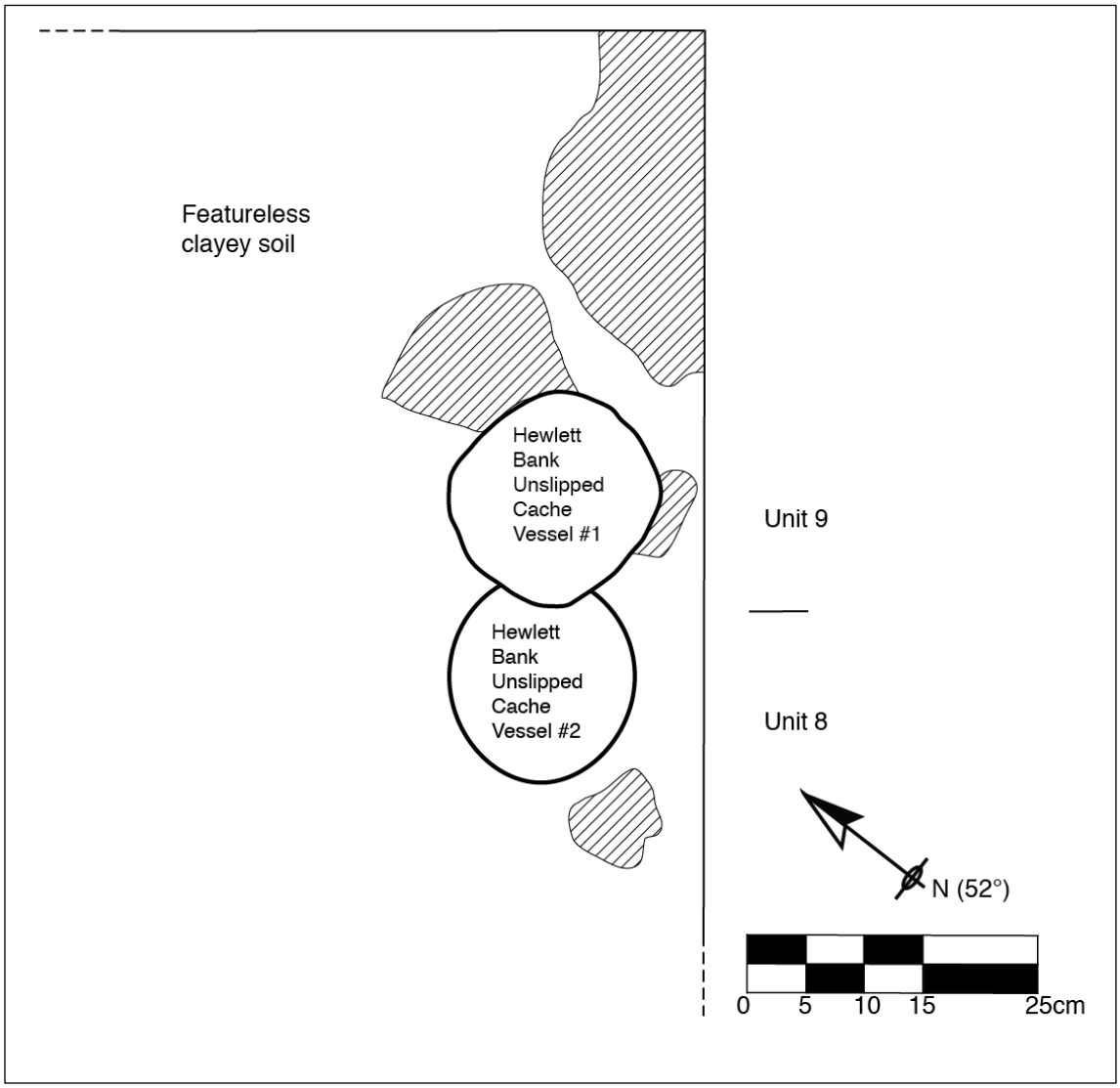


Figure B12. Actun Lak Units 8 and 9 showing location of Hewlett Bank Unslipped vessel cache on top of limestone boulders.

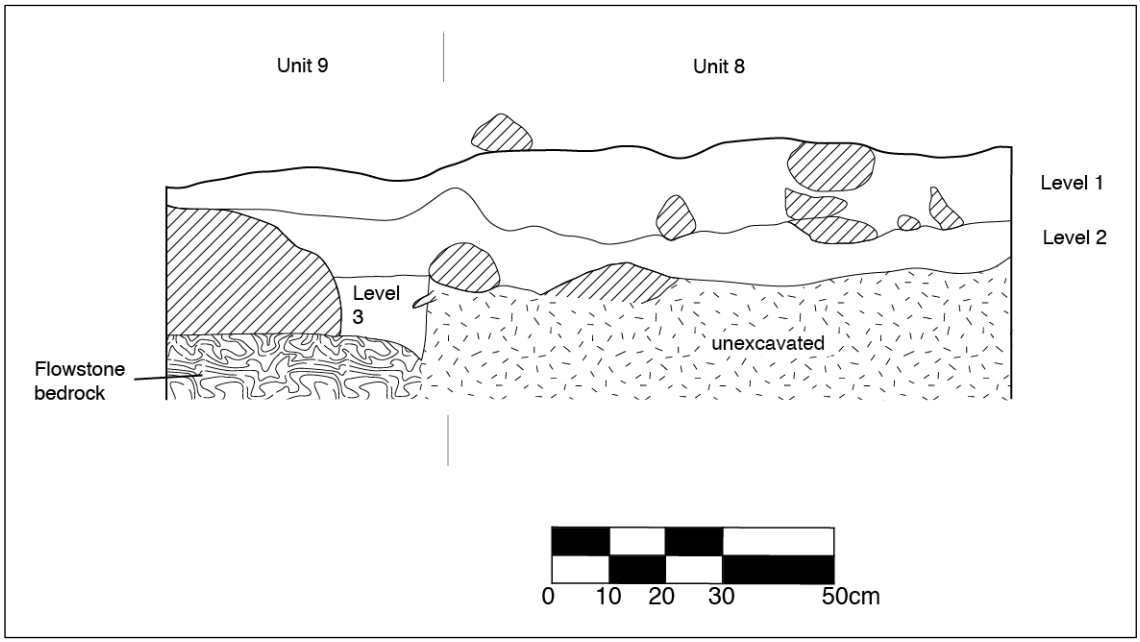


Figure B13. Actun Lak Units 8 and 9 southwest wall profile.

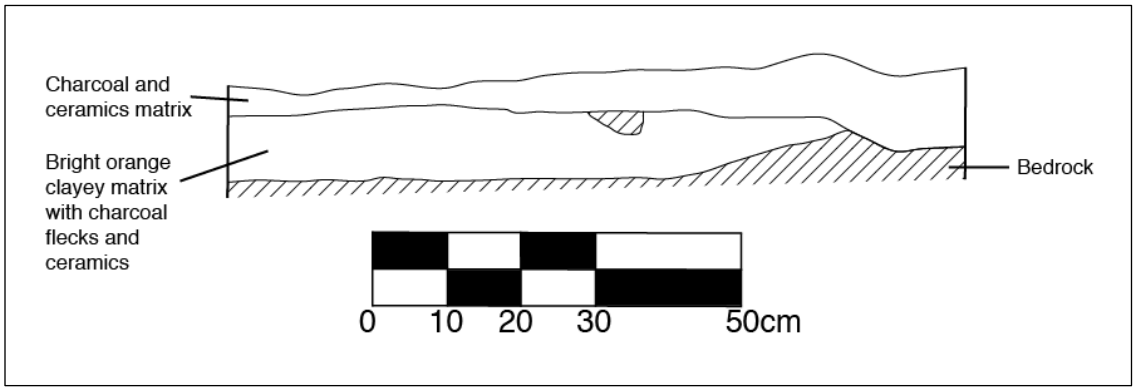


Figure B14. Actun Lak Unit 2 west wall profile.

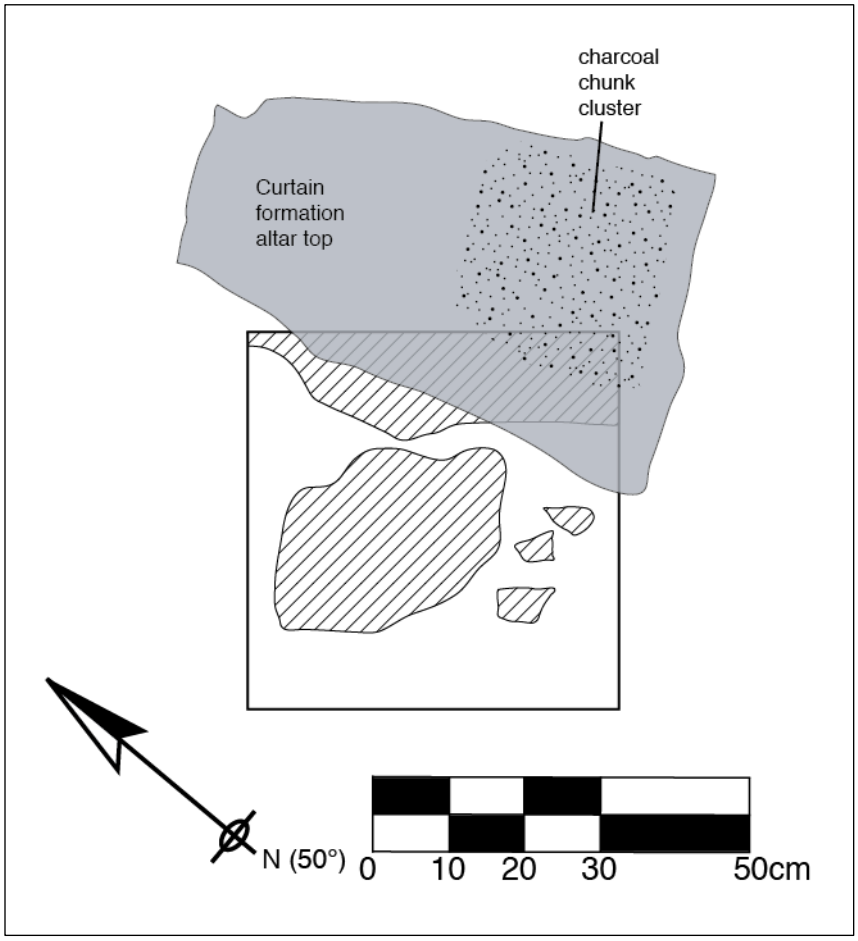


Figure B15. Actun Lak Unit 7 Level 1 bottom plan view, and showing location of cave curtain formation altar.

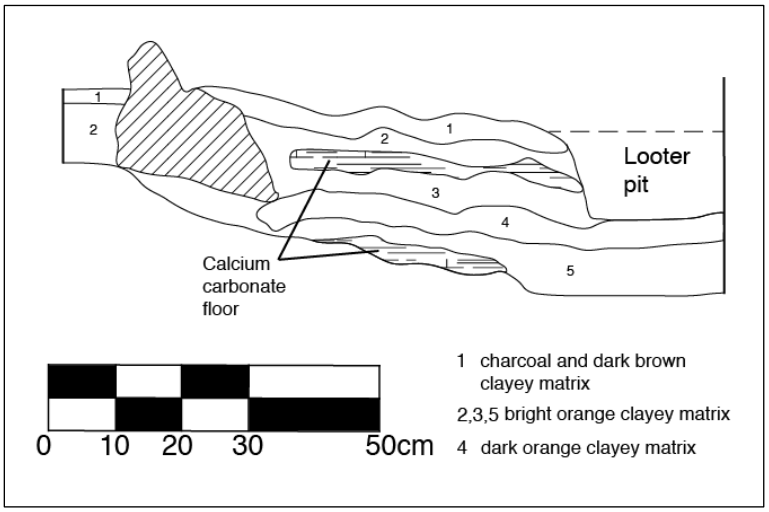


Figure B16. Actun Lak Unit 1 east wall profile.

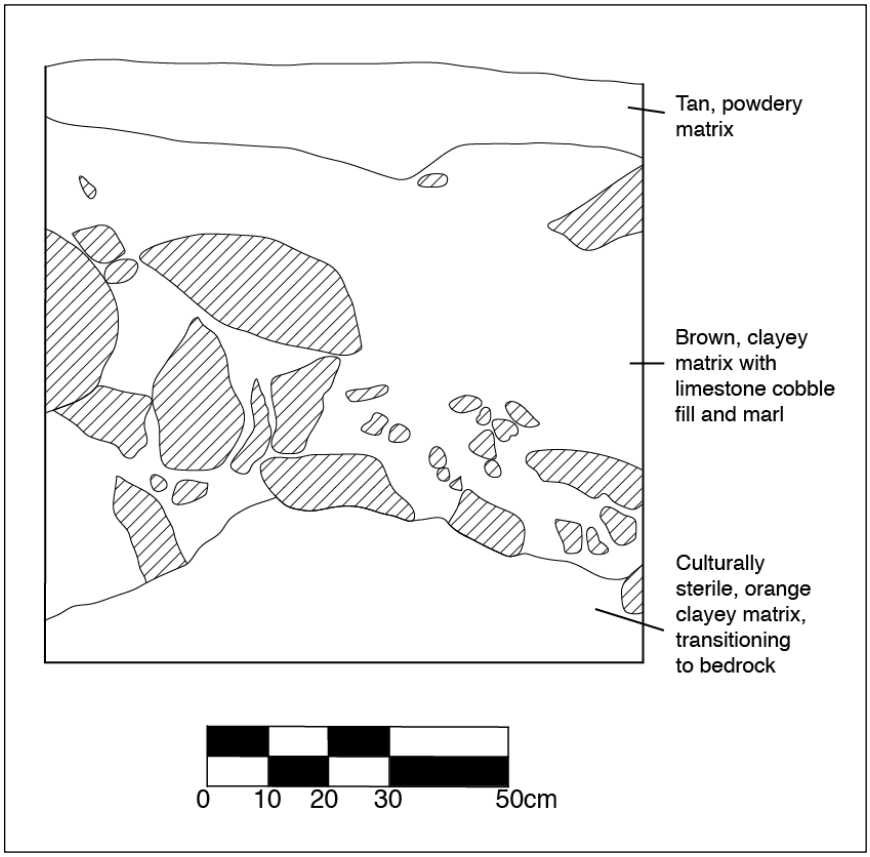


Figure B17. Actun Nohoch Tunich Unit 1 west wall profile.

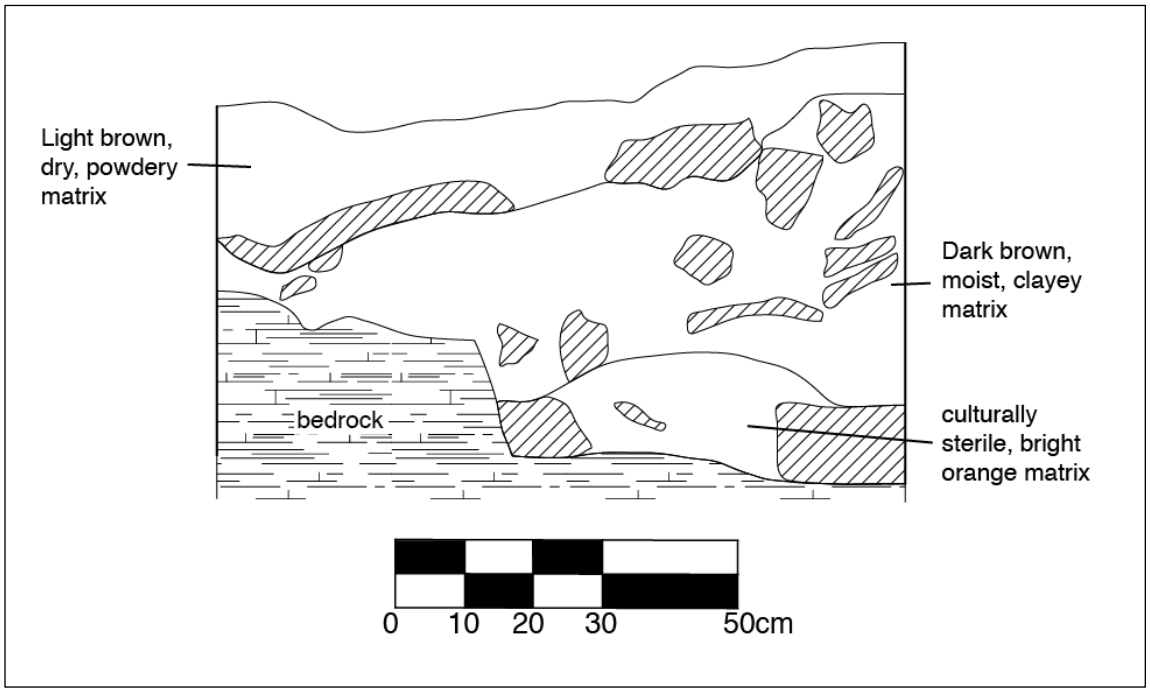


Figure B18. Actun Nohoch Tunich Unit 2 west wall profile

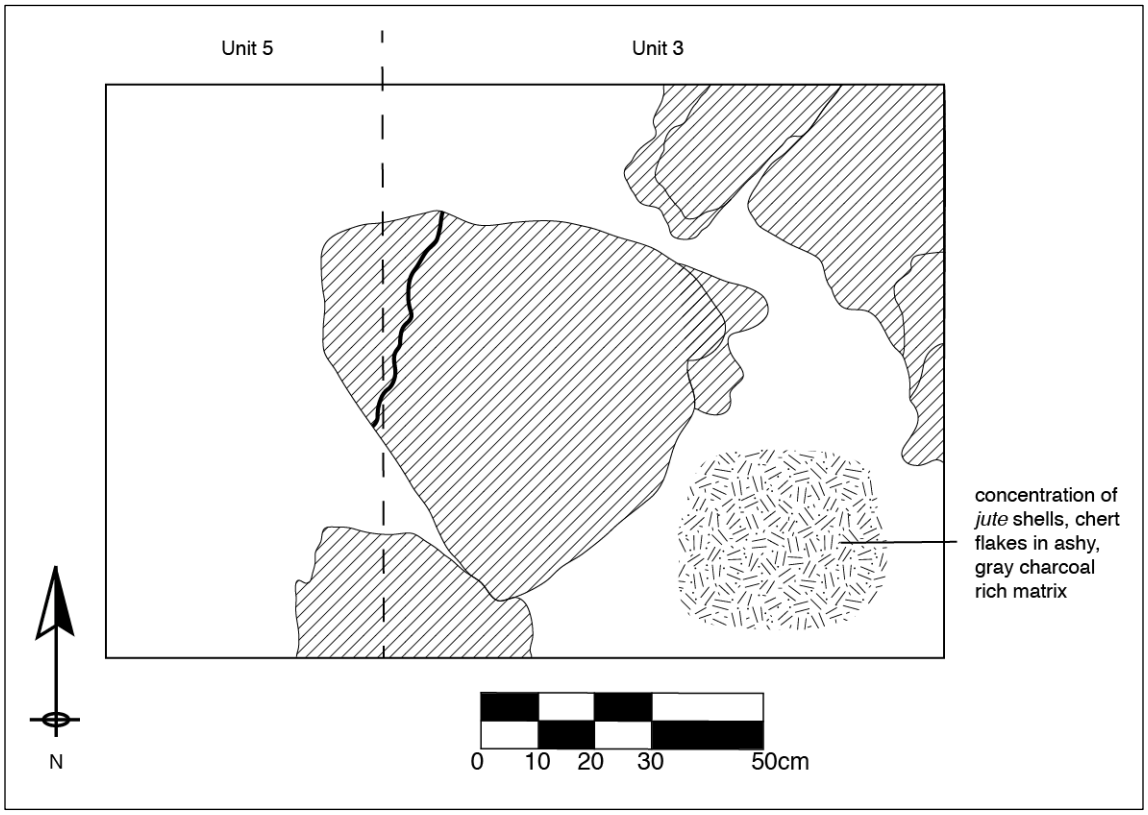


Figure B19. Actun Nohoch Tunich Units 3 and 5, profile of top of level 5 and Feature 2 rock alignment

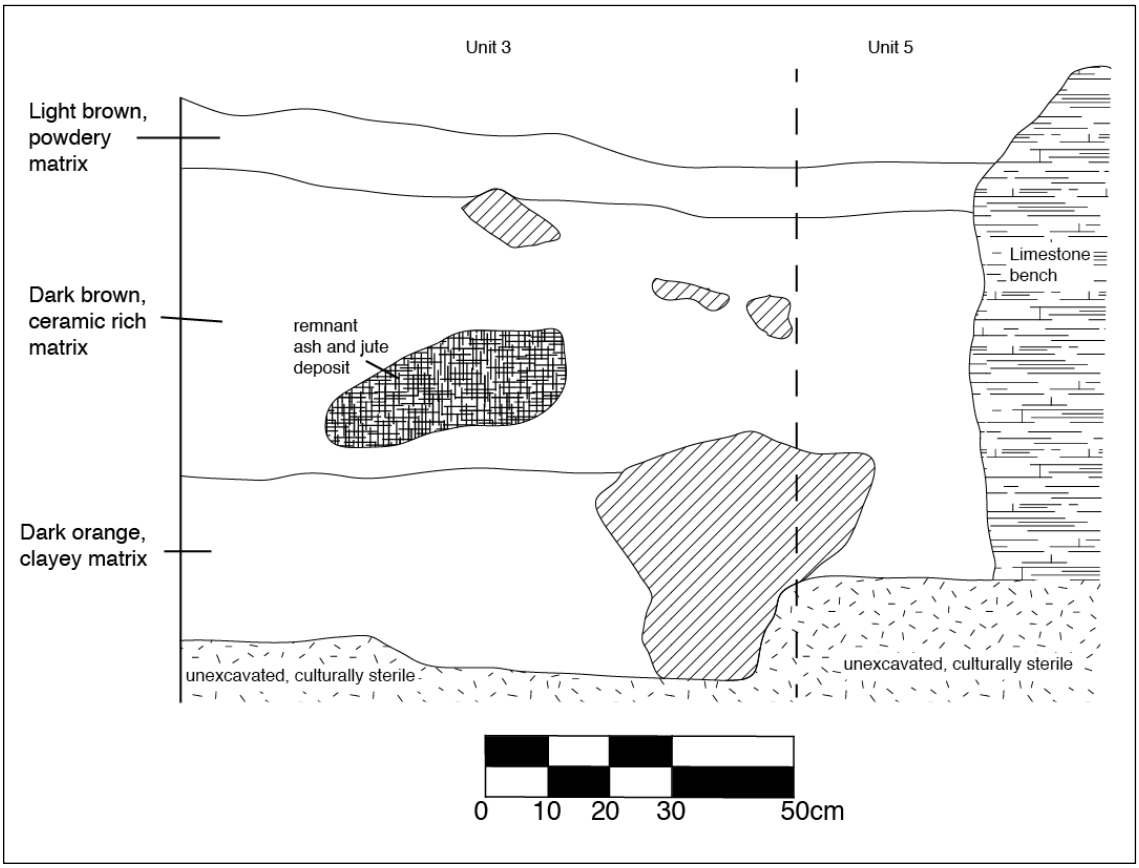


Figure B20. Actun Nohoch Tunich Units 3 and 5 south wall profile

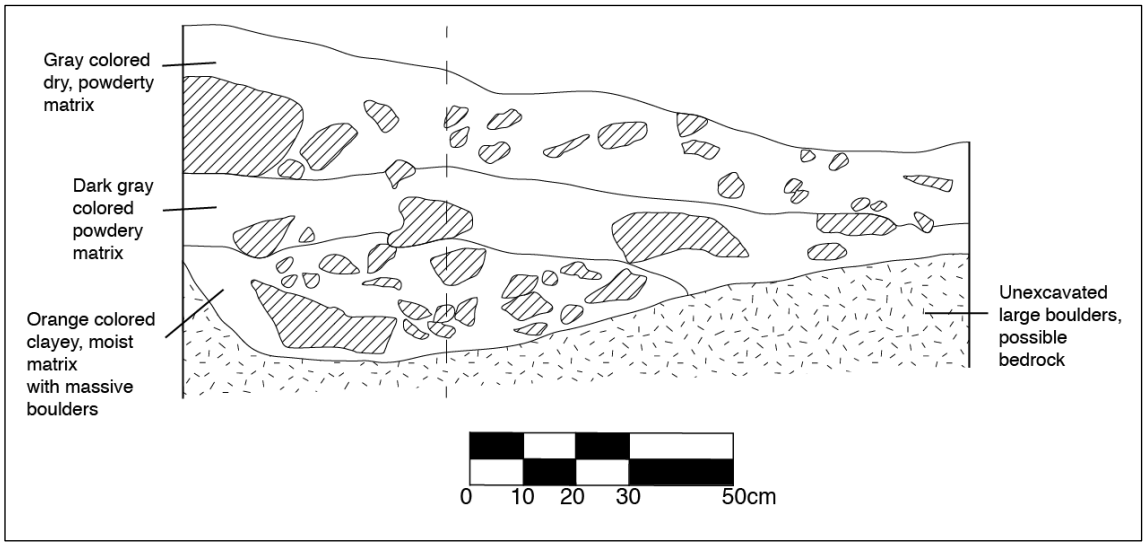


Figure B21. Actun Nohoch Tunich Units 6 and 7 south wall profile.

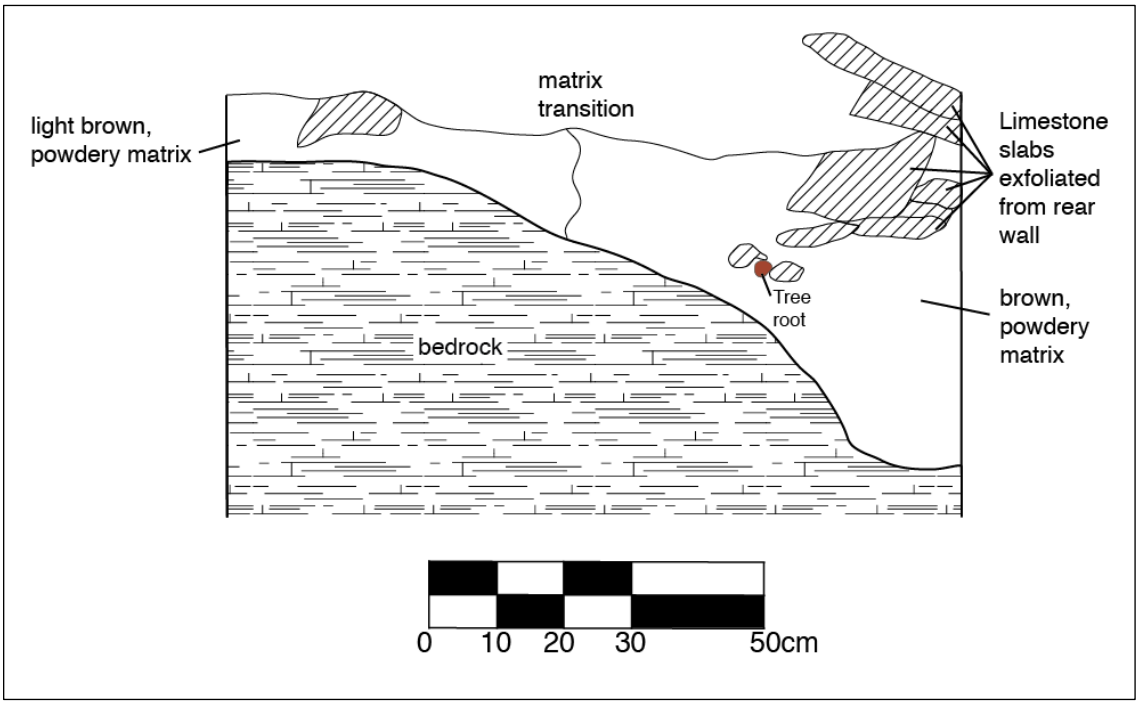


Figure B22. Actun Xtuyul Unit 1 south wall profile.

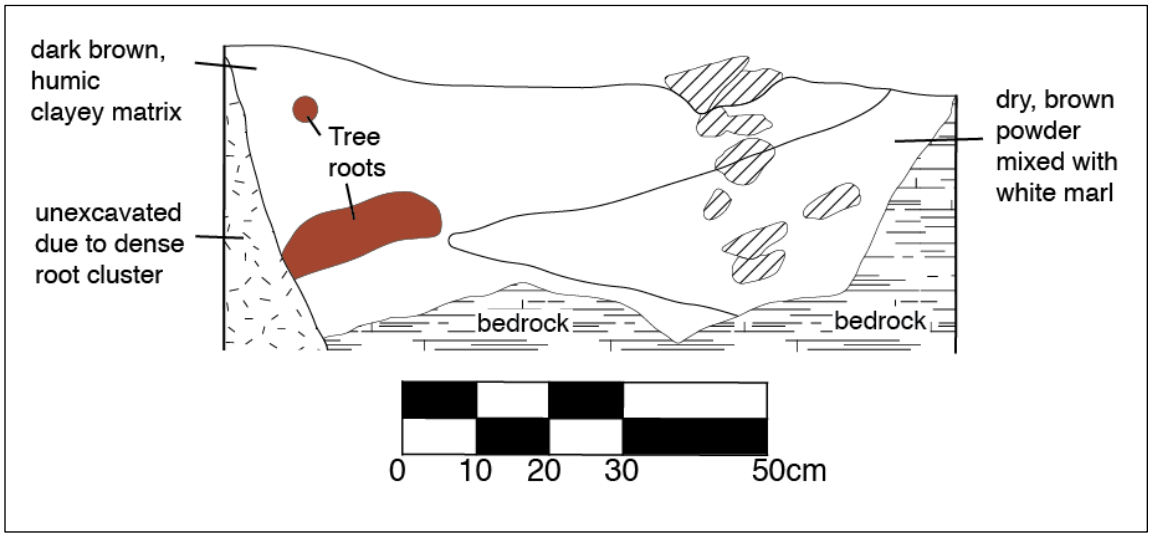


Figure B23. Actun Xtuyul Unit 2 south wall profile.

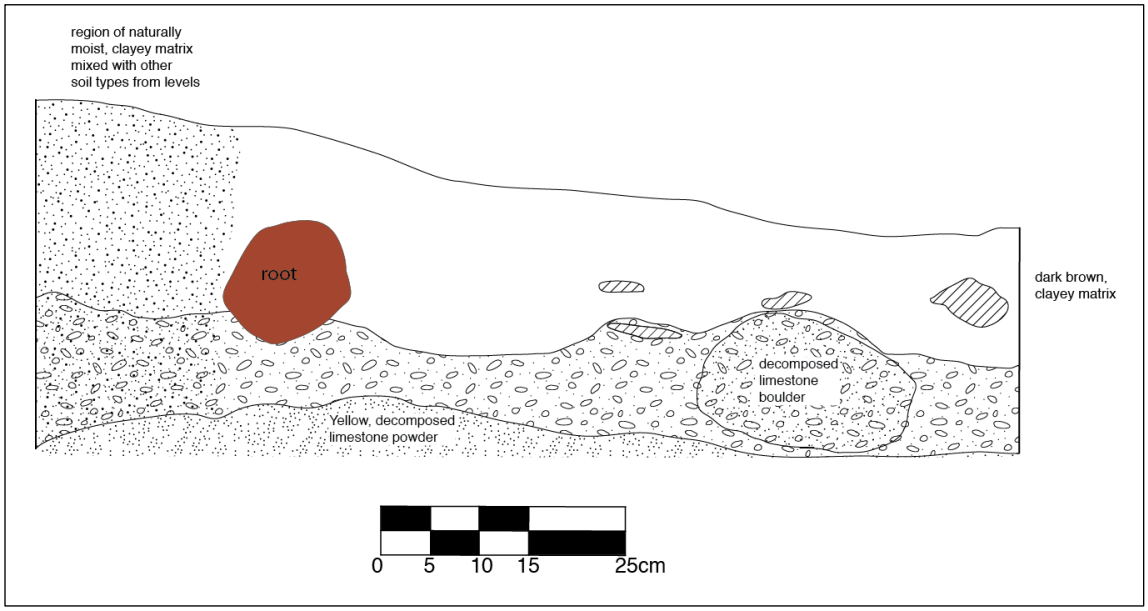


Figure B24. Actun Subuul, Unit 1 west wall profile.

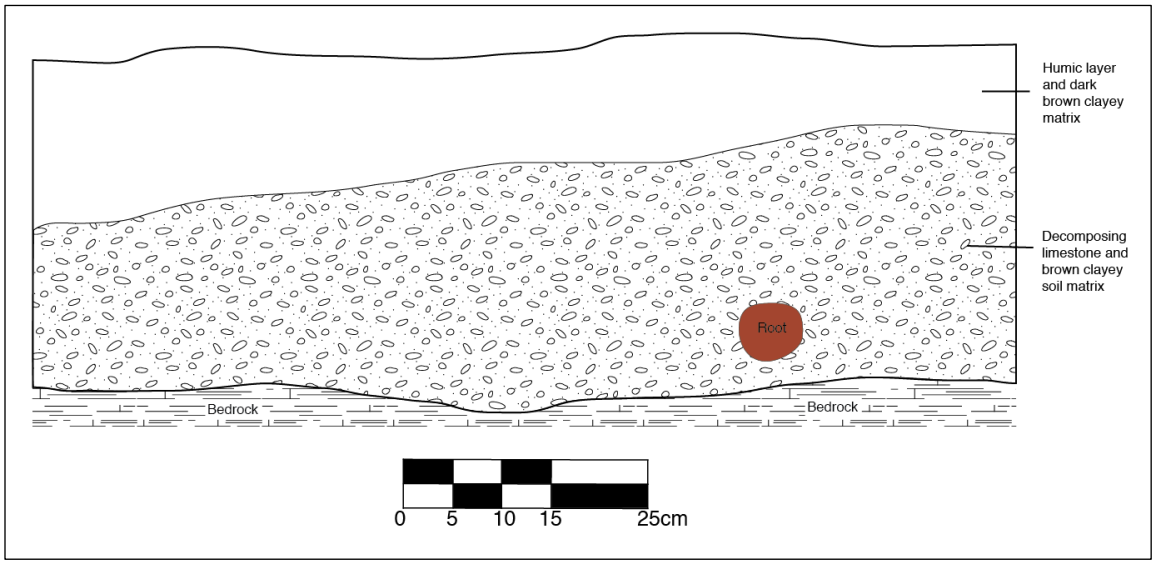


Figure B25. Actun Subuul, Unit 2 south wall profile.

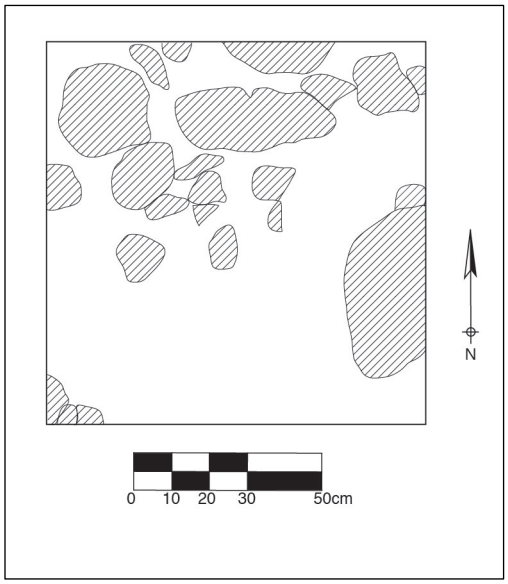


Figure B26. Actun Naj Che Unit 1 plan view of top of Level 3.

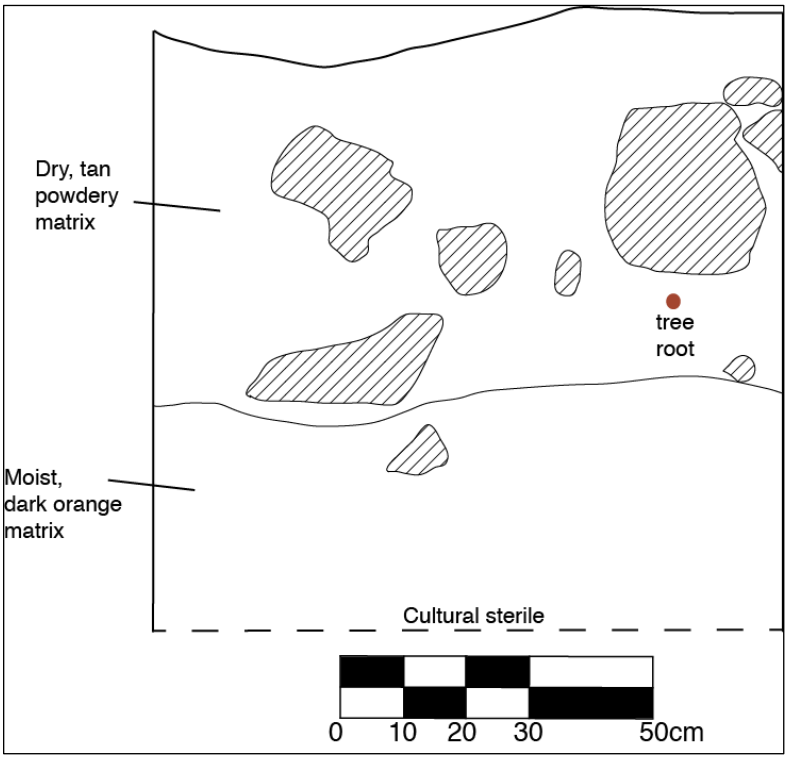


Figure B27. Actun Naj Che Unit 1 north wall profile.

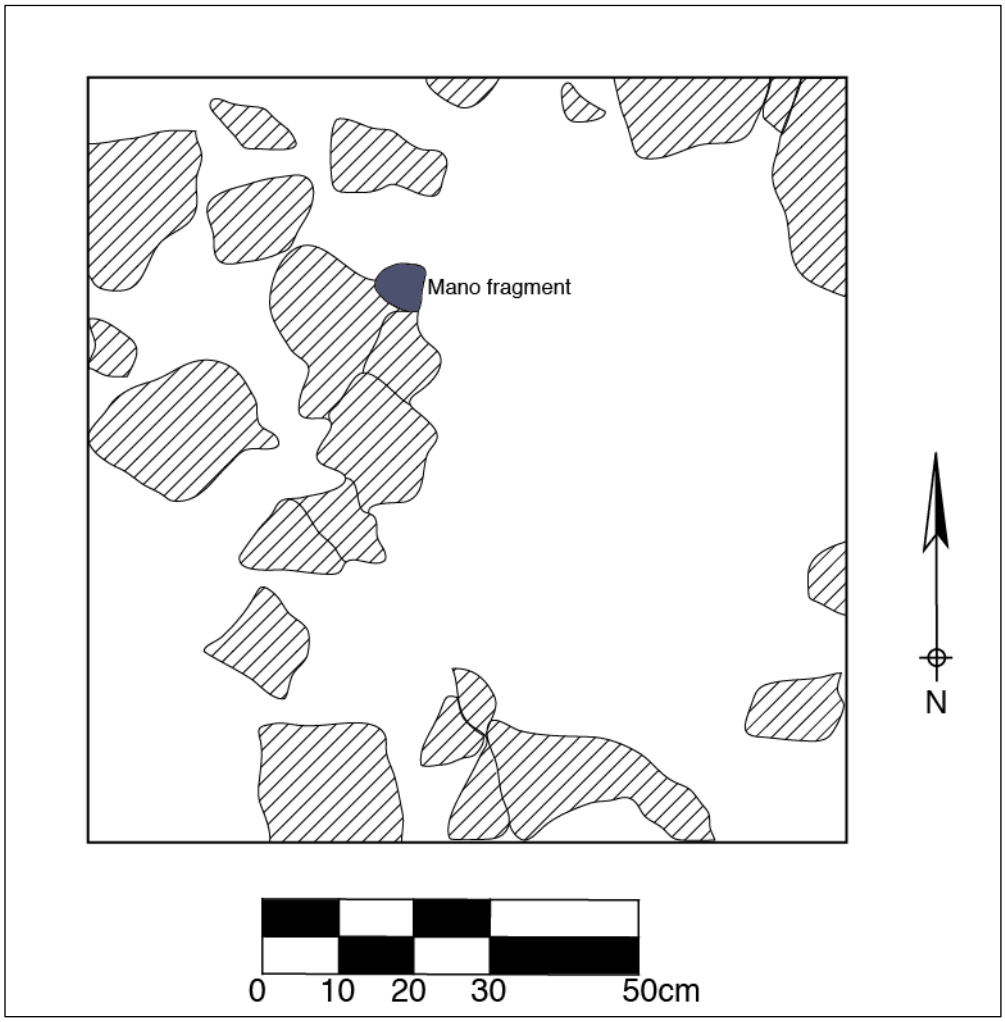


Figure B28. Actun Naj Che Unit 3 plan view of top of Level 3. Note the stone alignment running north-south.

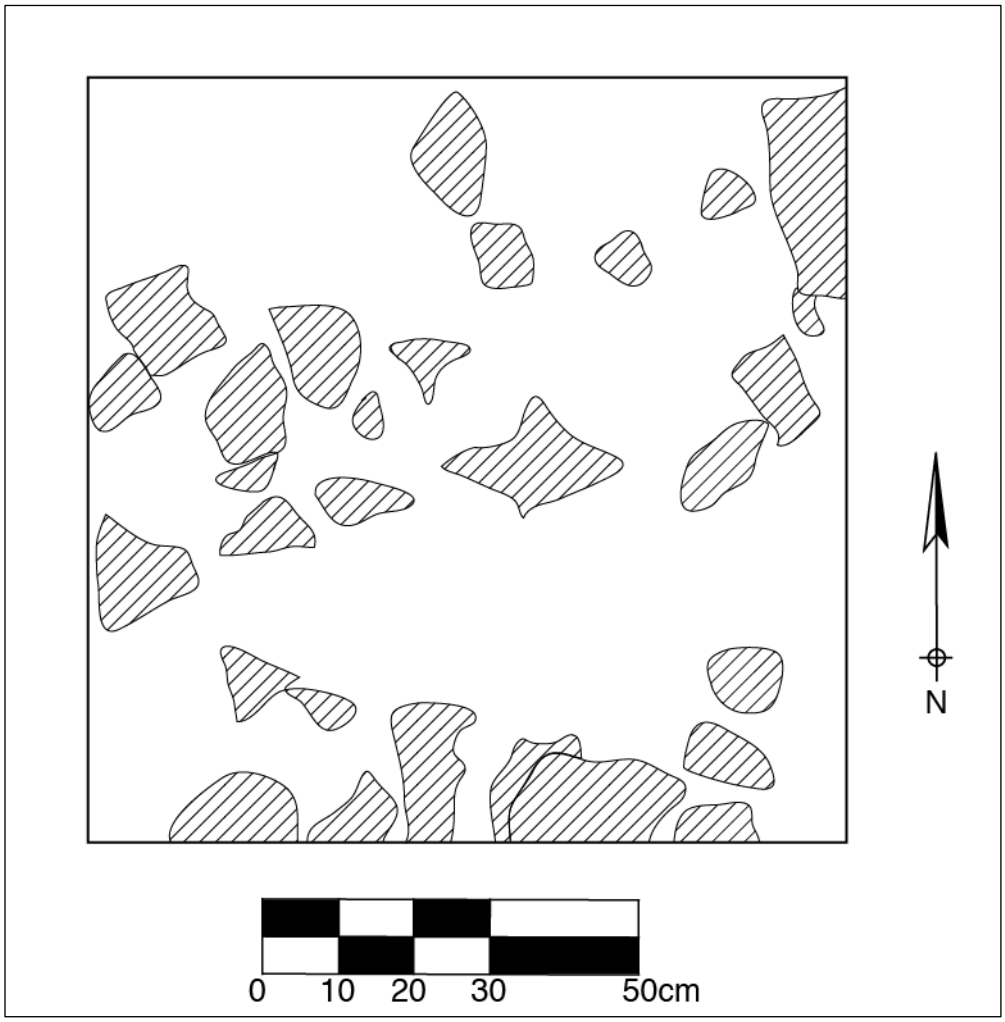


Figure B29. Actun Naj Che Unit 3 plan view of top of Level 4. Note the stone alignment running east-west.

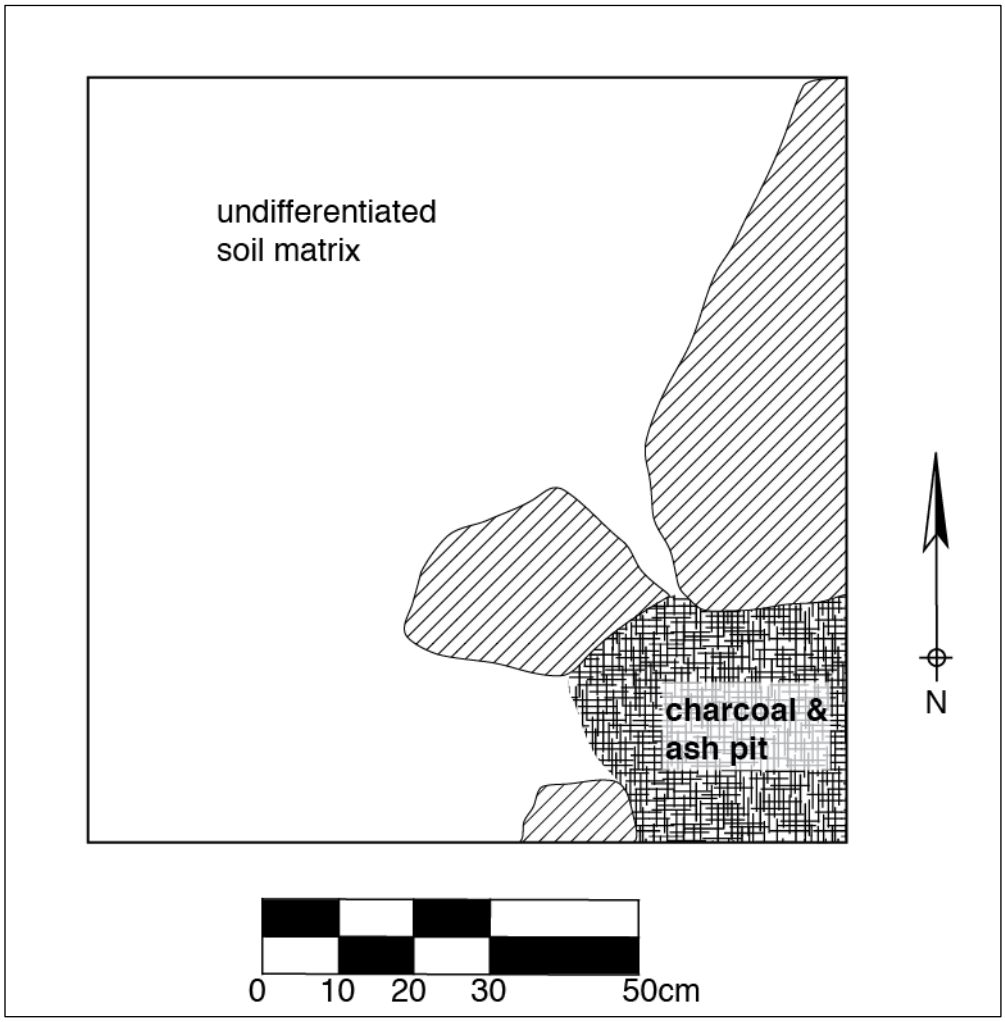


Figure B30. Actun Naj Che Unit 3 plan view of top of Level 5

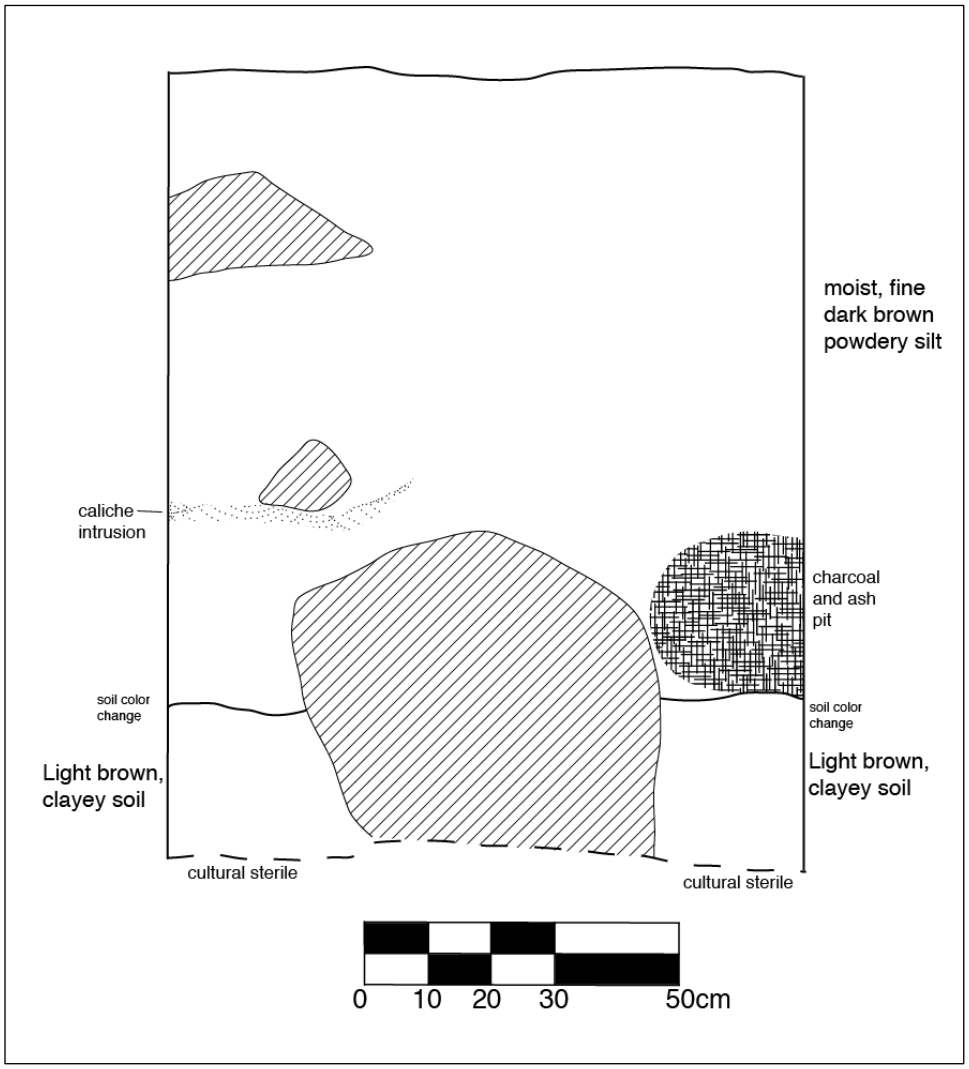


Figure B31. Actun Naj Che Unit 3 east wall profile.

APPENDIX C

REULTS OF THE TYPE:VARIETY:MODE ANALYSIS

A formal study of Pacbitun pottery has yet to be undertaken, and, as a result, a PRAP standard of analysis remains yet undeveloped. In light of this, I devised a system derived from my previous research in the Cancuen region, Guatemala charting variables including, ware, complex, group, type and variety determinations, quantity, weight, vessel form, vessel shape, vessel dimensions, vessel part, lip form, slip colors, and textual descriptions of modifications (Spenard 2006a). Those data collected for this study are presented in layout similar to that of the Barton Ramie ceramics, organized first chronologically, then ceramic group, type, and lastly, variety, the latter two of which are arranged alphabetically (Gifford 1976). Each entry in the following presentation includes up to 14 fields. Below is an overview establishing the format and order the data are presented and definitions of the contents and layout of each field. The information resulting from this descriptive analysis is intended to be useful for ceramicists and allows for comparisons with assemblages from other sites.

Group: Names the ceramic group that the types immediately following it belong to. They are arranged alphabetically by time period with the name used as a one-time introductory header prior to describing its first type. Each group begins on a separate page from the previous, although types are presented sequentially on the same page as space allows.

Ware: Names the established ceramic ware that the group belongs to. Wares are clusters of types and groups that were produced with similar methods and technologies, such as temper and surface treatment (Gifford 1976:14). They are broad categories spanning several temporal ranges and geographic regions, and indicate specific manufacturing processes (Sabloff 1972:27).

Discussion: A "catch-all" discussing group-level patterns, as well as tracing broader implications of the presence of the material such as regional connections between and beyond the Pacbitun area, and issues with chronology when appropriate.

Type:variety (mode) *(citations)*: Identifies the established pottery type, its varieties, and any additional unique or unusual modal attributes. Collectively, they are arranged alphabetically within the group, and follow directly one after the other on the same page. Only established types are presented, and varieties are used sparingly for reasons discussed above. The reader should consider types that lack the "***:variety***" suffix as ":unspecified" varieties. I use a parenthetical addition at the rear of a variety name to indicate the presence of a unique or unusual mode that sets off a cluster of sherds from the defined type. The following citation information indicates where the type was first described and significant updates to its definition to provide more comprehensive descriptions of the types than offered here.

Vessel form: Records the vessel forms identified for the type. I derived these categories from Sabloff (1972:23-27), supplemented by Rice (2005:219). See Figure XX (Sabloff:Primary Classes p 23) for ideal form categories.

Lip forms: Records the lip forms identified for each vessel type listed in the previous entry. A vessel form that is absent from this entry but appeaing in the previous indicates no rim pieces of it were recovered. See Figure XX (Sabloff:Subdivisions p24) for ideal lip forms categories.

Rim diameters: Reports the minimum, maximum, and average rim diameters for the different vessel forms, as well as the number of specimens used to calculate the average. I present the information using the following formula, "*Vessel form min* # cm, *max* # cm, *average* # cm (# measurements)." Measurements record the diameter in cm of the exterior lip of the vessel.

Thickness: Records the minimum, maximum, and average thickness for the entire type, in cm, using the same formula described above for rim diameters. I collected these measurements for all specimens except jars from the thinnest intact part of the specimen. I measured jar thicknesses at the collars if present; otherwise, I recorded them from as close to the basal break as possible.

Height: All vessel heights are reported in cm, although few were collected.

Quantity: Reports the total number and weight in grams of specimens recovered from all of the karst features investigated using the following formula, "#e (# g), #s (# g), #t (# g)." The "e" indicates sherds collected during excavations, "s" indicates surface collection, "t" is the total number of specimens collected, and "(# g)" indicates the weight

in grams for each class rounded to the nearest whole number. I distinguish between these acquisition strategies because the surface collections were intended for developing preliminary site chronologies, and as such, focused on highly diagnostic pieces rather than comprehensive sampling. Including those specimens into the totals outright would artificially inflate the presence of some types while deflating others. Weights for individual objects heavier than 400 g were measured to the closest 100 g.

Intrasite distribution and frequency: This field indicates the number of sherds of the type recovered from each karst feature. It follows the same labeling convention as the "quantity" field above except that it only reports total counts and weights from each location. A reference to "noted" in lieu of a number indicates that the type was noted during reconnaissance of the accompanying karst feature, but no specimens were analyzed from that location.

Representative general distribution: Offers a general overview of the presence of the material beyond the Pacbitun region to provide a general aerial context rather than an exhaustive list of all sites where it has been found.

Description: Presents a general description of the range of variables cataloged for the type based on all of the material recovered. I also make note of post-firing modifications when applicable such as smudging and use ware.

Figure(s): Provides rim profiles, line drawings, and some photographs of ceramic groups and types figuring prominently in the dissertation. When space permits, it begins on the

same page below the final type entry for that group. If not, it follows on a separate page before starting the next group.

Late Preclassic period (300 B.C.- 100 B.C.)

Group	Complex	Ware	TVM
Flor	Barton Creek	Paso Caballo Waxy	Flor Cream
Sierra	Barton Creek	Paso Caballo Waxy	Sierra Red

Group: Flor
Ware: Paso Caballo Waxy

Flor Cream (Smith and Gifford 1966:158, see also Gifford 1976:93)
Vessel forms: Bowl, dish
Lip forms: Bowl, rounded thickened; Dish rounded-thickened
Rim diameters: Bowl 23 cm, 24 cm (2 measurements); Dish 18.5 cm (1 measurement)
Thickness: 0.4 cm, 0.45 cm, 0.45 cm (3 measurements)
Quantity: 2e (34 g), 1s (56 g), 3t (90 g)
Intrasite distribution and frequencies: Actun Lak (3t, 90 g)
Representative general distribution: Altar de Sacrificios (Adams 1971); Barton Ramie (Gifford 1976); Becan (Ball 1977); Cancuen region (Spenard 2006a, Woodfill 2007, 2010); Caracol (Chase and Chase 2005); Las Cuevas (Moyes et al. 2012); Seibal (Sabloff 1972); Tikal (Culbert 1993); Uaxactun (Smith 1955; Smith and Gifford 1966:158).

Description: These specimens are identified based on vessel form rather than slip color, which included cream, yellow-orange, and orange. Crazing occurs on all three samples, and one of the specimens has smudging. The shape of the smudged sherd is nearly identical to a vessel found at Uaxactun (Smith 1955:Figure 70a35). Bowls have out-flaring walls, and those of the dishes are vertical.

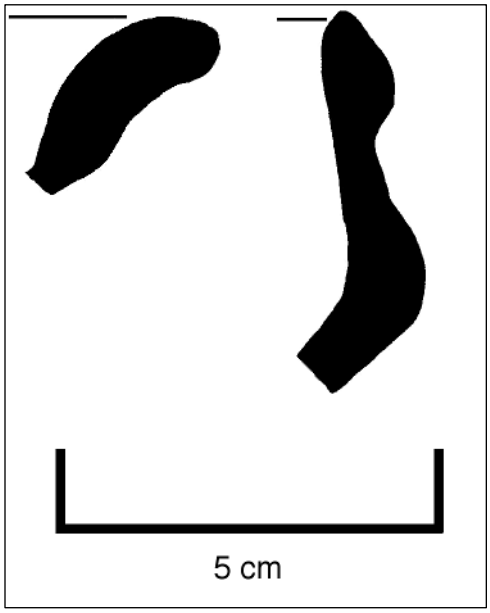


Figure C1. Flor Cream rim profiles.

Group: Sierra
Ware: Paso Caballo Waxy

Sierra Red (Smith and Gifford 1966:163, see also Gifford 1976:85)
Vessel forms: Bowl, dish, jar
Lip forms: Bowl, pointed, rounded; Dish, rounded-lipped
Rim diameters: Bowl, 22 cm, 33 cm, 27 cm (4 measurements)
Thickness: 0.5 cm, 1 cm, 0.75 cm (7 measurements)
Quantity: 8e (169 g), 3s (259 g), 11t (428 g)
Intrasite distribution and frequencies: Actun Lak (11t, 428 g)
Representative general distribution: Altar de Sacrificios (Adams 1971); Barton Ramie (Gifford 1976); Becan (Ball 1977); the Cancuen region (Spenard 2006a; Woodfill 2007, 2010); Seibal (Sabloff 1975); Tikal (Culbert 1993), Uaxactun (Smith 1955; Smith and Gifford 1966).

Description: This is a highly polished, glossy red-slipped ware made in bowl, dish, and jar forms. Bowls and dishes both have out-flaring walls, and the slip on all forms is variably applied. One of the bowl fragments is incised on the interior and has a folded over rim. One of the jar fragments was coated in powdery calcium carbonate, indicating it had been on the cave surface near splashing water for some time.

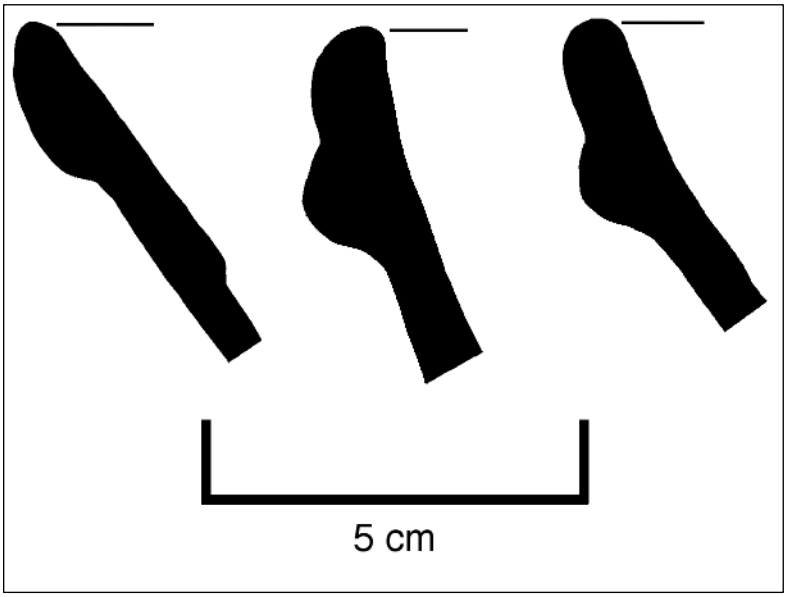


Figure C2. Sierra Red rim profiles.

Protoclassic period (100 B.C.- A.D. 300)

Group	Complex	Ware	TVM
Aguacate(?)	Floral Park	Holmul Orange	Aguacate Orange(?)
Chan Pond	Floral Park	Tumbac Unslipped	Chan Pond Unslipped Negroman Punctated-Incised
Hewlett Bank	Floral Park (Hermitage/Tzakol 1)	Unspecified	Hewlett Bank Unslipped: unspecified Hewlett Bank Unslipped: unspecified (orange) Hewlett Bank Unslipped: unspecified (red)
San Felipe	Mount Hope	Paso Caballo Waxy	San Felipe Brown

Group: Aguacate
Ware: Holmul Orange

Aguacate Orange (?) (Gifford 1976:129; see also Brady 1985; Brady et al. 1998)
Vessel forms: Bowl, Dish
Lip forms: Dish, rounded
Rim diameters: Bowl 12 cm (1 measurement)
Thickness: 0.4 cm, 0.6 cm (2 measurements)
Quantity: 3e (15.6 g), 1s (55.4 g), 4t (71 g)
Intrasite distribution and frequencies: Actun Lak (4t, 71 g)
Representative general distribution: Barton Ramie (Gifford 1976:129; see also Brady 1985, and Brady et al. 1998)

Description: Orange-red slipped bowls and dishes with out-flaring walls. In one case, vessel has a black slipped exterior and orange interior. In another instance, the vessel has red slipped interior and orange interior. The latter vessel has coarse paste with hematite, quartz, and possibly clay nodule tempering.

Discussion: The "?" next to the type name indicates an uncertain classification because the combined attributes of these pieces best fit with the defined type compared to others, but uncomfortably so. As such, they may represent local varieties or a previously undefined type.

Group: Chan Pond
Ware: Tumbac Unslipped

Chan Pond (Gifford 1976:149)
Vessel forms: Jar
Lip forms: Jar, interior beveled
Rim diameters: 19 cm (1 measurement)
Thickness: 0.8 cm (2 measurements)
Quantity: 2s,t (221 g)
Intrasite distribution and frequencies: Actun Lak (2t, 221 g)
Representative general distribution: Actuncan (LeCount and Blitz 2005), Barton Ramie (Gifford 1976:149); Buenavista del Cayo (Ball and Taschek 2004), Minanha (Longstaffe and Iannone 2011)

Description: Friable jars with coarse calcite, quartz, and mica paste. Exterior surfaces have rectilinear chains of punctations at the collar. One of the specimens has an irregular, pyramidal-shaped appliqué fillet in the midst of the punctations, and a chipped rim suggesting that it was symbolically "killed." The other has a small appliqué "pinched" handle and shows evidence of having been burned.

Negroman Punctated-incised (Gifford 1976:151)
Vessel forms: Bowl and jar
Lip forms: Bowl, pointed, flat
Rim diameters: Bowls, 22 cm, 31 cm (2 measurements)
Thickness: 0.7 cm, 0.8 cm (2 measurements)
Quantity: 4e (27 g), 2s (491 g), 6t (518 g)
Intrasite distribution and frequencies: Actun Lak (3t, 509 g) Actun Subuul (3t, 17 g)
Representative general distribution: Barton Ramie (Gifford 1976:151), Chechem Ha cave (Moyes 2006a). Mason (1928:Figures 11, 18) provides photographs of pots from the Rio Frio Caves that appear to be this type.

Description: Friable jars and basin-like bowls with coarse calcite, quartz, and mica paste. Exterior surfaces have diagnostic curvilinear incisions, chains of punctations, and sometimes both at the collar. Two of the samples from Actun Lak are fire clouded, one of which has had its rim nearly completely chipped off.

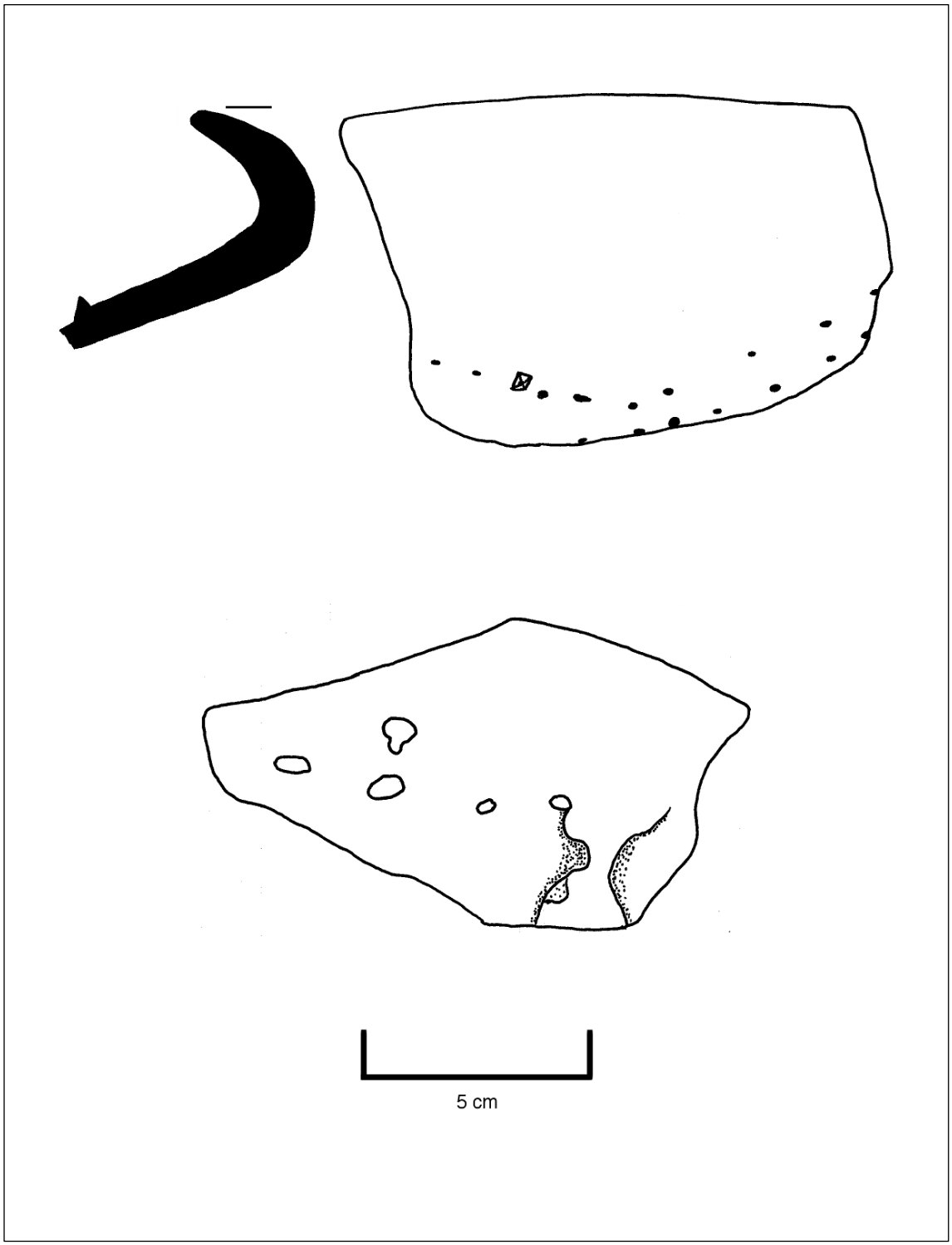


Figure C3. Chan Pond.

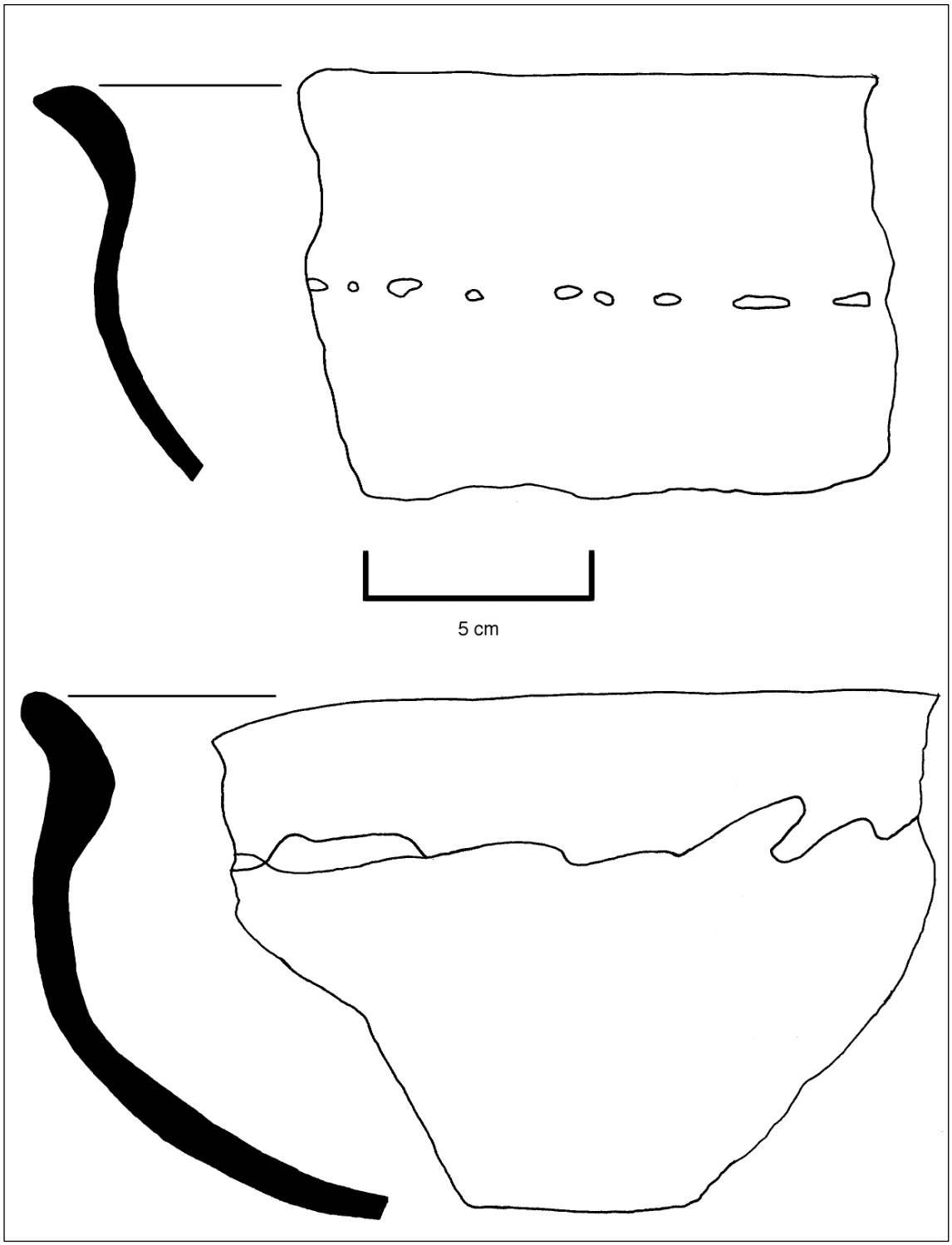


Figure C4. Chan Pond (top) and Negroman Punctated-incised (bottom) rim profiles.

Group: Hewlett Bank
Ware: Unspecified

Hewlett Bank Unslipped:unspecified (Gifford 1976:190)
Vessel forms: Shallow bowl
Lip forms: Bowl, exterior beveled, flat; flat-lipped, interior beveled, interior beveled-lipped, out flared-interior beveled, pointed, pointed-lipped, rounded, rounded-lipped, rounded-lipped-thickened, variable
Rim diameters: 11 cm, 35 cm, 20 cm (309 measurements)
Thickness: 0.4 cm, 1.1 cm**,** 0.75 (335 measurements)
Height: 5.0 cm, 6.5 cm (2 measurements)
Quantity: 582e,t (8368 g)
Intrasite distributions and frequency: Actun Lak (577t, 8311 g); Actun Xtuyul (5t, 58 g)
Representative general distribution: Actun Chapat Cave (Ishihara 2001b:261), Barton Creek Cave (Mirro and Mirro 2001), Barton Ramie (Gifford 1976), Baking Pot and Cahal Pech (Awe and Helmke 2005), Buena Vista del Cayo and Las Ruinas de Arenal (Brady et al. 1998). Mason (1928:Figure 5) published a photograph of vessels from the Rio Frio caves that appear to be the same type.

Description: Crude, shallow bowls with out-flaring walls and soft paste that display varying levels of production effort, at times verging on expedient pinch pots. Overall, there is little in the way of obvious production standardization with these crude vessels, which is their most diagnostic trait. Exteriors tend to be poorly smoothed, creating dimpled, uneven surfaces. Vessel interiors are often better prepared than the exteriors but remain generally unrefined. Nevertheless, smoothing efforts differ widely between vessels and some reach a near polish on some portions. Incising and striations are also present but extremely rare. Rim form varies greatly, even on the same vessel, further indicating a low labor investment and little concern for the appearance of the final product. In one case, a finger print depression remains on the rim. Bases vary from convex to concave, although most are flat. All but 31 of the specimens were fire clouded

or smudged, and several chipped rims were noted indicating that those vessels were symbolically "killed." Use ware is uncommon but does appear.

Although most specimens of this type that I recovered were smashed, one partial vessel was excavated in Unit 4, and a cache of two complete bowls were unearthed in a pit feature that spanned Units 8 and 9 in Actun Lak. The condition of the two cached pots demonstrates the range of variability found within this type (Figure side-by side comparison). The larger bowl is crude, poorly shaped, and resembles a pinch pot. Finger drag marks and impressions abound on the interior and exterior, and no effort appears to have been made to smooth any of its surfaces. Furthermore, obtaining a rim diameter was impossible because it is oval shape and undulating walls. On the other hand, the smaller vessel is highly refined for this type. Both its interior and exterior surfaces have been well smoothed, almost to a polish, and it has a well-shaped rounded-flat rim. No artifacts were found inside of the vessels, although small land shells and a small amount charcoal and resign that Parker (2014) identified as pine were recovered from the two bowls.

Hewlett Bank Unslipped:unspecified (orange)
Vessel forms: Shallow bowl
Lip forms: Bowl, exterior beveled, pointed, rounded, rounded-lipped, variable
Rim diameters: 16 cm, 22 cm, 19 cm (31 measurements)
Thickness: 0.5 cm, 0.9 cm, 0.65 cm (37 measurements)
Quantity: 56e,t (733 g)
Intrasite distributions and frequency: Actun Lak (55t, 727 g); Actun Xtuyul (1t, 6 g)
Representative general distribution: See Hewlett Bank Unslipped: unspecified above.

Description: This group of sherds is identical to Hewlett Bank Unslipped: unspecified described above except for the addition of an orange wash applied on vessel interiors. See that entry above for the complete type description. Two mendable specimens share a thick black painted line on their interior, above which is a single dot.

Hewlett Bank Unslipped:unspecified (red)
Vessel forms: shallow ellipsoid bowl
Lip forms: exterior beveled, rounded, rounded-lipped
Rim diameters: 15 cm, 24 cm, 19 cm (86 measurements)
Thickness: 0.4 cm, 0.9 cm, 0.7 cm (92 measurements)
Quantity: 377e,t (3546 g)
Intrasite distributions and frequency: Actun Lak (377t, 3546 g)

Description: See Hewlett Bank Unslipped: unspecified entry above for complete description. These samples are the same as those except for the application of a red wash on interior surfaces. Fire clouding is prevalent on all specimens, and rim chipping is common indicating that the vessels were ritually "killed." The chipping ranges from a single flake to the entire rim. Use ware was present on the interior of sherds, but was minimal, and some polished exteriors were noted.

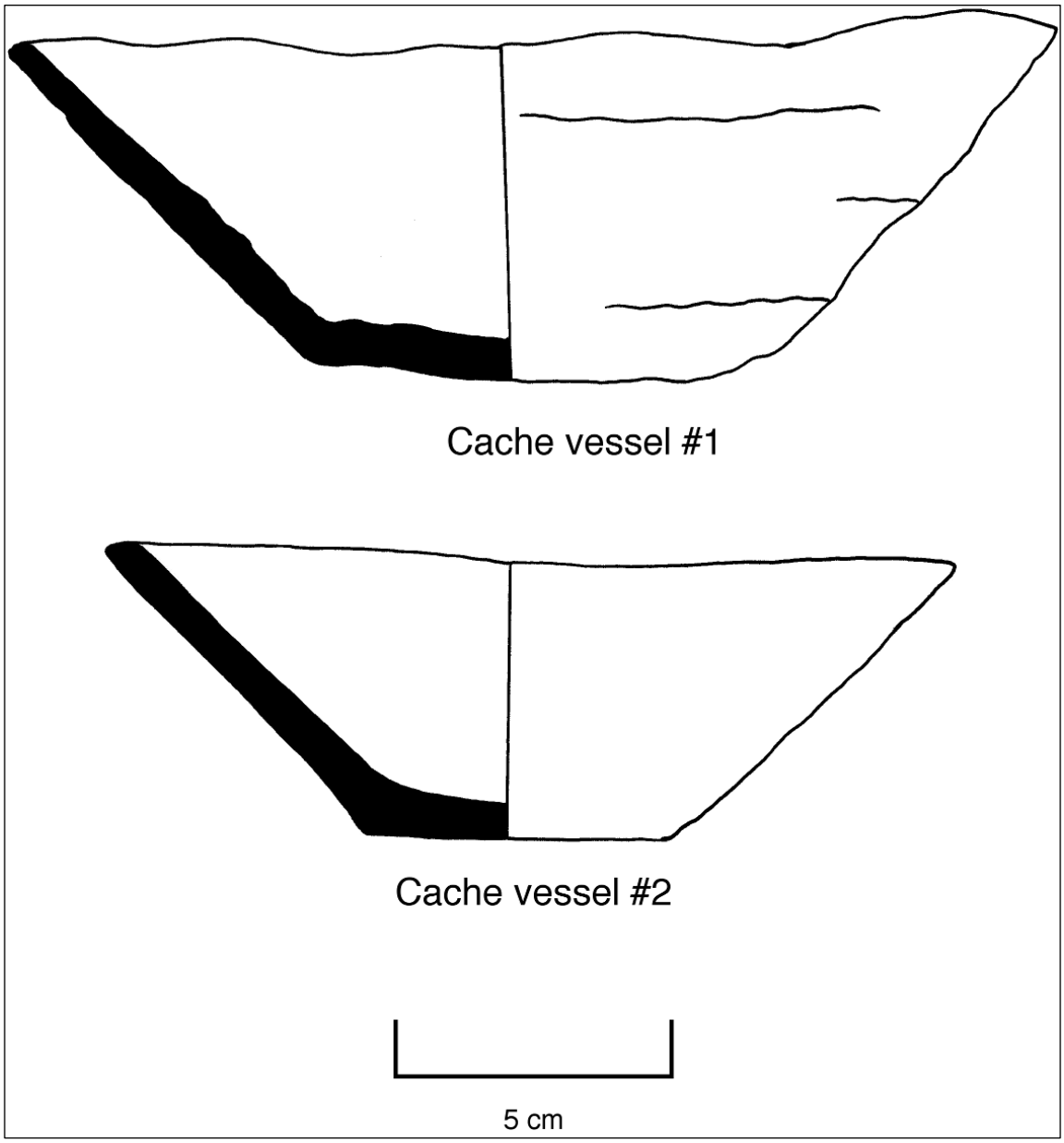


Figure C5. Hewlett Bank Unslipped whole vessels.

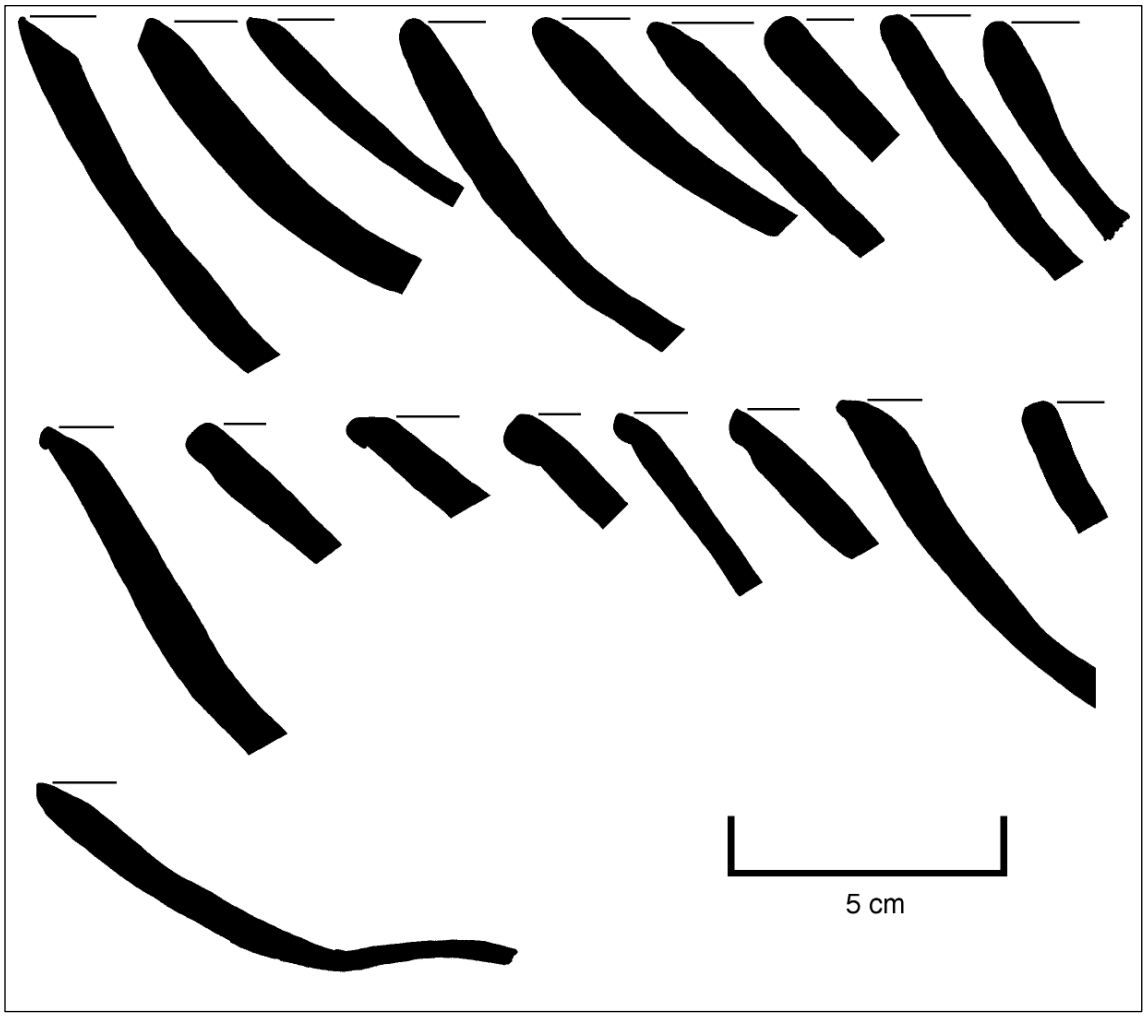


Figure C6. Hewlett Bank Unslipped rim profiles.

Group: San Felipe
Ware: Paso Caballo Waxy

San Felipe Brown (Gifford 1976:113)
Vessel forms: Bowl
Lip forms: rounded
Rim diameters: 23 cm (1 measurement)
Thickness: 0.9 cm (1 measurement)
Quantity: 6t (296 g, all mend to one partial vessel)
Intrasite distribution and frequencies: Actun Lak (6t, 296 g)

Description: Slip color varies greatly on the specimen and includes yellow, orange, brown, dark maroon, and black. This change in color is due in part to extensive fire clouding. The exterior is polished but poorly smoothed creating a dimpled, uneven surface.

Early Classic period (A.D. 250 - 600)

Group	Complex	Ware	TVM
Actuncan-Dos Arroyos	Hermitage	Peten Gloss (PG)	Dos Arroyos Orange polychrome
			Indeterminate
Aguila	Hermitage	PG	Aguila Orange
Balanza	Hermitage	PG	Balanza Black Lucha Incised Indeterminate
Dos Hermanos	Hermitage/Tzakol 1	PG	Dos Hermanos Red
Fowler	Hermitage/Tzakol 1	Unspecified	Indeterminate
Minanha	Hermitage	PG	Minanha Red
Pucte	Hermitage	PG	Pucte Brown Chorro Fluted:Chorro Santa Teresa Incised: Santa Teresa

Group Actuncan-Dos Arroyos
Ware: Peten Gloss

Discussion:

Most Peten Gloss wares had a wide distribution throughout the entire Maya Lowlands during the Late Protoclassic through Early Classic periods, many of which I discuss below (e.g. Smith and Gifford 1965:Figure 4). In order to simplify the following group and type descriptions, I elaborate on their collective distribution patterns here and refer back to this discussion when appropriate. The types of this ware category have been found throughout Belize (e.g. Gifford 1976; Thompson 1939), and sites in the greater Peten region in Guatemala including Altar de Sacrificios (Adams 1971), the Cancuen area, (Spenard 2006a; Woodfill 2007, 2010); Seibal (Sabloff 1972); Tikal (Culbert 1993), and Uaxactun (Smith 1955; Smith and Gifford 1966). They have also been reported in Northern Maya lowlands at sits such as Becan (Ball 1977), and Uxmal, Kabah, Chichen Itza, and Mayapan (Smith 1971), as well as the Puuc, Rio Bec, and Palenque regions in Mexico (Smith and Gifford 1965:Figure 4). Several types have also been recovered in Copan, Honduras (Smith and Gifford 1965:Figure 4).

Peten Gloss wares originated in the Protoclassic period, although they became prominent during the Early Classic. The Protoclassic forms are basal flanged bowls with vertical walls, while those from the Early Classic period are basal flanged dishes with flaring walls, giving them a more open appearance (Joe Ball personal communication 2013). I recovered both vertical walled and flared specimens during my investigations in the Pacbitun karstscape, indicating it was being produced in the Protoclassic.

Dos Arroyos Orange-polychrome (Smith and Gifford 1966)
Vessel forms: Basal-flanged dish
Lip forms: rounded, interior beveled, flat
Rim diameters: 27 cm, 38 cm, 31 cm (9 measurements)
Thickness: 0.6 cm, 0.9 cm, 0.75 cm (13 measurements)
Quantity: 24e (332 g), 10s (345 g), 34t (677 g)
Intrasite distribution and frequencies: Actun Lak (28t, 522 g); Actun Naj Che (1t, 2 g); Actun Nohoch Tunich (5t, 154 g). Noted at Actun Bosh Tunich, Crystal Palace, and Slate Cave.

Description: Red and black on orange polychrome out-flaring and vertical walled, basal flanged dishes with ring bases. The designs tend towards simple solid black and red lines, but geometric shapes and dots also appear. A stepped "z-shaped" motif that alternates between black, orange, and red commonly occurs on the interior of vessels near the basal break. This pattern is identical to one that Gifford (1976:Figure 96 g) illustrates from Barton Ramie, and Smith (1955b: Figure 13 c; 76 a 22) from Uaxactun. The interior of one of the specimens has been obliterated by use ware. Smudging and fire clouding appears on several of the sherds, and one that was burned has an extensively chipped rim indicating that it had been symbolically "killed."

Actuncan-Dos Arroyos group indeterminate
Vessel forms: Bowl, dish, lid
Lip forms: Bowl, rounded; Dish, rounded, rounded-flat; Lid, rounded
Rim diameters: bowl 30 cm; dish 25 cm; lid 22 cm; indeterminate 29 cm (1 measurement for each form)
Thickness: 0.5 cm, 0.9 cm, 0.65 cm (7 measurements)
Quantity: 16e,t (264 g)
Intrasite distributions and frequency: Actun Lak (15t, 261 g); Actun Nohoch Tunich (1t, 3 g)

Description: These are polychrome sherds that are too fragmented to securely identify below the group level, although several types are likely present. Fire clouding and smudging are common on both the interior and exterior of the sample, and chipping was noted on a rim and a flange from separate specimens indicating that they were ritually "killed."

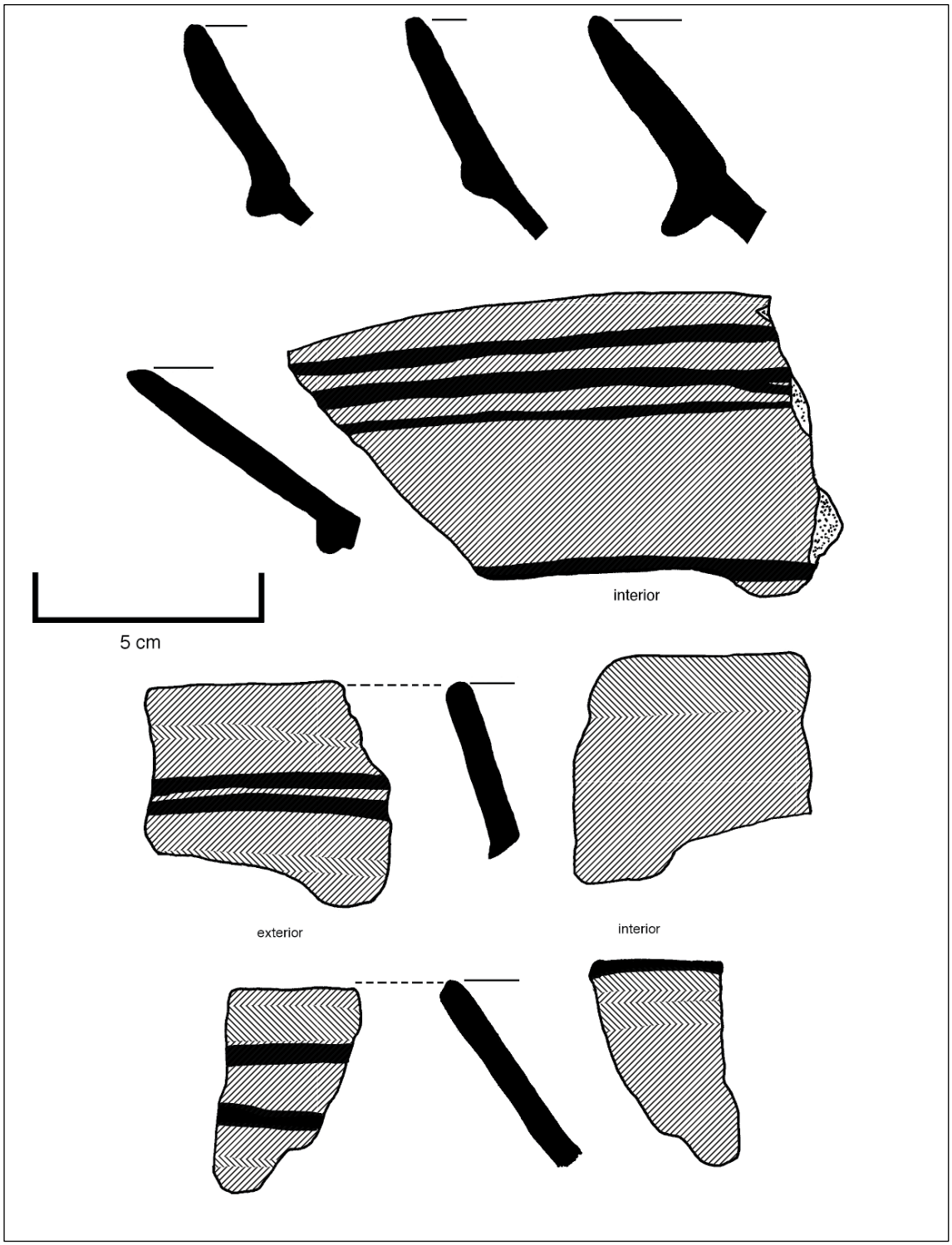


Figure C7. Dos Arroyos Orange-polychrome and Actuncan-Dos Arroyos group rim profiles.

Group: Aguila
Ware: Peten Gloss

Discussion: See above for discussion of Early Classic period Peten Gloss forms for the Actuncan-Dos Arroyos Orange group. Both early and late forms are present in the Pacbitun karstscape collection indicating use during the Protoclassic and Early Classic periods.

Aguila Orange (Smith and Gifford 1966:154, see also Gifford 1976:182)
Vessel forms: Bowl, dish, jar, miniature plate, plate
Lip forms: Bowl, pointed, variable; Dish, flat, interior beveled, rounded, pointed; Miniature plate, flat; plate flat, rounded
Rim diameters: Bowl 11 cm (2 measurements); Dish 24 cm, 28 cm, 25.5 cm (6 measurements); Miniature plate 15 cm (1 measurement); Plate 31 cm, 37 cm, 33.5 cm (4 measurements);
Thickness: 0.5 cm, 0.9 cm, 0.65 cm (13 measurements); Miniature plate 0.45 cm
Quantity: 39e (1158 g), 6s (659 g), 45t (1817 g)
Intrasite distributions and frequency: Actun Lak (33t, 1355 g); Actun Naj Che (1t, 3 g); Actun Nohoch Tunich (9t, 168 g); Actun Subuul (1t, 7.5 g); Actun Hayach Naj (1t 284 g, miniature plate)
Representative general distribution: See Dos Arroyos Orange polychrome distribution above.

Description: This type is found in several forms in the Pacbitun karstscape, particularly Actun Lak where specimens of it were recovered from throughout that cave. The most common forms are basal flanged bowls and dishes with out-flaring and vertical walls. Slip is primarily orange, although some specimens have yellow or cream colored exteriors. Muriel Kirkpatrick (cited in Gifford 1976:182) observes that this ceramic group is closely related to Actuncan-Dos Arroyos in form and orange slip color. Her observation is equally applicable to the Pacbitun karstscape ceramic assemblage. Several rims are chipped indicating that those vessels, or the pieces themselves, had been symbolically "killed." One of the vessels contains a possible mend hole just above its basal flange. Fire clouding and smudging are prevalent on the samples, and an unusual pattern was observed on two sherds that refit. The pieces were recovered them from the same excavation unit in Actun Lak near the altar in Chamber 2. One of the sherds was heavily burned, and the other was not causing the slips to be markedly different colors. This observation is significant for ceramic analysis because it suggests that the practice of calculating vessel totals by differences in slip color on similar rim forms can artificially inflate counts.

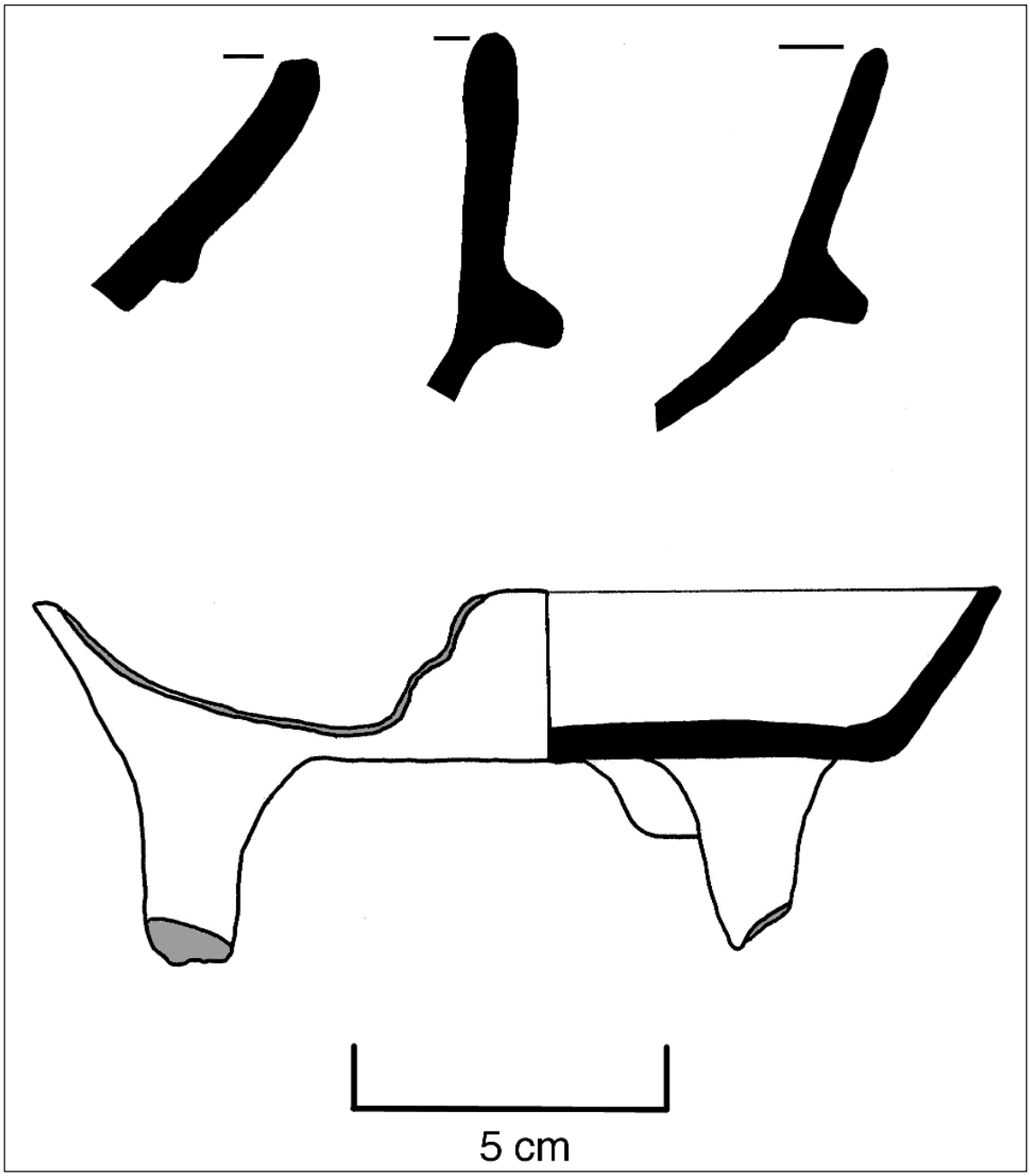


Figure C8. Aguila Orange rim profiles.



Figure C9. Aguila Orange miniature tripod.

Group: Balanza
Ware: Peten Gloss

Discussion: See Actuncan-Dos Arroyos group discussion above for vessel wall orientation as chronologically distinct modes for Peten Gloss wares. Balanza group is closely related to Pucte, which is described below. They share forms, pastes, and decorative techniques that distinguish the different types, suggesting that they may all belong to the same group, even though they have been defined separately elsewhere. When dealing with material from these two groups, I encountered several black and brown mottled specimens that could have been easily classified to either the Balanza or Pucte groups. In those cases, I differentiated between the two based on which slip color is present in a higher percentage.

Balanza Black (Smith and Gifford 1966:154 see also Gifford 1976:161)
Vessel forms: Bowl, dish, plate
Lip forms: Bowl, flat lipped-thickened, rounded; Dish, rounded, interior beveled; Plate, rounded
Rim diameters: Bowl: 20 cm, 33 cm, 26 cm (4 measurements); Dish 25 cm (1 measurement); Plate 24 cm (1 mesurement)
Thickness: 0.55 cm, 0.8 cm, 0.65 cm (7 measurements)
Quantity: 20e (173 g), 21s (543 g), 41t (716 g)
Intrasite distributions and frequency: Actun Lak (38t, 711 g), Actun Naj Che (1t, 2.2 g), Actun Nohoch Tunich (1t, 0.3 g), Actun Xtuyul (1t, 3 g), noted at Actun Merech
Representative general distribution: See Dos Arroyos Orange polychrome distribution above.

Description: Deep black, glossy slipped vessels primarily with out-flaring and vertical walls, basal flanges, and ring bases, but fragments of two simple bowls were also recovered. Although not well represented in the assemblage, this type was noted in several karst features suggesting that it was a common ritual type in the Pacbitun region. Two specimens from Actun Lak stood out as particularly noteworthy because the area beneath the flanges on both pieces were in-filled with brown clay and refired sometime after the original vessels had been constructed. The process gave the sherds a thicker looking, but more shallow flange (Figure X). One was collected from Ledge 3 and the other from the stalagmite pavement below in Chamber 1. The former has steep, nearly vertical walls and a chipped rim, suggesting that it is a Protoclassic period form and had been ritually "killed." The walls of the other are out-flaring, indicating that it dates to the Early Classic period, and that the two specimens were from different vessels. No other instances of this type of modification were noted for any type.

Lucha Incised (Smith and Gifford 1966:159; see also Gifford 1976:164)
Vessel forms: Bowl, dish, cylinder vase, tecomate
Lip forms: Bowl, interior beveled, rounded; Dish, interior beveled, rounded; Tecomate, tooled
Rim diameters: Bowl, 24 cm (1 measurement); Dish, 23 cm, 27 cm (2 measurements); Tecomate, 9.5 cm (1 measurement)
Thickness: 0.45 cm, 0.65 cm, 0.6 cm (8 measurements)
Quantity: 15e (121 g), 3s (39 g), 18t (160 g)
Intrasite distributions and frequency: Actun Lak (10t 87 g); Actun Nohoch Tunich (8, 74 g)
Representative general distribution: See Dos Arroyos Orange polychrome distribution above.

Description: Incised designs on glossy black, black and brown mottled, or dark creamy orange slipped vessels. The latter slip is rare although a similar pattern appears in the Barton Ramie ceramic assemblage (Gifford 1976:162). Incisions range from simple lines on vessel interiors and exteriors to complex glyph-like patterns on the outer surfaces. On the simple designs, lines are typically horizontal but vertical incisions are present on some specimens. The glyph-like designs appear on cylinder vases and dishes. Bowls and dishes have out-flaring walls, and those of the tecomate are sharply incurving.

Balanza group indeterminate
Vessel forms: Dish, vase
Lip forms: Vase, rounded
Rim diameters: Vase, 17 cm (1 measurement)
Quantity: 11e (34 g), 1s (2 g), 12t (36 g)
Intrasite distributions and frequency: Actun Lak (4t, 13 g); Actun Naj Che (5t, 10 g); Actun Nohoch Tunich (3t, 13 g)

Description: These specimens are too fragmentary or insufficiently diagnostic to determine the types to which they belong, but the presence of glossy black slip indicates membership in the Balanza group. Most specimens are vessel parts including a ring base, basal flange, and vessel supports. The specimens from Actun Naj Che are distinct from this others in this group because they are all the bottoms of vessel feet. Further complicating their presence is that they mark the only appearance of the Balanza group in that rockshelter save for a small rim fragment.

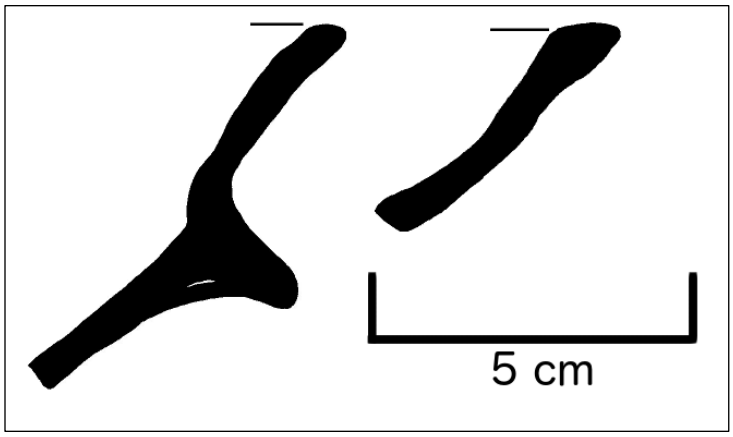


Figure C10. Balanza Black rim profiles.

Group: Dos Hermanos
Ware: Peten Gloss

Dos Hermanos Red (Smith and Gifford 1966:157; see also Gifford 1976:160)
Vessel forms: bowl, jar, miniature dish
Lip forms: Bowl, rounded; Miniature dish, rounded
Rim diameters: Bowl 15.5 cm, 22 cm, 19 cm (3 measurements); Miniature dish, 6 cm (1 measurement)
Thickness: 0.5 cm, 0.75 cm, 0.6 cm (4 measurements); Miniature dish, 0.45 cm
Quantity: 41e (134 g), 6s (267 g), 47t (402 g)
Intrasite distributions and frequency: Actun Lak (41t, 386 g); Actun Naj Che (5t, 15 g); Actun Nohoch Tunich (1t, 1 g)
Representative general distribution: This type is more poorly represented in published ceramic assemblages than the other Peten Gloss wares. Nevertheless, it still enjoyed a wide geographic distribution in the southern Maya Lowlands. In Belize it was recovered at Barton Ramie (Gifford 1976) and in the Sibun Region (Peterson 2006). In Guatemala, it was found in the Cancuen Region (Woodfill 2007, 2010) and at Uaxactun (Smith and Gifford 1966), although it is noticeably absent from the ceremonial and problematical deposits at Tikal (Culbert 1993).

Description: Red to mottled red-orange slip unevenly applied to bowls, dishes, and jars with tan to buff calcite-tempered paste. Bowls have both rounded and incurved walls, and those of dishes are gently out-flaring. A thick, meandering incised line was noted on the exterior of one of the specimens, and another had a chipped rim indicating that the piece was symbolically "killed."

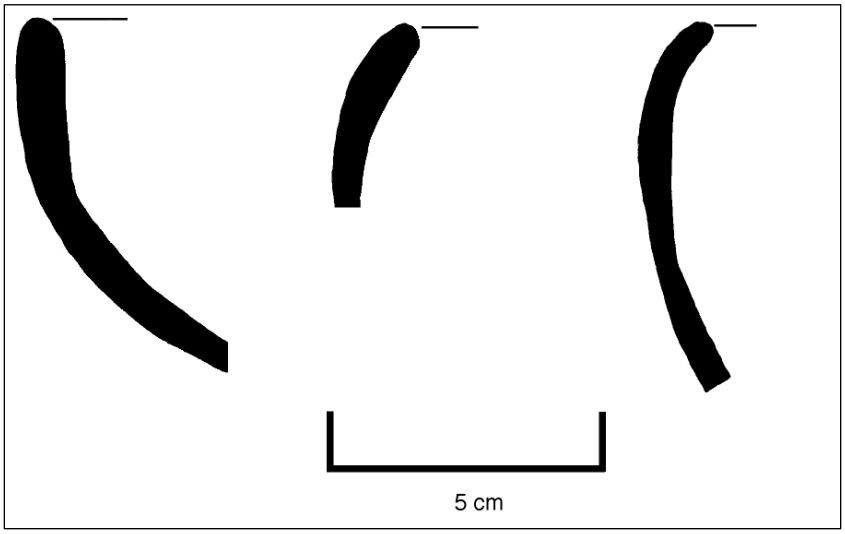


Figure C11. Dos Hermanos Red rim profile.

Group: Fowler
Ware: Unspecified

Fowler group indeterminate (Gifford 1976:160)
Vessel forms: Bowl
Lip forms: Bowl, rounded
Quantity: 1s,t (3.6 g)
Intrasite distributions and frequency: Actun Naj Che (1t, 3.6 g)
Representative general distribution: This is a local Belize Valley type as discussed below. It has been found at Barton Ramie (Gifford 1976), Baking Pot, Buena Vista del Cayo, Cahal Pech (Brady et al. 1998), the Caves Branch region (Wrobel et al. 2009), and the Sibun Valley (Peterson 2006).

Description: Only one specimen was identified of this type. It has an orange-red slip on a well-smoothed bowl with rounded walls.

Group: Minanha
Ware: Peten Gloss

Discussion: Joe Ball (cited in Brady et al. 1998:27, n6) challenges the validity of this type and suggests instead that it should be subsumed under the Fowler group. The data from the two identified samples of this type from the Pacbitun karstscape assemblage are insufficient to validate or refute Ball's (cited in Brady et al. 1998:27) challenge and must await further study of the Pacbitun ceramics.

Minanha Red (Gifford 1976:157)
Vessel forms: Dish
Lip forms: Dish, interior beveled, rounded-flat
Rim diameters: 35 cm, 46 cm (2 measurements)
Thickness: 0.55 cm, 0.65 cm (2 measurements)
Quantity: 2s,t (186 g)
Intrasite distributions and frequency: Actun Lak (2t, 186 g), noted at Actun K'oxol
Representative general distribution: Baking Pot and Cahal Pech (Awe and Helmke 2005), the Sibun region (Peterson 2006), Tipan Chen Uitz (Andres et al. 2011)

Description: Red to dark red slip on out-flaring walled dishes, one of which has a small basal ridge. The slip stops at the ridge, the area below is undecorated.

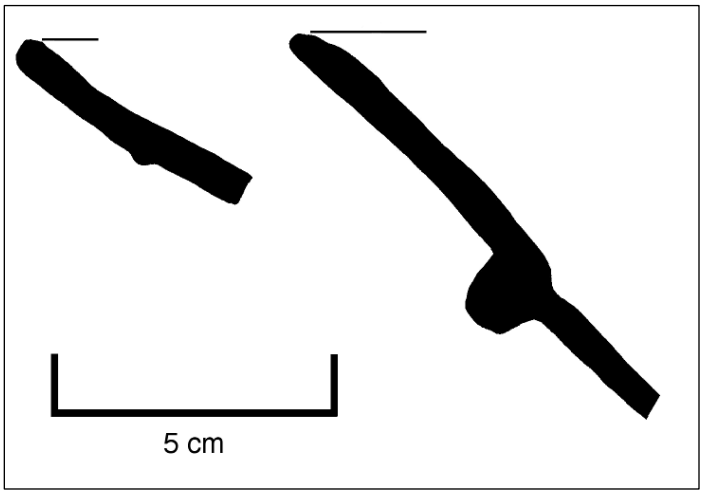


Figure C12. Minanha Red rim profiles.

Group: Pucte
Ware: Peten Gloss

Pucte Brown (Smith and Gifford 1966:161, see also Gifford 1976:190)
Vessel forms: Bowl, jar, miniature jar
Lip forms: Miniature jar, rounded
Thickness: 0.7 cm (1 measurement); miniature jar 0.4 cm
Quantity: 6e,t (36 g)
Intrasite distributions and frequency: Actun Lak (4t, 28 g); Actun Nohoch Tunich (2t, 9 g)
Representative general distribution: This is widely distributed Peten Gloss group. See discussion of Dos Arroyos Orange polychrome above for comprehensive details.

Description: Glossy brown slip on bowls with out-flaring walls and jars, one of the latter of which is a miniature vessel with ash cemented on its interior base. Slip on some of the samples is mottled brown and black. See Balanza Black description above for comprehensive discussion of this mottling and method for differentiating between the two groups. Paste is dark brown with medium texture with sand, quartz, and some calcite tempering.

Chorro Fluted:Chorro (Gifford 1976:170)
Vessel forms: cylinder vase
Quantity: 5e,t (28 g)
Intrasite distributions and frequency: Actun Naj Che (5 t 28 g)
Representative general distribution: See Dos Arroyos Orange polychrome above

Description: Pucte Brown type slip on fluted and crudely executed incised vessel. See entry for that type above for full description. One of the specimens contains a thin incised line and several flutes that run perpendicular to it. The remainder of the specimens is simply fluted. All specimens were recovered from the same excavation unit suggesting that they are all part of the same vessel, although no refits were possible.

Santa Teresa Incised:Santa Teresa (Gifford 1976:190)
Vessel forms: Bowl, cylinder vase, dish
Lip forms: Bowl, rounded; Dish, rounded-lipped
Rim diameters: Bowl, 22 cm (1 measurement); Dish, 22 cm (1 measurement)
Thickness: 0.55, 0.6, 0.6 (4 measurements)
Quantity: 7e (112 g), 1s (20 g), 8t (132 g)
Intrasite distributions and frequency: Actun Lak (6t, 109 g); Actun Nohoch Tunich (2t, 24 g)
Representative general distribution: See Dos Arroyos Orange polychrome above

Description: Identical to Pucte Brown type with the addition of incised and gouged decorations on bowls and dishes with out-flaring walls. Fire clouding is present on both the bowl and dish forms. The interior of the latter form is slipped deep red. Incisions included horizontal lines running below the rim, cross-hatching on body sherds, curvilinear designs, and punctations.

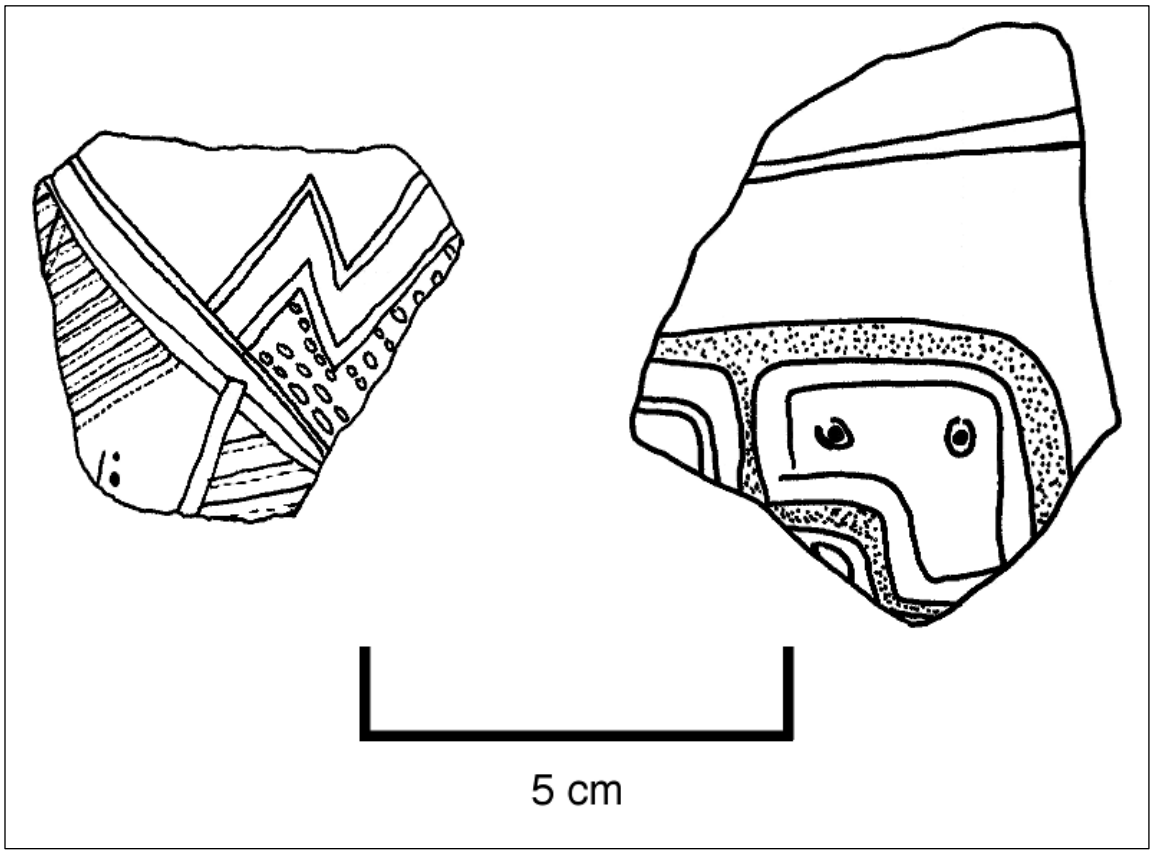


Figure C13. Line drawing of Santa Teresa Incised body sherds.

Late Classic period (A.D. 600-900)

Group	Complex	Ware	Type: variety
Achote	Spanish Lookout	PG	Achote Black Cubeta Incised
Altar	Jimba	Fine Orange	Altar Orange (?)
Belize	Spanish Lookout	British Honduras Volcanic Ash	Belize Red:unspecified Belize Red Incised Gallinero Fluted Martins Incised McRae Impressed Planton Punctated-Incised Puhui-zibal Composite Indeterminate
Cayo	Spanish Lookout	UU	Alexanders Unslipped: Beaverdam Alexanders Unslipped: Unspecified Cayo Unslipped
Chunhuitz	Spanish Lookout	Vinaceous Tawny	Chunhuitz Orange Xunantunich Black-on-Orange Benque Viejo-polychrome Indeterminate
Danta	Spanish Lookout	PG	Joyac Cream-polychrome
Dolphin Head	Spanish Lookout	Pine Ridge Carbonate (PRC)	Dolphin Head Red Silver Creek Impressed
Garbutt Creek	Spanish Lookout	PRC	Garbutt Creek Red Rubber Camp Brown Indeterminate
Macal	Tiger Run	Unspecified	Macal Orange-red
Macaw Bank	Hats' Chaak	Tumbac Unslipped	Macaw Bank Self-slipped Indeterminate

Meditation	Spanish Lookout	PG	Meditation Black
Mountain Pine	Tiger Run	PRC	Mountain Pine Red: unspecified Mountain Pine Red: Old Jim Rosario Incised Indeterminate
Mount Maloney	Spanish Lookout **(**Samal, Hats' Chaak, Tsak')	PRC	Mount Maloney Black (Samal) Mount Maloney Black (Hats' Chaak) Mount Maloney Black (Tsak') Mount Maloney Black: unspecified
Saxche-Palmar	Tepeu 1, Tepeu 2 (Tiger Run, Spanish Lookout)	PG	Paixban Buff polychrome Palmar Orange polychrome Saxche Orange polychrome Sibal Buff polychrome Tunich Red-on-orange Zacatel Cream polychrome
Sotero	Tiger Run	Unspecified	Sotero Red-brown Orange-Walk Incised
Teakettle Bank	Tiger Run	PG	Teakettle Bank Black
Tu-tu Camp	Spanish Lookout	UU	Tu-tu Camp Striated
Vaca Falls	Spanish Lookout	PRC	Vaca Falls Red
Yaha Creek	Spanish Lookout	Unspecified	Yaha Creek Cream
Yalbac	Spanish Lookout	PRC	Yalbac Smudged Brown

Group: Achote
Ware: Peten Gloss

Achote Black (Smith and Gifford 1966:154, see also Gifford 1976:248)
Vessel forms: Dish
Lip form: dish, rounded
Quantity: 5 e,t (249 g)
Intrasite distributions and frequency: Actun Lak (1t, 12 g), Actun Naj Che (4t, 237 g)
Representative general distribution: This type enjoys a wide distribution throughout the Maya Lowlands. In Belize, it has been identified, for example, at Barton Ramie (Gifford 1976), Actun Balam on the Vaca Plateau (Pendergast 1969), Chechem Ha cave (Moyes 2006a), the Sibun Valley (Harrison-Buck 2010), and throughout northwest part of the country (Lohse et al. 2005). It was defined from material recovered from Uaxactun (Smith and Gifford 1965), but it also occurs at Altar de Sacrificios (Adams 1971), and Tikal (Culbert 1993). Ball (1977) reports that it is abundant at Becan in Campeche, Mexico.

Description: Glossy black to mottled black and orange slip on out-flaring wall dishes with a poorly compacted, calcite and magnetic nodule tempered red paste. The four sherds from Actun Naj Che refit to form a partial vessel. A hollow oven foot with rattle is present on the base of that dish. The support is ventless although a slight depression on its dorsal side suggests that one may have been started but ultimately been left unfinished. The partial vessel is a rare form for this type, although it has been documented both at Tikal (Culbert 1993), and Actun Balam in Belize (Pendergast 1969). Its form is more common for Tinaja Red, but its slip color determines the current classification. Nevertheless, both types share identical chronological and geographic distributions, and therefore the information gleaned from either classification is the same.

Cubeta Incised (?) (Smith and Gifford 1966:161, see also Gifford 1976:190)
Vessel forms: Dish, jar
Lip forms: dish, interior beveled
Rim diameters: 26 cm
Thickness: 0.75 cm
Quantity: 2e,t (321 g)
Intrasite distributions and frequency: Actun Lak (1t, 33 g); Actun Naj Che (1t, 289 g)
Representative general distribution: See Achote Black description above, possibly Chechem Ha cave? (Moyes 2006:Figure 4-149)

Description: Mottled black and orange slipped vessels that are the same as Achote Black described above with the addition of incised decorations. The sherd from Actun Lak is incised, punctated and vitrified, likely as a result of the intense fire event near the altar in Chamber 2. The specimen from Actun Naj Che is composed of seven sherds that refit to form partial vessel. The incisions on that pot are oblique (approximately 25 to 30

degrees) and begin halfway down the exterior wall. They continue to just above the basal break, where another horizontal line had been carved. Additionally, the remnants of a hollow oven foot with two vents are present on the vessel base and the bowl is extensively fire clouded. A seeming identical vessel was photographed in Chechem Ha cave, although it was looted before archaeological investigations began there (Moyes 2006a: Figure 4-149). See discussion for Achote Black above regarding unusual dish forms.

Group: Altar Orange
Ware: Fine Orange

Altar Orange (Adams 1971:27; see also Brainerd 1958; Smith 1958:151-152, 1971:161)
Vessel forms: Bowl
Lip forms: Bowl, internal beveled
Rim diameters: 16 cm (1 measurement)
Thickness: 0.6 cm (1 measurement)
Quantity: 1 whole vessel (297 g)
Intrasite distributions and frequency: Actun Lak (1t, 297 g)
Representative general distribution: This type enjoys a wide although spotty distribution throughout the Maya Lowlands, which is summarized by Smith (1971:19). In general, it has been found as far as San Salvador, El Salvador in the east, Palenque and Yaxchilan, Mexico to the west, Seamay Cave, Alta Vera Paz, Guatemala in the south, and Uxmal and Mayapan, Mexico to the north.

Description: Orange to pinkish-orange slipped, shallow bowl with gently out-flaring walls, and a broad flat base. Paste well compact, appears temperless, although some mica may be present, and is the same color as the slip. Overall, the vessel is heavily burnished but unpolished.

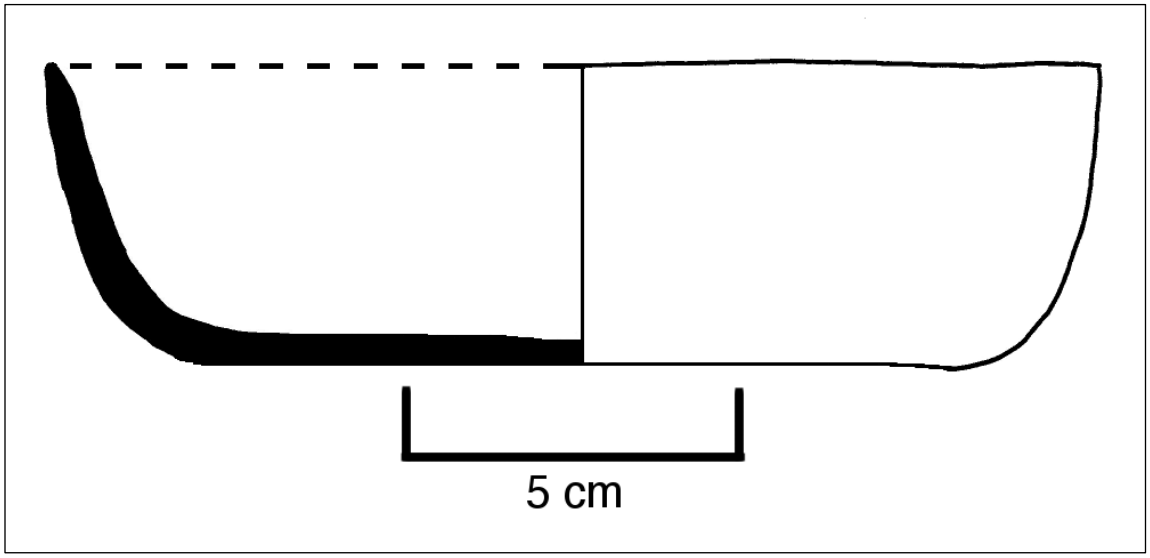


Figure C14. Altar Orange rim profile.

Group: Belize
Ware: British Honduras Volcanic Ash

Discussion: Sunahara (2003) identifies two paste recipes for this group in the Belize Valley, one that included calcite and the other in which it was absent, and both appear in this assemblage. Some of the forms are similar to those of Dolphin Head Red, and presence of calcite in the temper made distinguishing the two types difficult at times. This difficulty was particularly prevalent when working with body sherds. In such cases, the distinction was based on the durability and feel of the temper. Belize Red has an easily eroded paste that leaves behind a gritty powder when rubbed. Some heavily eroded specimens take on the appearance of loosely compact sandstone pebbles. Alternatively, the paste of Dolphin Head Red does not erode to the touch and is more durable than Belize Red.

Belize Red:unspecified (Gifford 1976:155)
Vessel forms: Bowl, dish, and plate
Lip forms: Bowl, flat, rounded, rounded-flat; Dish, interior beveled, pointed, rounded, rounded-flat
Rim diameters: Bowl, 11 cm, 41 cm, 20 cm (6 measurements, average drops to 16 cm if 41 cm measurement removed); Dish, 19.5 cm, 28 cm, 24 cm (4 measurements)
Thickness: 0.5 cm, 0.95 cm, 0.7 cm (13 measurements)
Quantity: 7e (201 g), 7s (461 g), 14t (662 g)
Intrasite distributions and frequency: Actun Lak (14t, 662 g), noted at, Actun Bosh Tunich, Actun Kix Och, and Actun K'oxol
Representative general distribution: The Belize ceramic group was a widely circulated trade ware found throughout southern Belize and adjacent areas of the south-central Peten, Guatemala in the Late to Terminal Classic period (Chase and Chase 2012:6). More specifically, the group is found at sites along the Belize, Mopan, Salsipuedes, and San Juan Rivers and their tributaries, and along a land route that circumvents the Maya Mountains to the south (Chase and Chase 2012:6). The type may also be present in at Quirigua, Guatemala, and the Ulua Valley, Honduras (Sheptak 1987).

Description: Red slip on primarily ash tempered bowls, dishes, and plates. Bowls have both rounded and incurved walls, and dish forms have out-flaring sides. Only one plate fragment was identified, which has out-flaring walls, and heavy fire clouding appears on the exterior of two bowls. One of the dishes has an orange slipped interior, but the exterior is red and is further elaborated by an appliqué band of square, squat bosses along its basal break.

Belize Red Incised (LeCount 1996:398)
Vessel forms: Dish and plate
Lip forms: Dish, interior beveled, pointed, rounded, rounded-flat; Plate, rounded
Rim diameters: Dish 20 cm, 34 cm, 25 cm (8 measurements); Plate, 23 cm
Thickness: 0.65 cm, 0.9 cm, 0.75 cm (10 measurements)
Quantity: 5e (137 g), 10s (747 g), 15t (884 g)
Intrasite distributions and frequency: Actun Lak (13t, 886 g), Actun Naj Che (2t, 18 g)

Description: Identical to Belize Red discussed above but with the addition of incised designs on exterior surfaces. Dishes with out-flaring walls are the most common form, although one was out-curving, and one plate with out-flaring walls was recorded. Incisions include simple horizontal or vertical lines that run just below the rim, above basal breaks, or along the body, and may also form geometric patterns such as crescents, tau forms, and zigzag lines. Some lines are thick and appear to have been gouged. Approximately one-quarter of the vessels are fire clouded, and one has cave growth on it.

Discussion: This type was originally classified as Planton Punctated-incised, which is described below. The primary difference it is only incised, while the latter is similarly modified but also has punctations, as its name suggests. LeCount (1996:398-401) defined the Belize Red Incised at Xunantunich in order to maintain the integrity of the original type description that notes both incised and punctated decorations. I follow her justification in this dissertation for maintaining the split for the Pacbitun Belize Red ceramics.

Gallinero Fluted (Gifford 1976:262)
Vessel forms: cylinder vase, dish
Lip forms: cylinder vase, interior beveled; dish, rounded
Rim diameters: cylinder vase, 20 cm (1 measurement); dish, 22 cm (1 measurement)
Thickness: 0.45 cm, 0.7 cm
Quantity: 6e (103 g), 3s (42 g), 9t (145 g)
Intrasite distributions and frequency: Actun Lak (6t, 103 g), Actun Subuul (3t, 42 g)

Description: Red to deep red glossy slip on ash tempered vessels further elaborated with parallel fluting, and incisions on exterior surfaces. Interior surface slip is present on some specimens. Vertical to slightly flaring walled cylinder vases are the most common form, all of which were recovered from Actun Lak. Another three sherds from out-flaring walled dishes were recovered during mitigation activities in Actun Subuul. I was unable to mend the three pieces from that rockshelter, although they likely belong to the same vessel. Both vertical and oblique fluting occurs, and typically begins below a series of horizontal incisions. Fire clouding is present on vessel exteriors. Interior surfaces tend to be more eroded than exteriors, although whether this is the result of use ware or other processes is indeterminable.

Martin's Incised (Gifford 1976:262)
Vessel forms: Cylinder vase
Lip forms: Rounded
Thickness: 0.65 cm (1 measurement)
Quantity: 1s,t (29 g)
Intrasite distributions and frequency: Actun Lak (1t, 29 g)

Description: Red semi-glossy slip on ash tempered cylinder vase with in-sloping walls. Slip is present on the exterior and continues on the interior although it is heavily eroded there. Vessel exterior is further elaborated with fine-line incisions and irregular-shaped punctations. Pairs of parallel lines frame two single lines of punctations. The first set is positioned just below the rim, the other near the midpoint of the vessel. These two design sets frame the latter half of a vertically positioned "B" shaped element.

McRae Impressed (Gifford 1976:259)
Vessel forms: Bowl, dish
Lip forms: Bowl, pointed; Dish, rounded
Rim diameters: Bowl, 20 cm (1 measurement); Dish, 25 cm, 31 cm, 27 cm (3 measurements)
Thickness: 0.6 cm, 0.95 cm, 0.75 cm (7 measurements)
Quantity: 1e (13 g), 6s (309 g), 7t (322 g)
Intrasite distributions and frequency: Actun Lak (7t, 322 g)

Description: Red to deep red slip on ash tempered dishes and bowls with out-flaring walls. Specimens are badly eroded but slip appears to cover all interior and exterior surfaces. Neither bases nor supports were slipped. Vessel exteriors are further elaborated by bands of fingernail impressions along the basal ridges, and occasional careless incisions below rims. One specimen has a small basal flange decorated with squat, squared bosses. Extensive interior fire clouding is present on two specimens, and another had a chipped rim, indicating that it had been ritually "killed."

Planton Punctated-Incised (Gifford 1976:257)
Vessel form: Dish
Lip forms: rounded-flat
Rim diameters: 31 cm
Thickness: 0.75 cm
Quantity: 2s,t (53 g)
Intrasite distributions and frequency: Actun Lak (2t, 53 g)

Description: Red to deep red slip on interiors and exteriors of ash tempered dishes with out-flaring sides. One of the two specimens has hard, white, "clinky" paste. The other has been heavily burned, which has turned the slip deep red. It has two sets of carelessly executed incisions and punctations, one just below the rim, and the other just above the

basal break. The upper set has two horizontal parallel lines, the lower one of which alternates positions with the punctations, of which there are also minimally two rows. The upper incision is unbroken although it contains a few meandering sections along the path of the line. The lower set of decorations is of varying size, but never alternate positions on the sherd. The incisions sit above the punctations, and the latter run along the basal break.

Puhui-zibal Composite (Gifford 1976:266)
Vessel form: Bowl
Intrasite distributions and frequency: Noted at Tzul's cave

Description: This is an exceedingly rare type of British Honduras Volcanic Ash ware in the Pacbitun karstscape ceramic assemblage. It is ash and calcite tempered, has orange paste, and slightly incurving walls. There is fugitive black slip on its rim, and the body may be self-slipped (orange), or it is extensively burnished. It has a band of repeating boot-shaped pseudoglyphs framed into individual registers by single horizontal and double vertical incisions. The interstitial spaces between pseudoglyphs are marked by punctations either at the top or bottom of the register. All incisions were made after the surface had been treated. The only other known specimen of this type at Pacbitun was found on the Mai Causeway in the site epicenter (Weber 2013). That specimen has yet to be fully described but my preliminary observations of it is that it is vertical-walled vessel with solid tau-shaped feet. It has a similar band of deeply carved pseudoglyphs as the Tzul's cave specimen that run just above the base of the vessel. Overall, the Mai Causeway sherd is extensively weathered, but some remnant orange slip may remain in the deeper incisions.

Belize group indeterminate (Gifford 1976:255)
Vessel forms: "Brandy-snifter," bowl, dish, plate, vase
Lip forms: Bowl, rounded, rounded-lipped; Dish, flat, interior beveled, pointed, rounded, rounded-flat, rounded-lipped;
Rim diameters: Bowl, 10 cm, 19 cm, 32 cm (3 measurements); Dish, 17 cm, 38 cm, 25 cm (8 measurements)
Thickness: 0.45 cm, 0.95 cm, 0.7 cm (28 measurements)
Quantity: 285e (1707 g), 21s (785 g), 306t (2492 g)
Intrasite distributions and frequency: Actun Lak (276t, 2295 g), Actun Naj Che (14t, 128 g), Actun Nohoch Tunich (10t, 10 g), Actun Subuul (6t, 22 g), noted at Actun Kix Och

Description: This is the residual category for the Belize Group. It contains red to deeply red slipped ash tempered specimens that are either too fragmentary or insufficiently diagnostic to allow type designations to be made. Some are simply slipped, while others have more elaborate decorations such as incisions and punctations. Slip appears on

external and internal surfaces, and in one instance, it continues onto a support. A possible orange preslip was noted on one specimen. Support forms include conical nubbins, solid squat slabs, pedestal and ring bases, and the scars of hollow oven feet. Fire clouding and burning are common. Forms include "Brandy snifter" with in-sloping sides, bowls with out-flaring and incurving walls, one of which resembles a tecomate. Out-flaring dishes and plates, and cylinder vases with vertical sides were recorded.

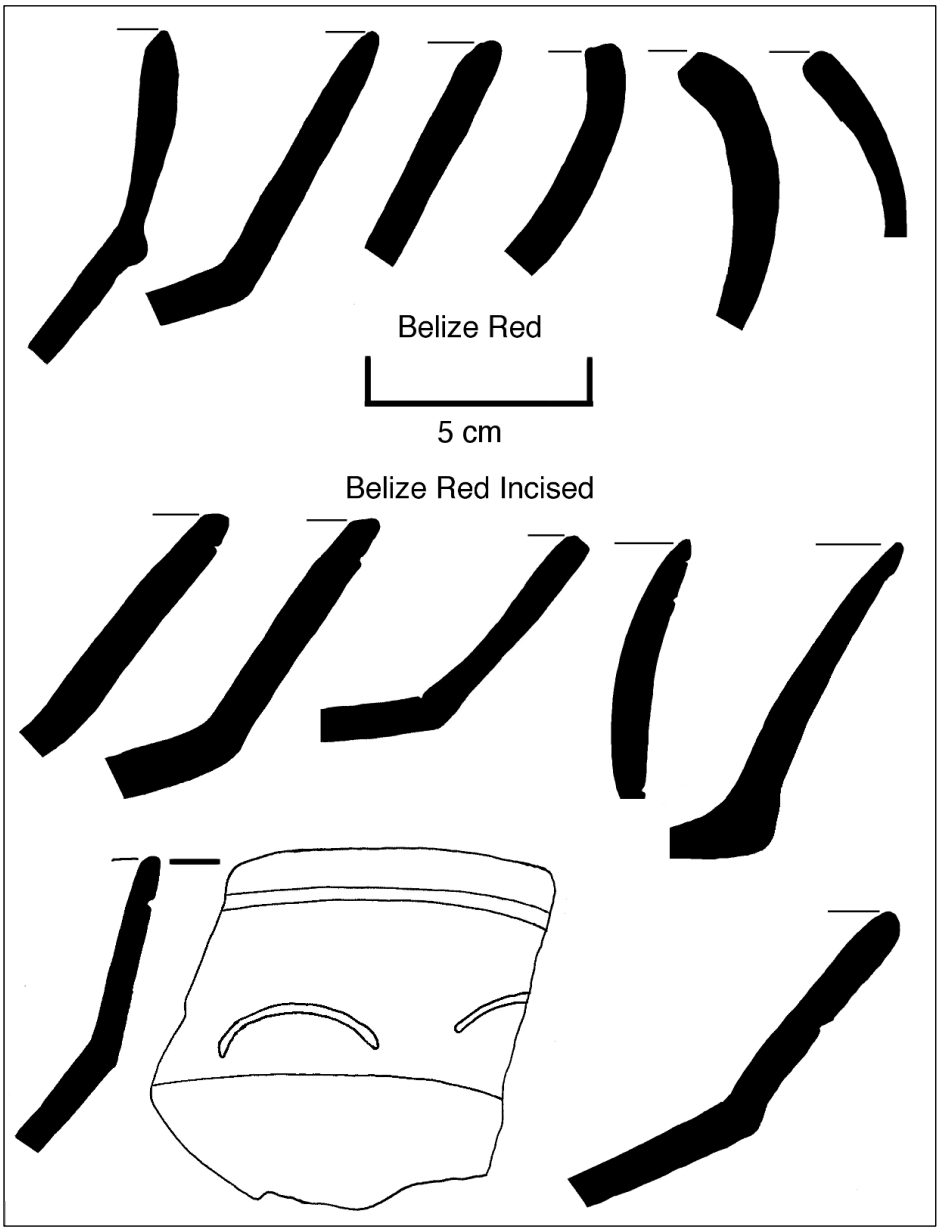


Figure C15. Belize Red and Belize Red Incised rim profiles.

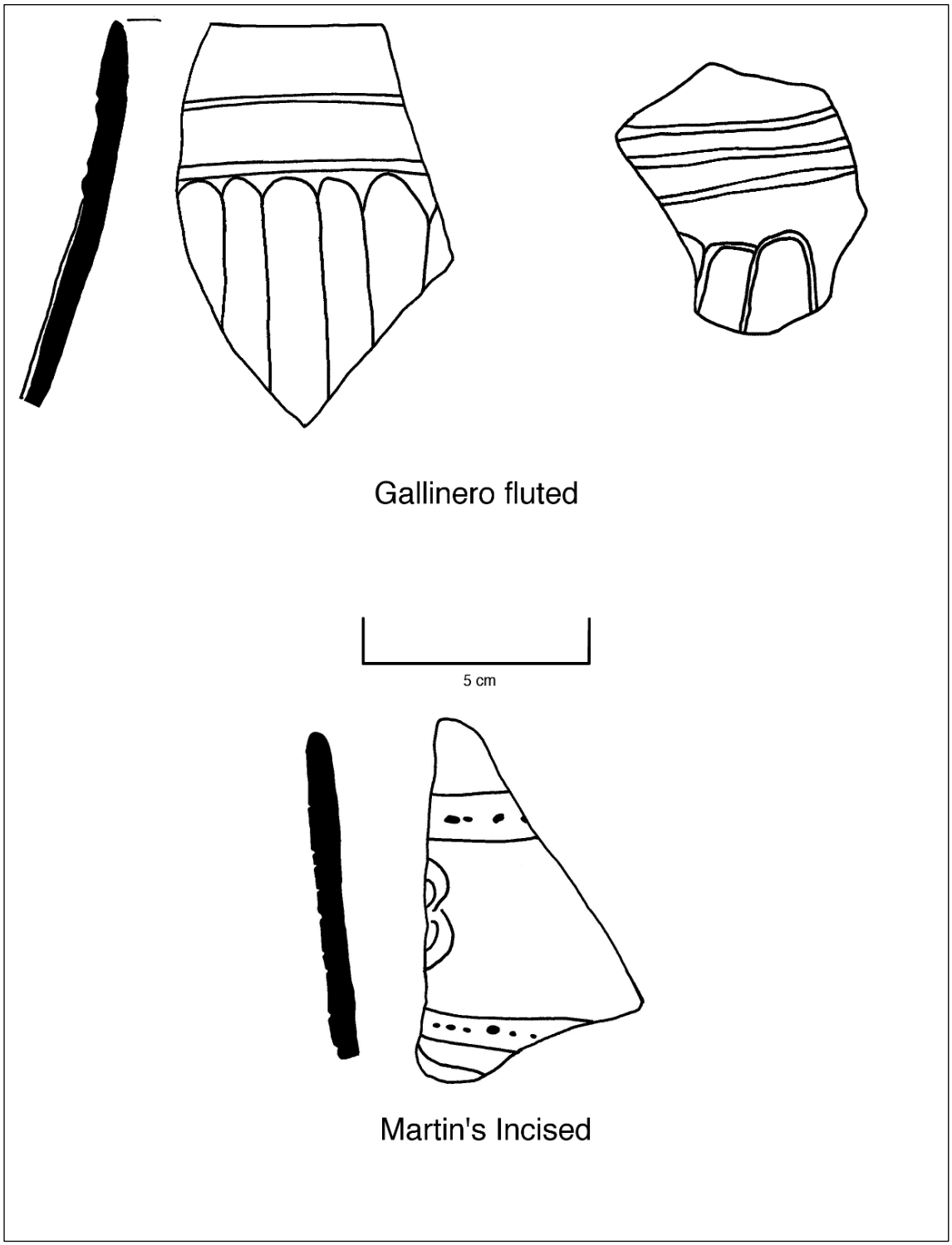


Figure C16. Gallinero Fluted and Martin's Incised rim profiles.

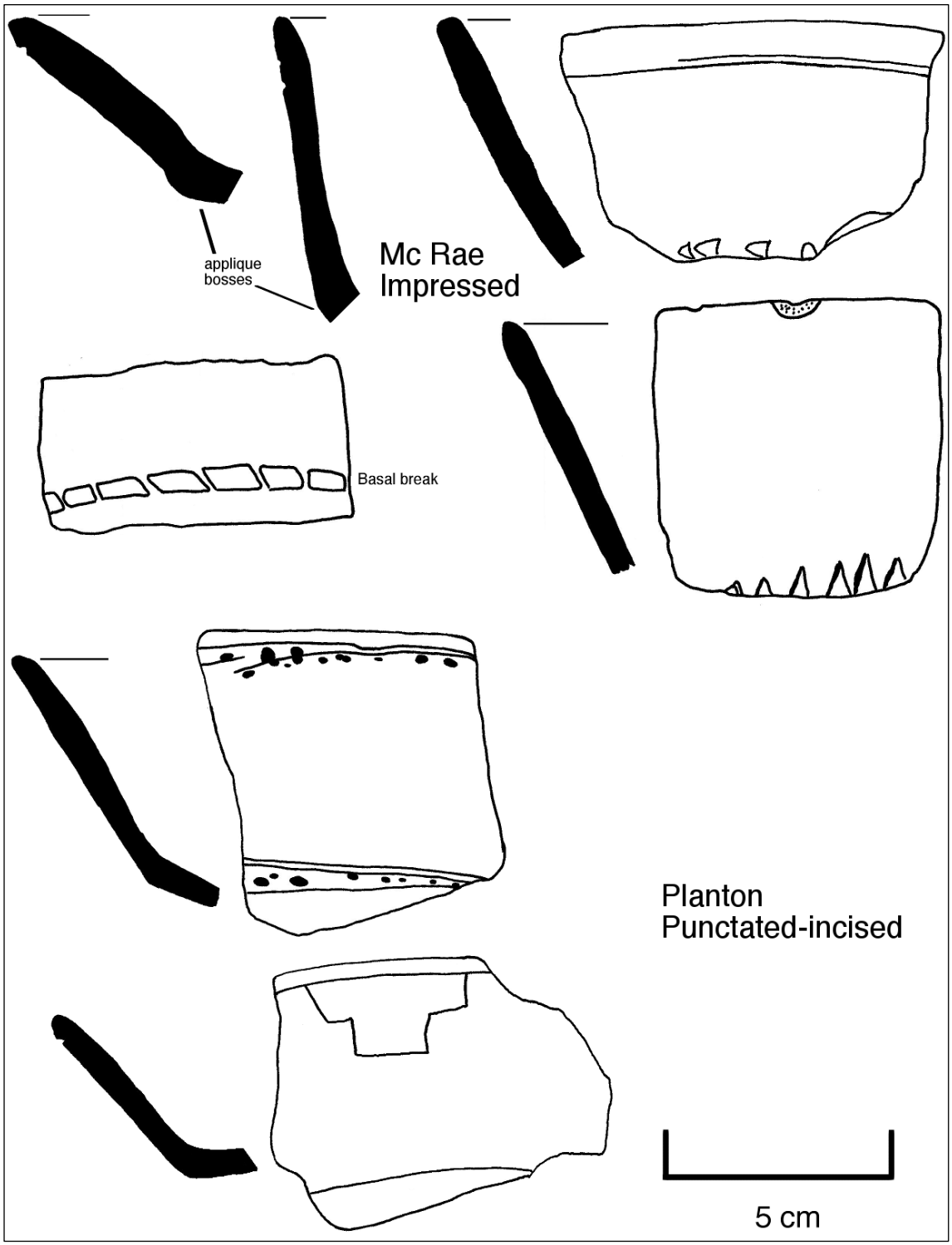


Figure C17. McRae Impressed and Planton Punctated-incised rim profiles.



Figure C18. Puhui-zibal Composite from Tzul's Cave.

Group: Cayo
Ware: Uaxactun Unslipped

Alexanders Unslipped:Beaverdam (Gifford 1976:284)
Vessel forms: Jar (massive)
Lip forms: Rounded, variable tooled
Rim diameters: 37 cm, >55 cm (2 measurements)
Thickness: 0.9 cm, 1.85 cm, 1.3 cm (11 measurements)
Quantity: 18e (1099 g); 1s (165 g); 19t (1265 g)
Intrasite distributions and frequency: Actun Lak (19t, 1264 g), noted at Actun Balam, and Actun Sinan
Representative general distribution: The Cayo group comprises the dominant Late Classic period unslipped ceramic assemblage and is present at all known sites in the Belize Valley. As such, I make no effort here, or with the types and varieties that follow, to locate the material to specific sites.

Description: Massive, thick-walled, coarse calcite tempered jars with both slightly restricted and constricted necks, the latter of which is rare. Exteriors and interiors are lightly smoothed. Fire clouding and use ware are prevalent. A complete jar was noted in the entrance of Actun Sinan. It has a gently out-sloping, slight restricted neck, and a spherical shaped body approximately 2 m in circumference, and a truncated-round base. Overall, that vessel is just over 80 cm tall. Two large sherds were knocked off its the rim as if to symbolically kill the vessel, although they remained adjacent to it. Fire clouding is present around the base, suggesting its use as an incense burner. A residue sample was collected from the interior of the vessel that is still undergoing analysis.

Alexanders Unslipped:Unspecified (Gifford 1976:283)
Vessel forms: Jar (large)
Lip forms: flat-lipped, grooved, grooved-lipped, pointed, rounded, rounded-flat-thickened, rounded-lipped, tooled
Rim diameters: 26 cm, 43 cm (Two-55+ cm specimens not included due to inability to calculate), 34 cm (8 specimens, two-55+ cm diameter specimens not included in calculations)
Thickness: 0.8 cm, 1.6 cm, (15 measurements)
Quantity: 85e (6223 g); 4s (426 g); 89t (6649 g)
Intrasite distributions and frequency: Actun Lak (49t, 3234 g), Actun Naj Che (40t, 3411 g), noted at Actun Balam, Actun Bosh Tunic, and Actun Merech

Description: Large, coarse calcite tempered, thick-walled jars with wide flaring necks. A brown wash is present on some specimens, although it is not common, and others have burnished patches. Interior and exterior fire clouding or smudging appears on most specimens. Some use ware is present on interior rims indicating that stirring of contents

was common. Some rims have been symbolically "killed" as indicated by chipping. One specimen has an appliqué strap handle on it, and another has the scars from one.

Cayo Unslipped (Gifford 1976:276)
Vessel forms: Bowl, censer, dish, jar, and lid
Lip forms: Bowl, flat, flat-lipped, pointed, rounded, rounded-lipped, squared-grooved; dish, flat, flat-lipped, rounded, squared; jar, exterior beveled, flat, flat-lipped, grooved, grooved-lipped, interior beveled-grooved, pointed, rounded, rounded-lipped, square-grooved, square-lipped, squared, tooled; lid, square-lipped, flat
Rim diameters: Bowl, 10 cm, 41 cm, 21 cm (14 measurements); Dish, 16 cm, 38 cm, 25 cm (8 measurements); Jar, 9.5 cm, 45 cm, 22 cm (67 measurements)
Thickness: 0.35 cm, 1.2 cm, 0.8 cm (128 measurements)
Quantity: 530e (8172 g); 96s (4164 g); 626t (12,336 g)
Intrasite distributions and frequency: Actun Jcheehem (6t, 438 g); Actun Lak (513t, 9720 g); Actun Naj Che (24t, 414 g); Actun Nohoch Tunic (57t, 1407 g); Actun Subuul (22t, 327 g); Actun Xtuyul (4t, 28 g). Noted at, Actun Balam, Actun Bosh Tunich, Actun Hayach Naj, Actun Kix Och, Actun K'oxol, Actun Merech, Slate Cave, and Actun Zotz

Description: Cayo unslipped represents the second most common undecorated jar type identified in the Pacbitun karstscape next to the Tumbac Unslipped wares. Jars with out-curving, open collars are the dominant form encountered, although constricted necks occur with some regularity. Bowl and dish forms were also recorded, the former of which is the more common of the two. Bowl walls are either out-flaring or slightly incurving, and a tecomate form, possibly a censer, was noted. Dishes all contain out-flaring walls with one exception that is incurved. A spherical censer with medial flange was collected in Actun Nohoch Tunich, and a lug from another was recovered from Actun Lak. A variety of decorations are found on these vessels, typically around their collars, including, appliqué additions, incisions, striations, punctations, and washes. The first decorative technique ranges from simple, undecorated bands to chains of circular and fingernail punctated fillets, and an ornamental handle. Incisions are deep and consistently located along junctures of necks and bodies that may suggest a production technique rather than a purposeful decorative element, or a combination of the two. Punctation shape and patterns vary greatly. The former includes ovaloids, squares, circles, and rectangles, and fingernails, some of which were dragged along the surface. These decorations are in single, double, or triple rows in straight or meandering chains, shallow "V" shapes, or as isolated occurrences. Cream, black, orange, and white washes on neck interiors appear, although they are rare. Other appliqué strap handles were noted, and almost all specimens has extensive interior and exterior fire clouding or smudging.

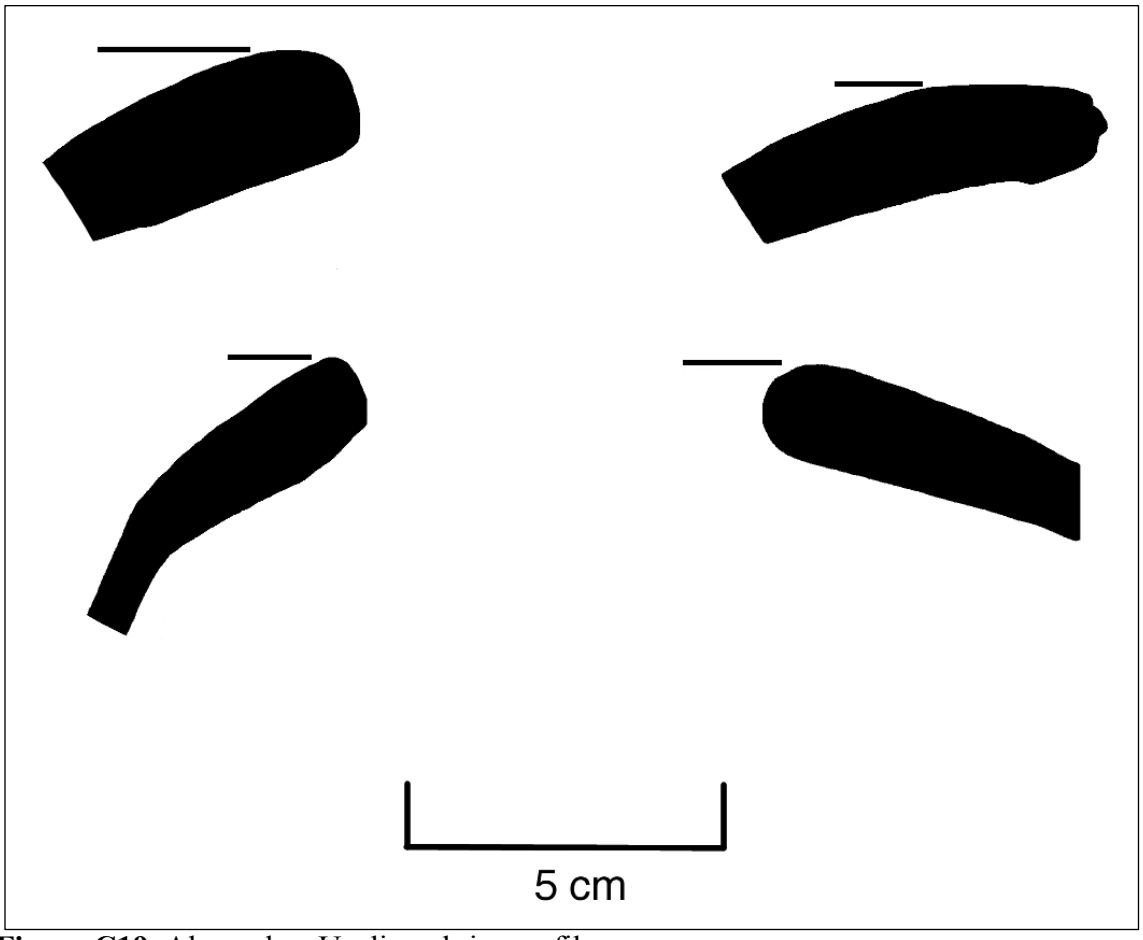


Figure C19. Alexanders Unslipped rim profiles.

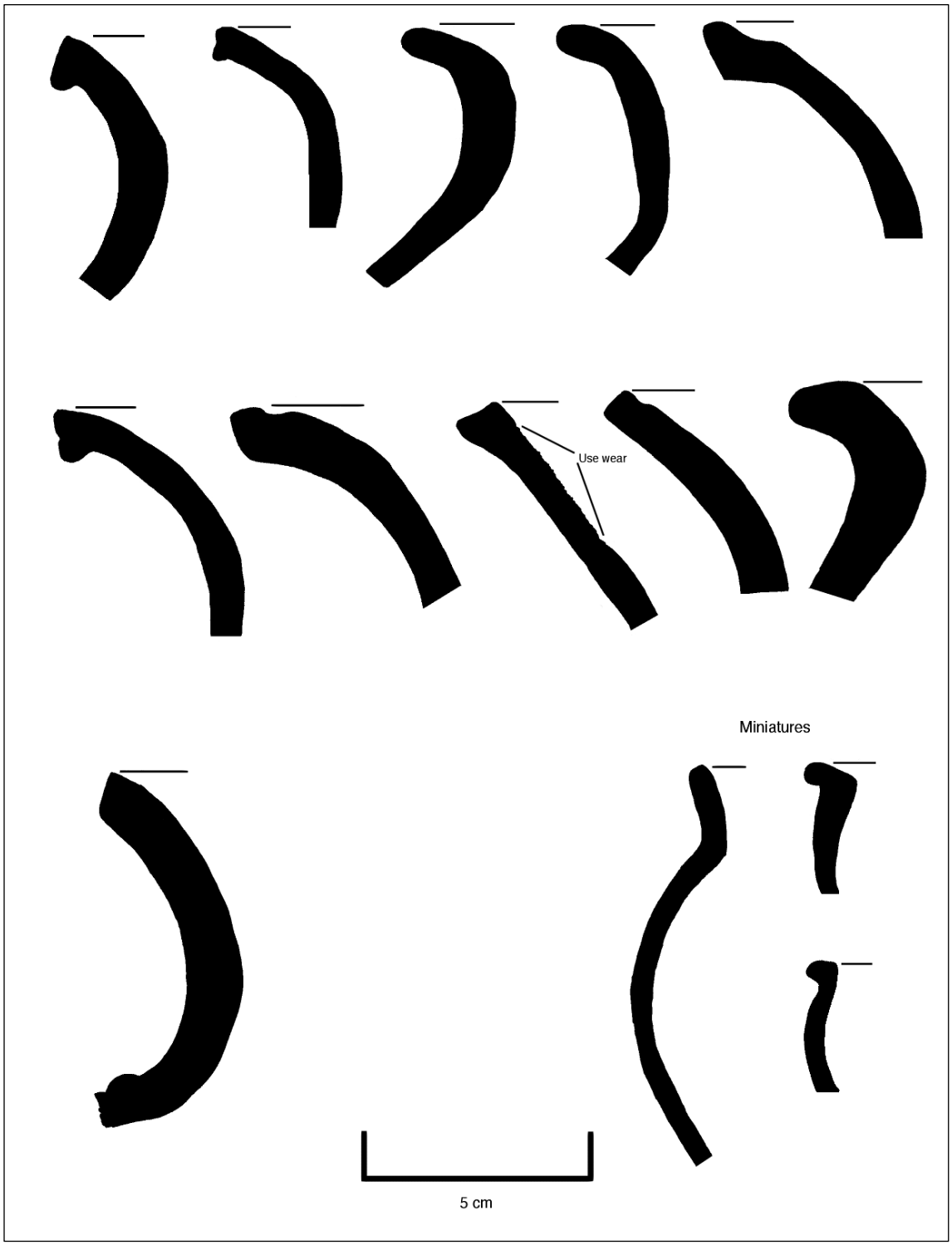


Figure C20. Cayo Unslipped rim profiles.

Group: Chunhuitz
Ware: Vinaceous Tawny

Chunhuitz Orange (Smith and Gifford 1966:156; see also Thompson 1942)
Vessel forms: dish
Lip forms: rounded, rounded-flat, pointed
Rim diameters: 16 cm, 21 cm, 27 cm (3 measurements)
Thickness: 0.6 cm, 0.65 cm, 0.75 cm (3 measurements)
Height: 4.0 cm, 6.5 cm (2 measurements)
Quantity: 3s,t (167 g)
Intrasite distributions and frequency: Actun Lak (all), noted at Actun Kix Och
Representative general distribution: The entire Chunhuitz group is represented in the eastern Peten and particularly the Belize Valley throughout the Late Classic period. It has been documented as far west as Uaxactun, Guatemala, and as far east as the Sibun valley, Belize, although it greatly tapers off in that later area (e.g. Peterson 2006; Reents-Budet 1980a, 1980b; Smith and Gifford 1966).

Description: Orange slipped, Vinaceous tawny-colored ash tempered dishes with out-flaring walls. One specimen has extensive use ware on the interior base and a chip removed from the rim indicating that it was symbolically "killed." Another is fully slipped in its interior but only partially so on its exterior.

Discussion: This type is likely better represented in the assemblage than current evidence is able to account for as discussed earlier. LeCount (1996:414) notes that Chunhuitz Orange continued to be made throughout the Late Classic and Terminal Classic periods at Xunantunich, while the production of the more elaborate Xunantunich Black-on-orange and Benque Viejo polychrome types, described below, ended during with the Hats' Chaak ceramic phase (ca A.D. 780).

Xunantunich Black-on-orange (Gifford 1976:268)
Vessel forms: Bowl, dish
Lip forms: Dish, rounded
Rim diameters: Dish, 20 cm (1 measurement)
Thickness: 0.75 cm, 0.95 cm (2 measurements)
Height: 5.2 cm (1 measurement)
Quantity: 2s,t (216 g)
Intrasite distributions and frequency: Actun Lak (2t, 216 g)

Description: Orange slipped, Vinaceous tawny-colored ash tempered vessels with out-flaring walls and additional black painted decorations. One partial dish and one bowl fragment were recorded. Both of the identified specimens have round, solid, flat-based nubbin feet. The additional decoration on the partial dish includes a black painted rim, line along the basal break, and a single elongated vertical curvilinear design emerging

from the latter. The other piece has a yellow-orange slip that is badly eroded on its interior. The extant additional decoration consists of a long horizontal line that intersects with a vertical line approximately 2.5 cm above the basal break.

Benque Viejo Polychrome (Gifford 1976:269)
Vessel forms: Dish, vase
Lip forms: Dish, flat, rounded; Vase, rounded
Rim diameters: 15 cm, 28 cm, 22 cm (11 samples)
Thickness: 0.55 cm, 0.95 cm, 0.7 cm (16 samples)
Quantity: 18e (304 g); 14s (672 g); 26t (976 g)
Height: 4 cm, 7.8 cm (2 measurements)
Intrasite distributions and frequency: Actun Lak (30t, 939 g), Actun Nohoch Tunich (2t, 37 g), noted at Actun Merech, and Actun Hayach Naj

Description: Orange slipped, Vinaceous tawny-colored ash tempered vessels with additional black and red painted decorations, and occasional fluting. Dishes with out-flaring walls are the primary form, although three cylinder vases were also recorded. Painted decorations range widely for this type from black and red horizontal, solid and dashed lines below the rim on the interior or exterior of vessels, to elaborate geometric designs of black and orange with separate red patches. A partial vessel has a thick red line on its exterior that extends over the rim, below which shallow vertical fluting begins. That later decoration extends down to cover most of the dish's body until reaching a thick horizontal black line that covers the basal break. Some of the slip within the flutes is absent, although whether that is a result of weathering or a decorative technique is unclear. Overall, vessels of this type tend to be flat based and without supports, although one partial pot has long, solid rectangular slab foot with rounded corners less than 2mm tall. Extensive use ware is common on vessel interiors, and fire clouding and smudging is present. Two rims had chips removed from them indicating that they were symbolically "killed."

Chunhuitz Group indeterminate (Gifford 1976:255)
Vessel forms: Bowl, dish, plate
Lip forms: Bowl, flat, rounded; Dish, interior beveled, rounded
Rim diameters: Bowl, 8 cm (miniature), 27 cm; Dish, 25 cm
Thickness: 0.45 cm, 1.05 cm, 0.72 cm
Quantity: 76e (688 g); 11s (522 g); 87t (1210 g)
Intrasite distributions and frequency: Actun Lak (78t, 1166 g), Actun Naj Che (1t, 1.6 g), Actun Nohoch Tunich (5t, 26 g); Actun Subuul (3t, 17 g)

Description: This is the residual category for the Chunhuitz Group. It contains orange slipped Vinaceous tawny-colored, ash-tempered specimens that are either too

fragmentary or insufficiently diagnostic to allow satisfactory type designations to be made. Some are only orange-slipped, while others have more elaborate decorations such as black painted motifs and fluting. Any orange slipped specimens with additional black and red decorations were classified as Benque Viejo polychrome, and tabulated with the previous entry. Bowls and dishes with out-flaring walls occur in near equal proportions, and samples with vertical walls occur in both forms, although rarely. Solid, round and rectangular nubbin feet are common, and several have been chipped suggesting a previously unrecognized "killing" method. One rectangular nubbin has a round piercing with a diameter of 0.46 cm running through its ventral and dorsal sides. A hollow round support, and tau-shaped foot were also noted. Fire clouding and use ware occurs but is uncommon. Overall, decorations vary widely for this residual classification category. One sherd has a Belize Red slipped interior, Chunhuitz Orange exterior with a basal break appliqué filleting, a nubbin foot. The form of that specimen suggests that it belongs to the latter group, although the Belize Red slip is problematic. Another specimen is orange slipped with deep fluting and a black coat-of-arms-like decoration just above the basal break. This vessel is likely a Benque Viejo polychrome but classified only to group level because fluting is rare and insufficient specimens are known to determine if Xunantunich Black-on-orange included such a decoration

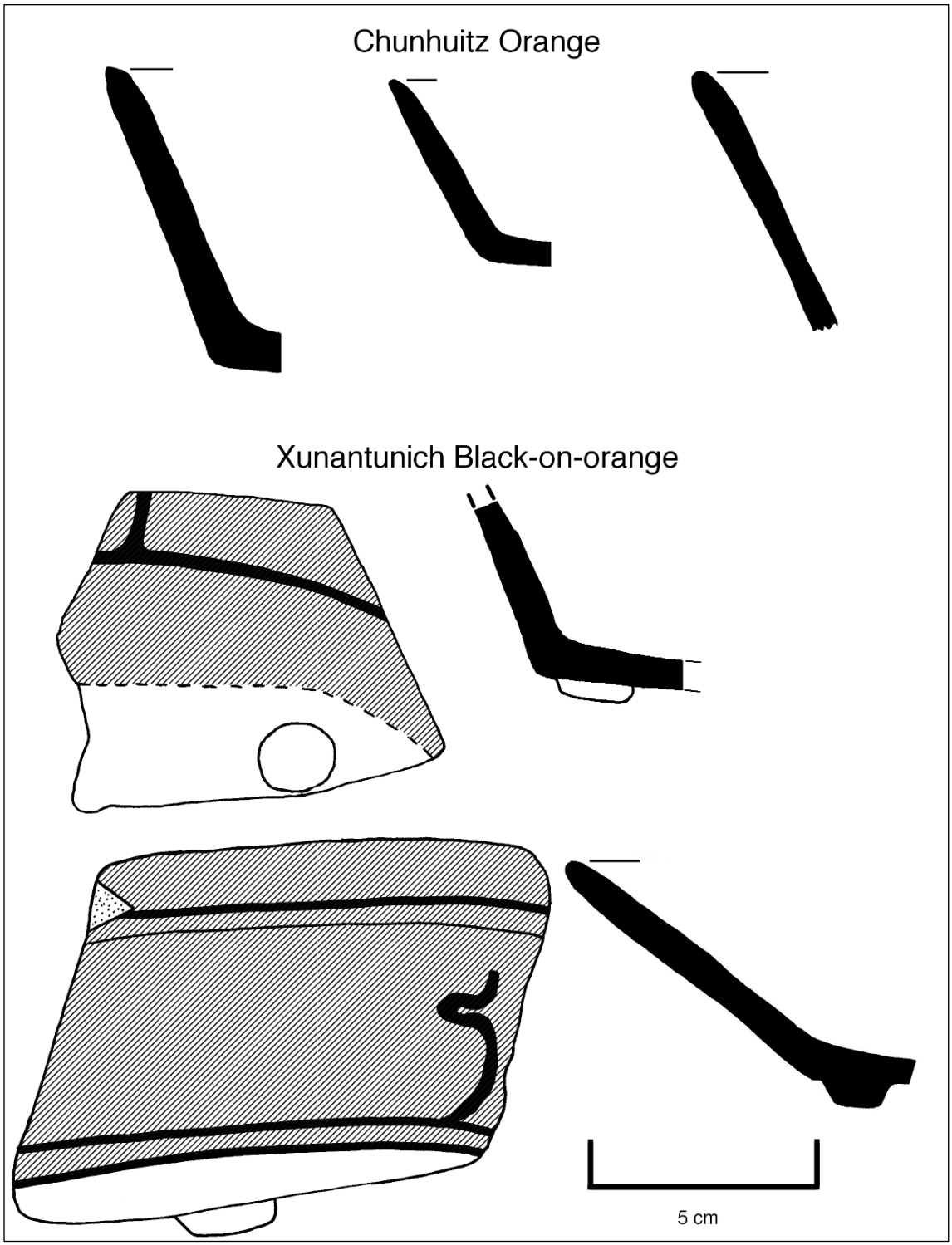


Figure C21. Chunhuitz Orange and Xunantunich Black-on-orange rim profiles.

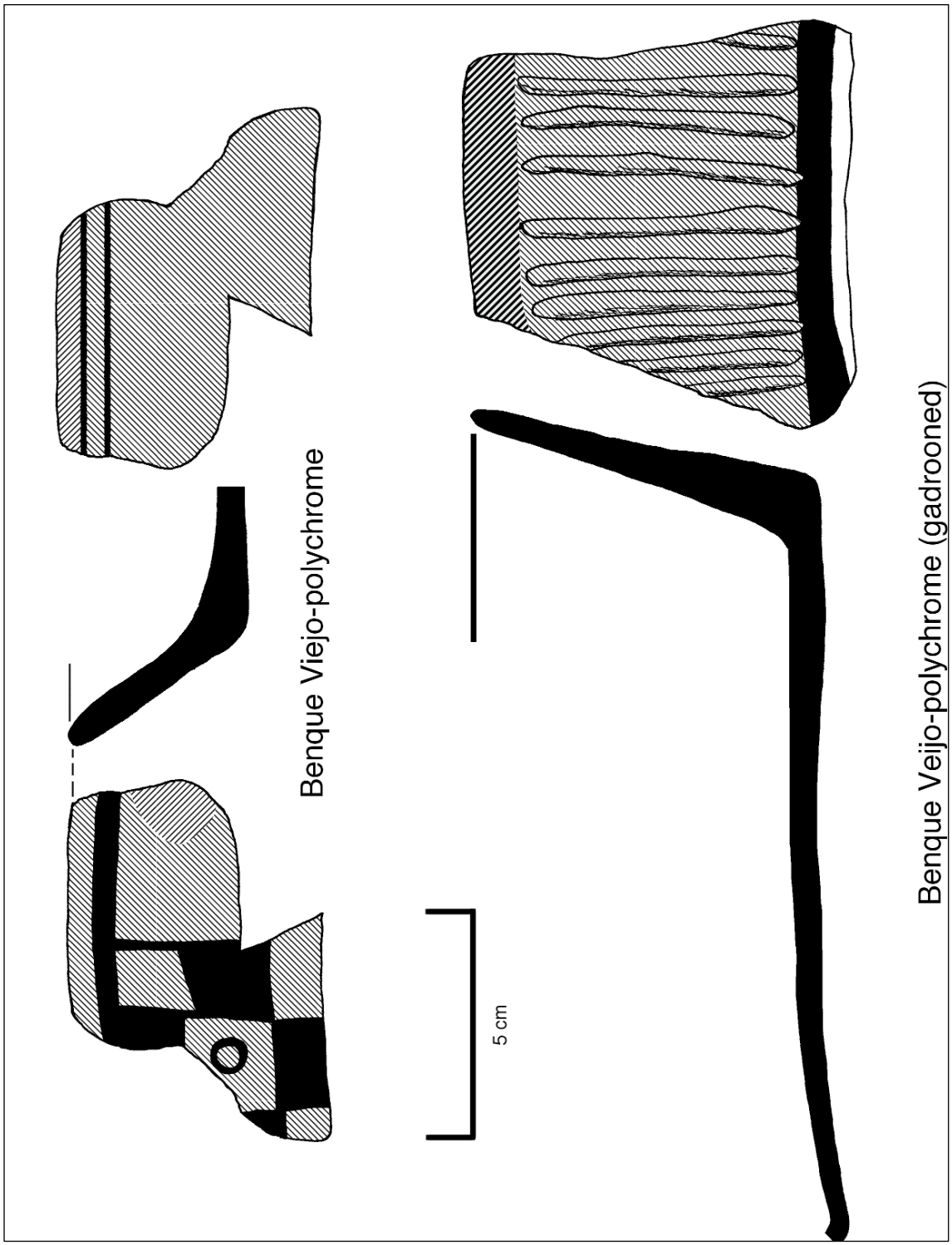


Figure C22. Benque Viejo polychrome rim profiles.

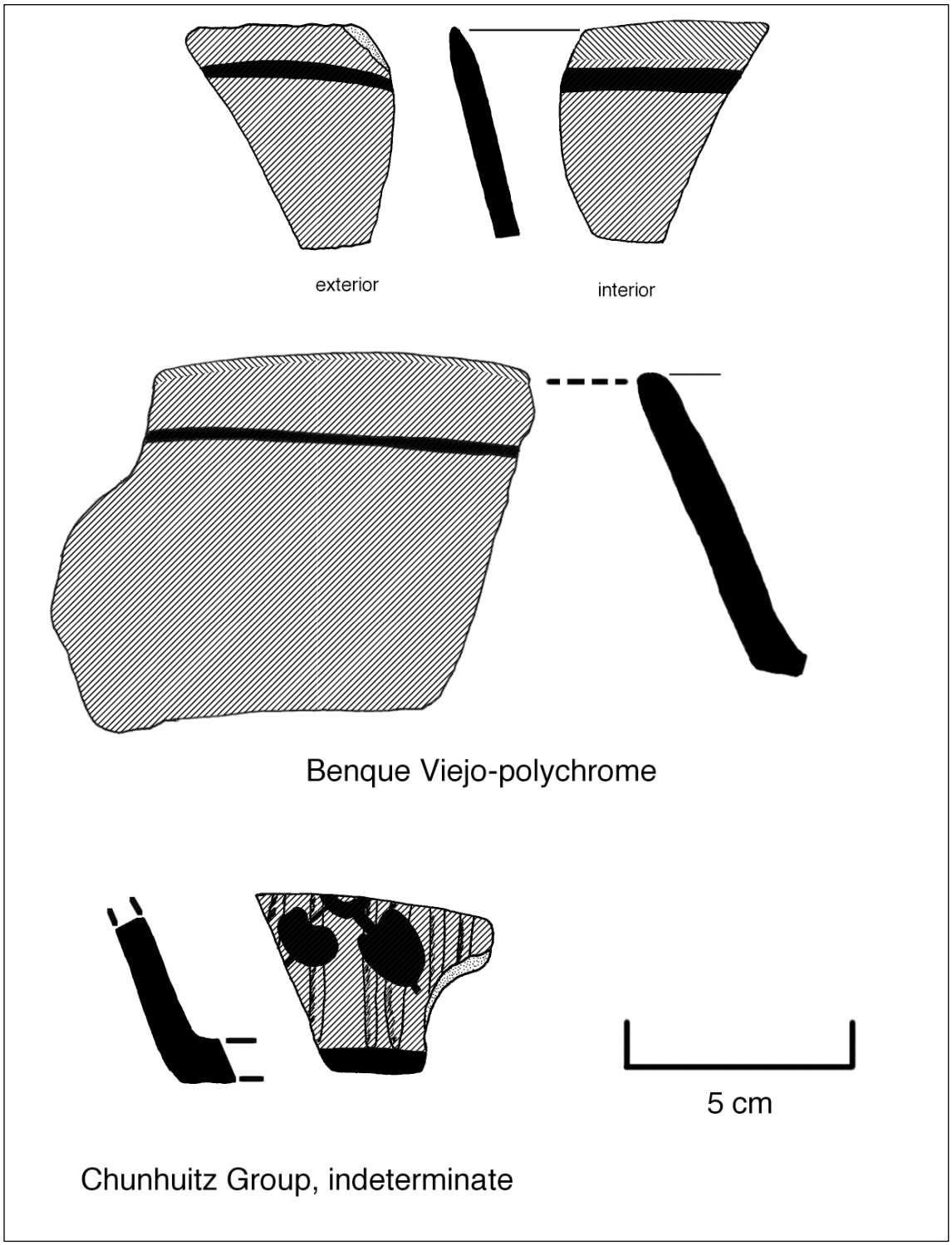


Figure C23. Benque Viejo polychrome and Chunhuitz group indeterminate.

Group: Danta
Ware: Peten Gloss

Joyac Cream-polychrome (Smith and Gifford 1966:158)
Vessel forms: Dish, Vase
Lip forms: Dish, interior beveled
Thickness: 0.6 cm, 0.65 cm (2 measurements)
Quantity: 1 e (5 g), 1s (54 g), 2t (59 g)
Intrasite distributions and frequency: Actun Lak (1t, 54 g), Actun Nohoch Tunich (1t, 5 g)
Representative general distribution: Unlike other Peten Gloss wares, this type is relatively rare, and restricted to the Southern Maya Lowlands. In Guatemala, it appears at Uaxactun and in the Tayasal-Paxcaman zone in the Peten (e.g. Chase 1984; Smith and Gifford 1966:158), and in Belize, at Barton Ramie, and Caracol (Chase and Chase 2007:Figure 2; Gifford 1976:252)

Description: This polychrome type has a matte cream base slip on its exterior and glossy orange on its interior. Sets of solid, horizontal lines and oily blotches, both of which are black, further elaborate the outside. Both specimens have out-flaring walls, and neither supports nor scars for them are present on the one flat base recovered. The vase specimen shows evidence of rather extensive use ware on its interior, and some cave growth is present.

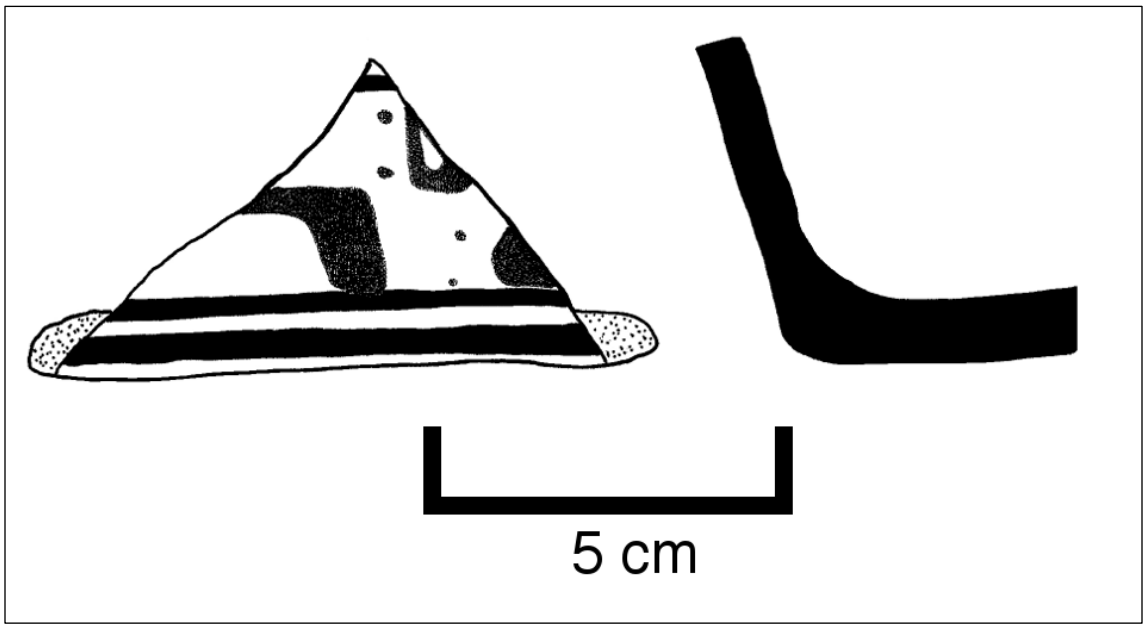


Figure C24. Joyac Cream-polychrome.

Group: Dolphin Head
Ware: Pine Ridge Carbonate

Discussion: Gifford (1976:226) notes that Dolphin Head Red is only found during the early facet of the Spanish Lookout ceramic complex at Barton Ramie. LeCount (1996:383) found for a similar date, noting that it is only found in Hats' Chaac assemblages (A.D. 670-780) at Xunantunich. Nevertheless, it appears with later ceramic material in the Pacbitun karstscape suggesting that its use around Pacbitun continued throughout the Terminal Classic period.

Dolphin Head Red (Gifford 1976:255)
Vessel forms: Bowl, dish, vase (drum?)
Lip forms: Bowl, flat, grooved-rounded, interior beveled, rounded; Dish, flat, interior beveled, pointed, rounded, rounded-flat, square
Rim diameters: Bowl 11 cm, 46 cm, 25 cm (27 measurements); Dish 11.5 cm, 47 cm, 27 cm (69 measurements)
Thickness: 0.35 cm, 1.1 cm, 0.65 cm (124 measurements)
Quantity: 484e (6836 g), 62s (2273 g), 546t (9109 g)
Intrasite distributions and frequency: Actun Jcheeheem (2t, 151 g), Actun Lak (484t, 8225 g), Actun Naj Che (21t, 349 g), Actun Nohoch Tunich (21t, 168 g), Actun Subuul (18t, 216 g), noted at Actun Balam, Actun Bosh Tunich, Actun Hayach Naj, Actun Kix Och, Actun K'oxol, Actun Merech, Slate Cave
Representative general distribution: This group is common to sites throughout the Upper Belize Valley, and as far east as the Sibun Region (e.g. Gifford 1976; Harrison-Buck 2010; Kosakowski 2012; LeCount et al. 2002; Reents-Budet 1980a, 1980b; Wrobel et al. 2010)

Description: Red to deep red slip on carbonate tempered bowls and dishes with occasional incised decorations. Dishes are the more common form, and having both out-flaring and in-curving walls —the former of which occur most regularly. Incisions appear only on dish exteriors and are present on about one-quarter of the specimens. Bowls have rounded and incurved walls, and appear less frequently than the other form. Two specimens of an unusual bowl form were recovered that have incurving interior walls, and slightly out-flaring transitioning to in-sloping exterior walls (Figure XX). The "vase" form has an unusual curvature suggesting that it is a drum. Other red-slipped drums have been recovered at Pacbitun, Baking Pot, Tipu, and the Peten Lakes district, the earliest of which appears in the Terminal Classic period (Aimers 2004:85; Healy et al. 2009:Figure 4). Decorations on the non-drum forms include simple horizontal incised lines near rims

or basal breaks, as well as more complex motifs that include single vertical zigzagged and straight lines that frame registers of ticked areas. These decorations are nearly identical to those found on Rosario Incised specimens discussed below except that the latter are better executed. A few of the horizontally incised specimens also contain irregular punctations. One unique sherd of this type was decorated on its exterior with oblique spiral fluting. Fire clouding, smudging, and chipped rims were common indicating that the vessels were used in fire burning rituals and likely symbolically "killed" as part of the offering. Distinguishing between this type and Belize Red was often problematic due to an overlap of tempering agents and some forms. See Belize Red entry for how these types were differentiated.

Silver Creek Impressed (Gifford 1976:228)
Vessel forms: Dish
Lip forms: Dish, rounded
Rim diameters: 15.5 cm, 31 cm, 23 cm (7 measurements)
Thickness: 0.5 cm, 0.8 cm, 0.65 cm
Quantity: 10e (268 g), 1s (18.9 g), 11t (289 g)
Intrasite distributions and frequency: Actun Lak (11t, 289 g)

Description: Red to deep red slip on carbonate tempered dishes with out-flaring sides and impressions or appliqué filleting along the basal break. Some additional incising is present on the rims of some specimens. Another has a set of widely spaced horizontal lines below the rim, followed by a series of vertical-oblique incisions across the middle of the body, and fingernail impressions above the basal break. Fire clouding and a chipped rim were noted on separate sherds.

Discussion: LeCount (1996:386) has found that this type predates Dolphin Head Red at Xunantunich and is associated with the Samal phase (ca A.D. 600-670), although it continues into Hats' Chaak (A.D. 670-780) there.

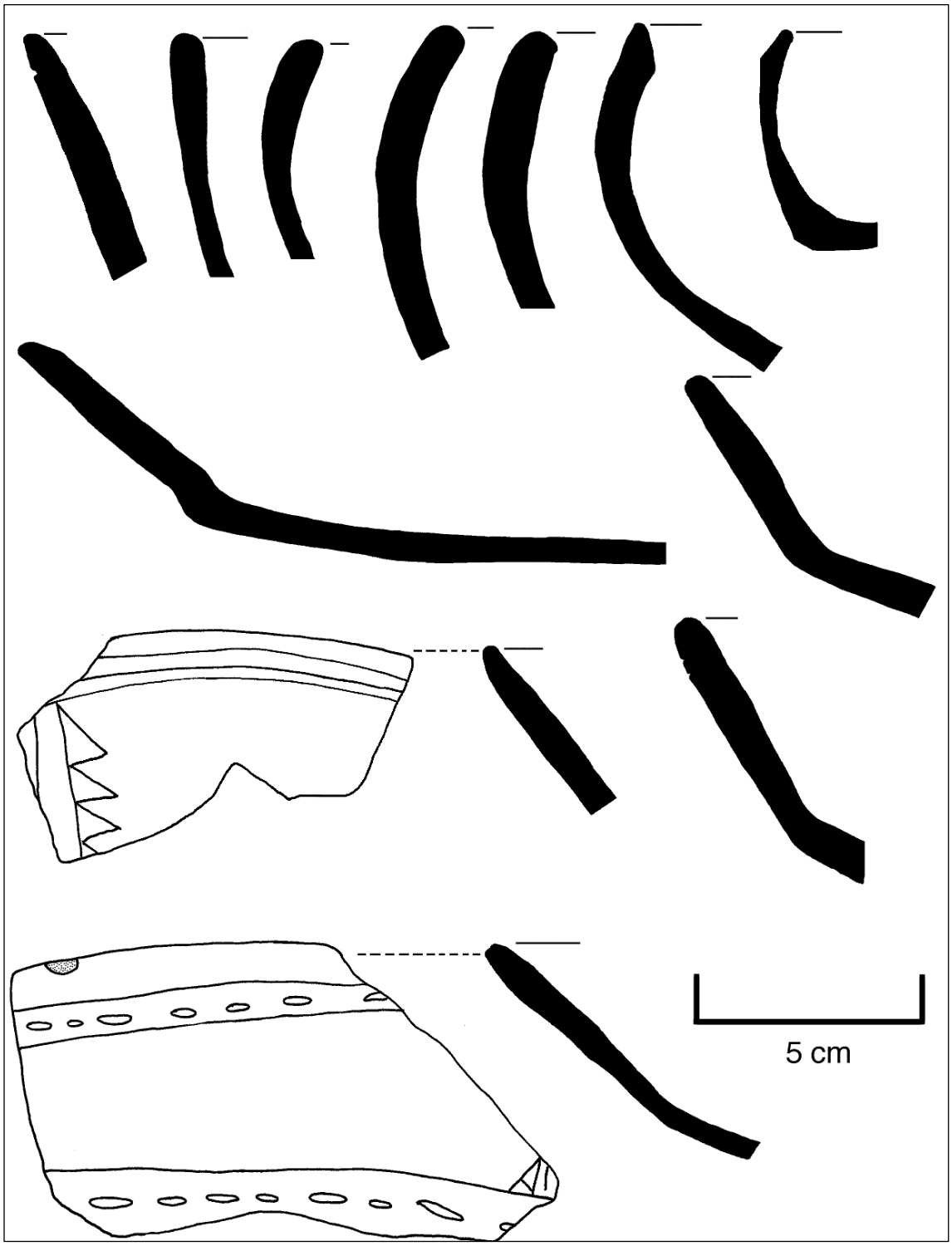


Figure C25. Dolphin Head Red rim profiles.

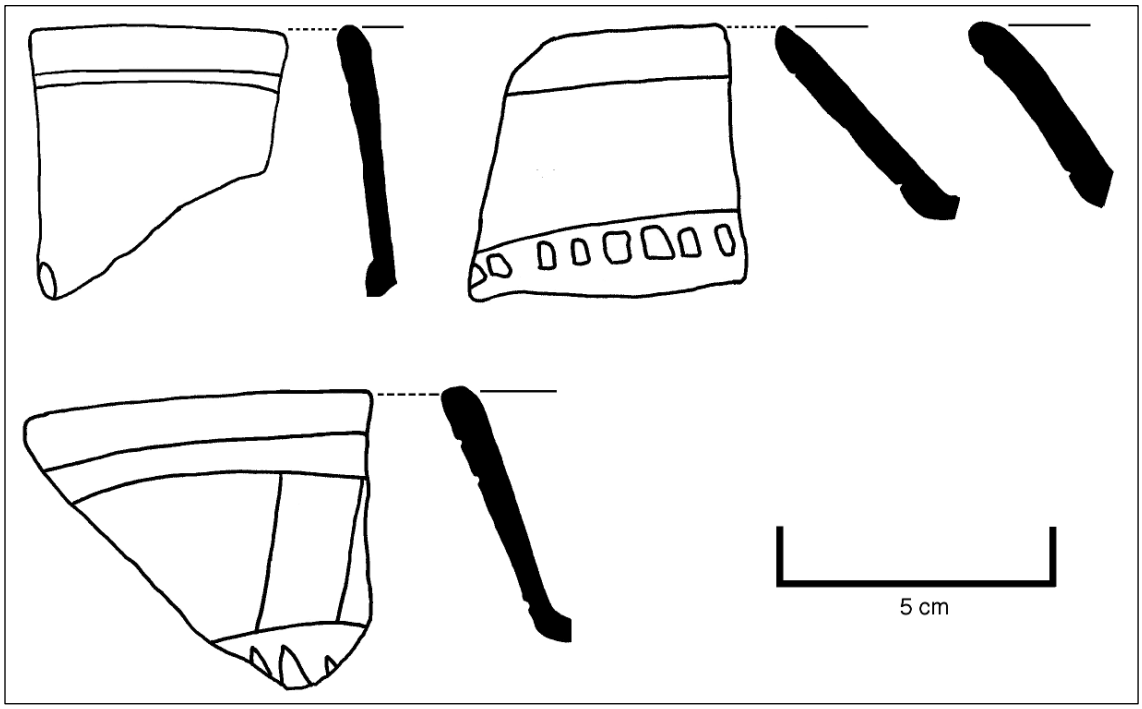


Figure C26. Silver Creek Impressed rim profiles.

Group: Garbutt Creek
Ware: Pine Ridge Carbonate

Discussion: Garbutt Creek is one of two ceramic groups that Connell (2000, 2010) identifies as diagnostic of the socio-political territories of the Upper and Lower Belize Valley discussed in Chapter 2. In particular, he notes that Garbutt Creek Red is indicative of eastern communities unaffiliated with Xunantunich (Connell 2010:309).

Garbutt Creek Red (Gifford 1976:230-233)
Vessel forms: Bowl
Lip forms: Bowl, flat, flat-interior beveled, flat-lipped, grooved, pointed, rounded, rounded-flat, square-lipped, squared
Rim diameters: 14 cm, 45 cm, 29.5 cm (12 measurements)
Thickness: 0.4 cm, 0.9 cm, 0.65 cm (13 measurements)
Quantity: 74e (542 g), 4s (217 g), 76t (759 g)
Intrasite distributions and frequency: Actun Lak (70t, 661 g), Actun Naj Che (2t, 48 g), Actun Nohoch Tunich (6t, 50 g), noted at Actun Balam and Actun Kix Och
Representative general distribution: Garbutt Creek is a common group throughout the Upper and Lower Belize Valley, although is more abundant in the latter. See discussion below.

Description: Dark red-brown slip on polished carbonate tempered bowl interiors. Exteriors may be unslipped, and are often only smoothed if undecorated. Interior fire clouding appears on most specimens, and several have chipped rims suggesting that they were used to burn offerings, and were symbolically "killed." Overall, Garbutt Creek Red in the Pacbitun karstscape is similar in form to the Rubber Camp Brown type and Yalbac group discussed below, with slip being the primary mode of differentiation between them.

Rubber Camp Brown (Gifford 1976:255)
Vessel forms: Bowl, dish
Lip forms: Bowl, flat, informal, rounded, rounded-flat; Dish, flat, interior beveled, rounded
Rim diameters: Bowl, 18 cm, 44 cm, 25.5 cm (9 measurements); Dish 33 cm, >55 cm
Thickness: O.5 cm, 0.85 cm, 0.65 cm (19 measurements)
Quantity: 39e (523 g), 10s (449 g), 49t (968 g)
Intrasite distributions and frequency: Actun Lak (35t, 815 g), Actun Naj Che (5t, 65 g), Actun Nohoch Tunich (9t, 87 g); noted at Actun Kix Och and Slate Cave

Description: Mottled brown and dark orange slip on calcite tempered vessels. Bowls with rounded and incurving sides are the most common forms, although one with vertical walls was recorded. Dishes do occur their shapes are indeterminate based on the

specimens in the assemblage. Incisions appear on interiors just below the rim. Slip is present on both vessels interiors and exteriors, but only occasionally and partially when present on the latter. Most vessel bottoms are flat, although an inverted ring base was noted on one specimen. Interior fire clouding occurs on about one-third of the samples in the assemblage, and two chipped rims were present. Overall, this type is similar in form and surface treatment to Garbutt Creek Red discussed above, and Yalbac group described below.

Garbutt Creek Group Indeterminate (Gifford 1976:255)
Vessel forms: Bowl
Lip forms: Bowl, flat, flat-lipped, rounded
Rim diameters: 21 cm, 25 cm, 33 cm (all measurements reported)
Thickness: 0.7 cm, 0.8 cm, 0.85 cm, 0.9 cm (all measurements reported)
Quantity: 3e (57 g), 1s (41 g), 4t (98 g)
Intrasite distributions and frequency: Actun Lak (4t, 98 g)

Description: These four sherds are common Garbutt Creek group shapes although they are unslipped and thus insufficiently diagnostic to assign them to a type. Several others recovered from Actun Lak that were typeable had extensively eroded slips suggesting that these specimens were decorated at one point also.

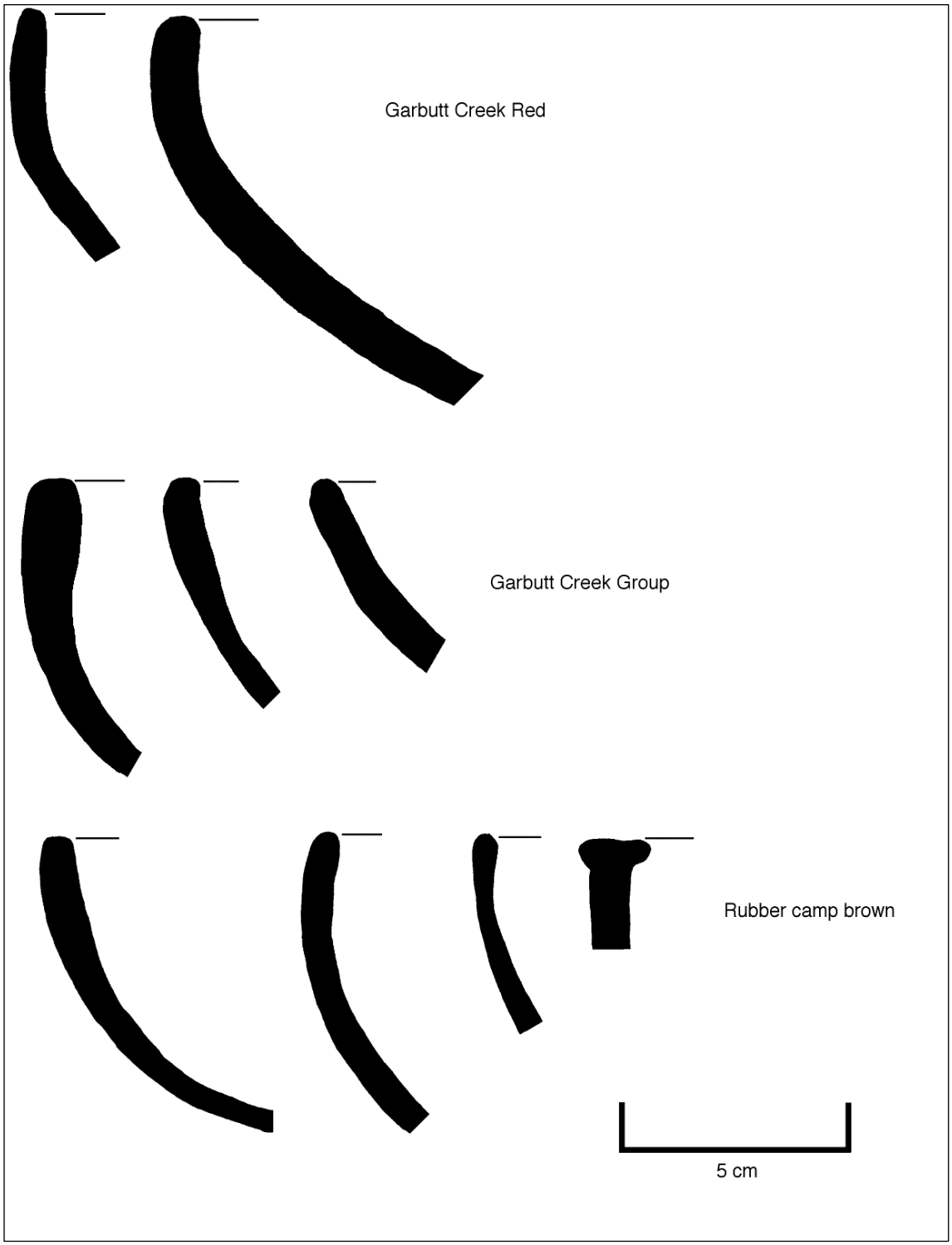


Figure C27. Garbutt Creek group rim profiles.

Group: Macal
Ware: Unspecified

Macal Orange-red (Gifford 1976:214)
Vessel forms: "Brandy-snifter"
Quantity: 3e,t 89 g
Intrasite distributions and frequency: Actun Lak (3t, 89 g)
Representative general distribution: Barton Ramie, and possibly found at Altar de Sacrificios, Guatemala, and San Jose Belize (Gifford 1976:213). They are also present at Tipan Chen Uitz (Andres et al. 2011:106), and the greater Caves Branch area, Belize (Wrobel et al. 2009:202).

Description: Hard calcite tempered "Brandy-snifter-shaped" vessels with red to orange slip. All three specimens have some remnant of the container portion. Two of the specimens refit and all three have the same base diameter (9 cm). On the two sherds that refit, the slip ends unsystematically below the basal break of the container. The vessel had been symbolically killed as indicated by the removal of a chip on the support, as well as a punched hole in the bottom center of the container portion. Use ware and fire clouding are present on the interior of the vessel indicating that it was used to burn offerings. The slip on the third sherd also ends unsystematically below the basal break of the container, and, when coupled with the shared 9 cm diameter, suggests that it may be part of the same vessel as the other two, although attempts to mend the three pieces were unsuccessful.

Group: Macaw Bank
Ware: Tumbac Unslipped

Discussion: This group appears closely related to the Floral Park Chan Pond, and they may represent a long-lasting tradition. See the Chan Pond group entry above for a complete discussion.

Indeterminate (LeCount 1996:381)
Vessel forms: Bowl, Censer, Jar
Lip forms: Bowl, flat-lipped, rounded; Jar, flat, grooved-lipped, interior beveled, pointed, rounded, rounded-flat, rounded-lipped
Rim diameters: Bowl, 13 cm, 14 cm 28 cm (all measurements reported); Jar, 9 cm, 49 cm (one specimen >55 cm), 28.5 cm (20 measurements)
Thickness: 0.55 cm, 1.75 cm, 0.9 cm (25 measurements)
Quantity: 749e (8360 g), 41s (2855 g), 790t (11215 g)
Intrasite distributions and frequency: Actun Lak (597t, 9480 g), Actun Naj Che (34t, 291 g), Actun Nohoch Tunich (81t, 762 g), Actun Subuul (46t, 466 g), Actun Xtuyul (32t, 216 g). Noted at Actun Bosh Tunich, Actun Hayach Naj, and Slate Cave
Representative general distribution: This group has only been previously reported at Xunantunich (e.g. LeCount 1996:381)

Description: Coarse calcite and mica tempered, thick walled, unslipped vessels, primarily in large to massive jar forms, although a few bowls and a censer fragment were recorded. The presence of either silver or gold colored mica is what distinguishes this type from the Cayo group, and the comparatively hard paste separates it from the earlier Chan Pond group as discussed above. Both curvilinear incisions and chains of punctations regularly decorate jar collars, although they never appear on the same specimen with one exception. Other rim and neck sherds are self-slipped black or orange on their interiors, but the former may be heavy smudging as both interior and exterior fire clouding regularly accompanies those samples. Interior use ware on jar necks and body sherds indicate the contents were stirred, and some rims have been "killed" by chipping. Appliqué bosses, and false and strap handles occur infrequently near jar throats. Only the base of the censer remains but it is heavily fire clouded and a foot scar is present, above which is an incision along which the vessel broke.

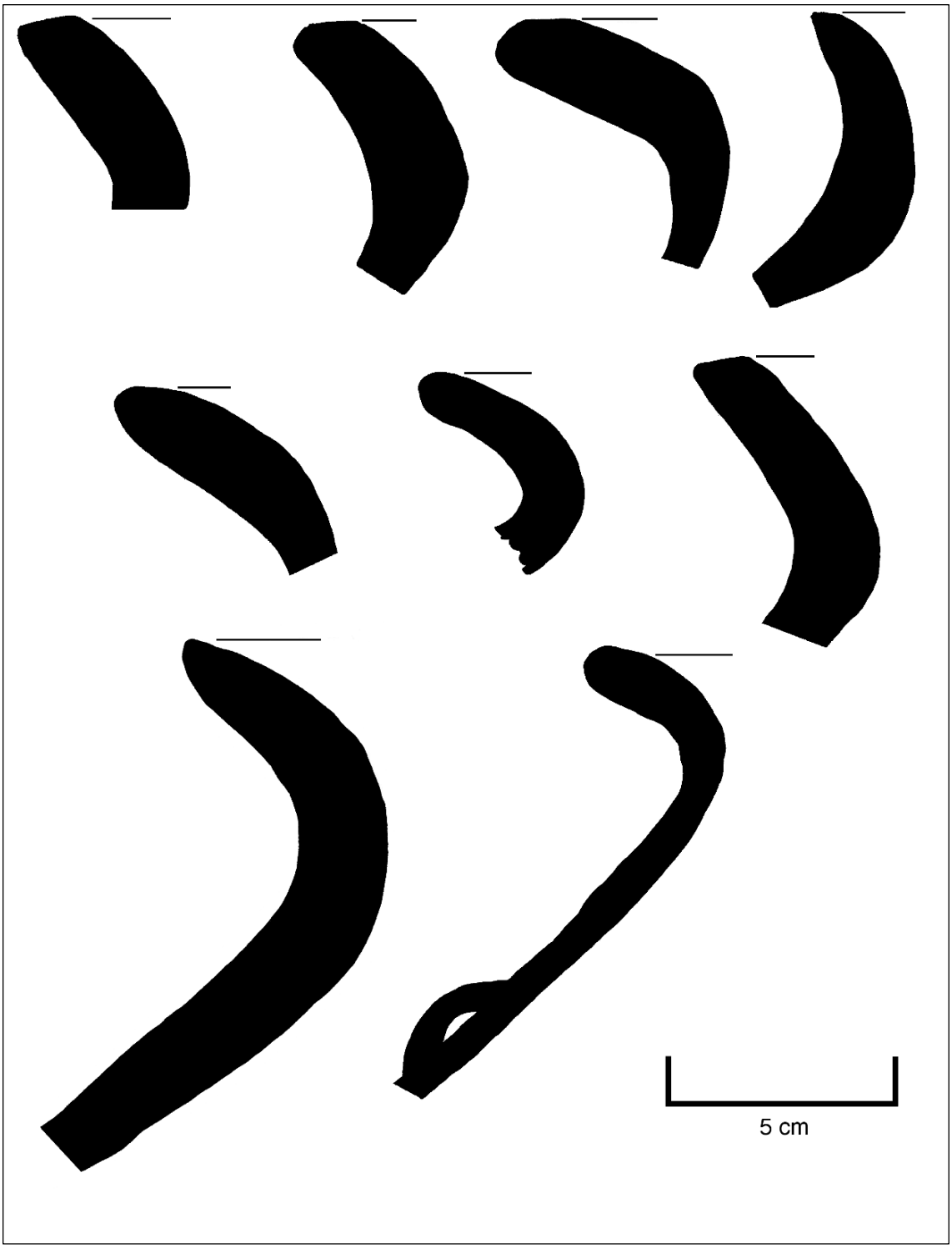


Figure C28. Macaw Bank group rim profiles.

Group: Meditation
Ware: Peten Gloss

Meditation Black (Gifford 1976:246)
Vessel forms: Bowl, dish
Lip forms: Bowl, flat, interior beveled, rounded; dish, rounded
Rim diameters: Bowl 19 cm, 21 cm, 23 cm, 33 cm (all measurements reported); Dish, 15 cm
Thickness: 0.6 cm, 1.0 cm, 0.75 cm (6 measurements)
Quantity: 48e (317 g)
Intrasite distributions and frequency: Actun Lak (37t, 276 g), Actun Nohoch Tunich (11t, 41 g)
Representative general distribution: Barton Ramie (Gifford 1976:247), and the Sibun region (Harrison-Buck 2007) in Belize, and the Tayasal-Paxcaman Zone in Guatemala (Chase 1984:34)

Description: Glossy black slip on interiors of calcite tempered hemispherical-shaped bowls and dishes, similar to Yalbac Smudged-brown discussed below. Most exteriors are poorly smoothed, and unslipped allowing gray paste to be visible. Slip on one vessel is crazed and orange mottling is present. Fire clouding was noted on one specimen, and walls on both bowls and dishes are rounded to slightly incurving.

Group: Mountain Pine
Ware: Pine Ridge Carbonate

Mountain Pine Red:Old Jim (Gifford 1976:193)
Vessel forms: Dish
Lip forms: Dish, rounded, pointed
Rim diameters: 20 cm, 31 cm, 32 cm (all measurements reported)
Thickness: 0.55 cm, 0.55 cm, 0.75 cm (all measurements reported)
Quantity: 1e (31 g), 4s (235 g), 5t (266 g)
Intrasite distributions and frequency: Actun Lak (5t, 266 g)
Representative general distribution: This variety has a close affiliation with caves in the Belize Valley. All of the sherds that Gifford (1976:195) used to describe this variety were collected from the Black Rock Caves. Helmke and Halperin (2001:48) report on one piece recovered from a *sacbe* connecting the center of Cahal Uitz Na to Actun Nak Be cave in the Roaring Creek valley. Moyes (2006a) reports a possible appearance of the type in Chechem Ha Cave.

Description: Dull, dark red slipped, calcite tempered, out-flaring dishes with dark fire clouds and smudging on exterior and interior surfaces. The paste of this variety is very hard and the sherds have a distinctive "clink" when dropped or tapped against one another. A false incision runs below the rim on the exterior of one vessel. The extent of slip coverage on exterior surfaces varies and often terminates unsystematically when present.

Mountain Pine Red:unspecified (Gifford 1976:193)
Vessel forms: Dish
Lip forms: Dish, rounded, rounded-flat
Rim diameters: 16 cm, 37 cm, 25 cm
Thickness: 0.55 cm, 0.8 cm, 0.65 cm
Quantity: 6e (85 g), 6s (341 g), 12t (426 g)
Intrasite distributions and frequency: Actun Lak (9t, 410 g), Actun Naj Che (1t, 3 g) Actun Nohoch Tunich (2t, 13 g)

Description: Dull, dark red slip on calcite tempered, out-flaring walled dishes with large fire clouding spots and smudging, and one tecomate-like bowl. Overall, the extent of slip coverage on exterior surfaces varies and often terminates unsystematically when present. A discontinuous incised line runs horizontally along the exterior of one specimen just below its lip. Gifford (1976:193) reports that basal ridges are common modes for this type, but they are absent from this assemblage. Instead, the forms present in the Pacbitun karstscape are closely related to those found in the later Dolphin Head Red type discussed above. The primary method used to distinguishing between the two types is the softness of the slip. The decoration on the present type is easily scratched with a fingernail, while that on Dolphin Head Red is more resilient.

Rosario Incised (Gifford 1976:196)
Vessel forms: Dish, plate
Lip forms: Dish, rounded; Plate, interior beveled
Rim diameters: Dish, 28 cm, 32 cm; Plate 32 cm, 34 cm (all measurements recorded for both forms)
Thickness: 0.4 cm, 0.5 cm, 0.7 cm, 0.7 cm (all measurements recorded)
Quantity: 2e (75 g); 6s (355 g), 8t (430 g)
Intrasite distributions and frequency: Actun Lak (8t, 430 g)

Description: Identical form, slip, temper, and fire clouding as Mountain Pine Red: Old Jim. The only differences between the two types are that the current one is additionally embellished with incisions and punctations, and it has a plate form with out-flaring walls. The decorations are similar to those found on some incised and punctated Dolphin Head Red specimens discussed above, and include horizontal and vertical incisions that are used to frame alternating registers of zigzagged and stippled lines. Fire clouding appears on all specimens.

Mountain Pine Group indeterminate (Gifford 1976:123)
Vessel forms: Dish
Thickness: 0.75 cm, 0.75 cm (all measurements reported)
Quantity: 2s,t (55 g)
Intrasite distributions and frequency: Actun Lak (2t, 55 g)

Description: This is the residual category for Mountain Pine group sherds that are difficult to identify below group level. Two specimens are present in it. The first appears to be a composite of two separate types, and the other is insufficiently diagnostic. Both have the same paste characters as the Old Jim variety described above. The first specimen has three rows of regularly spaced punctations above dragged fingernail impressions located along the basal break. The second specimen has square impressions on a possible appliqué band around the basal break of the vessel. The slip on this second sample has eroded completely.

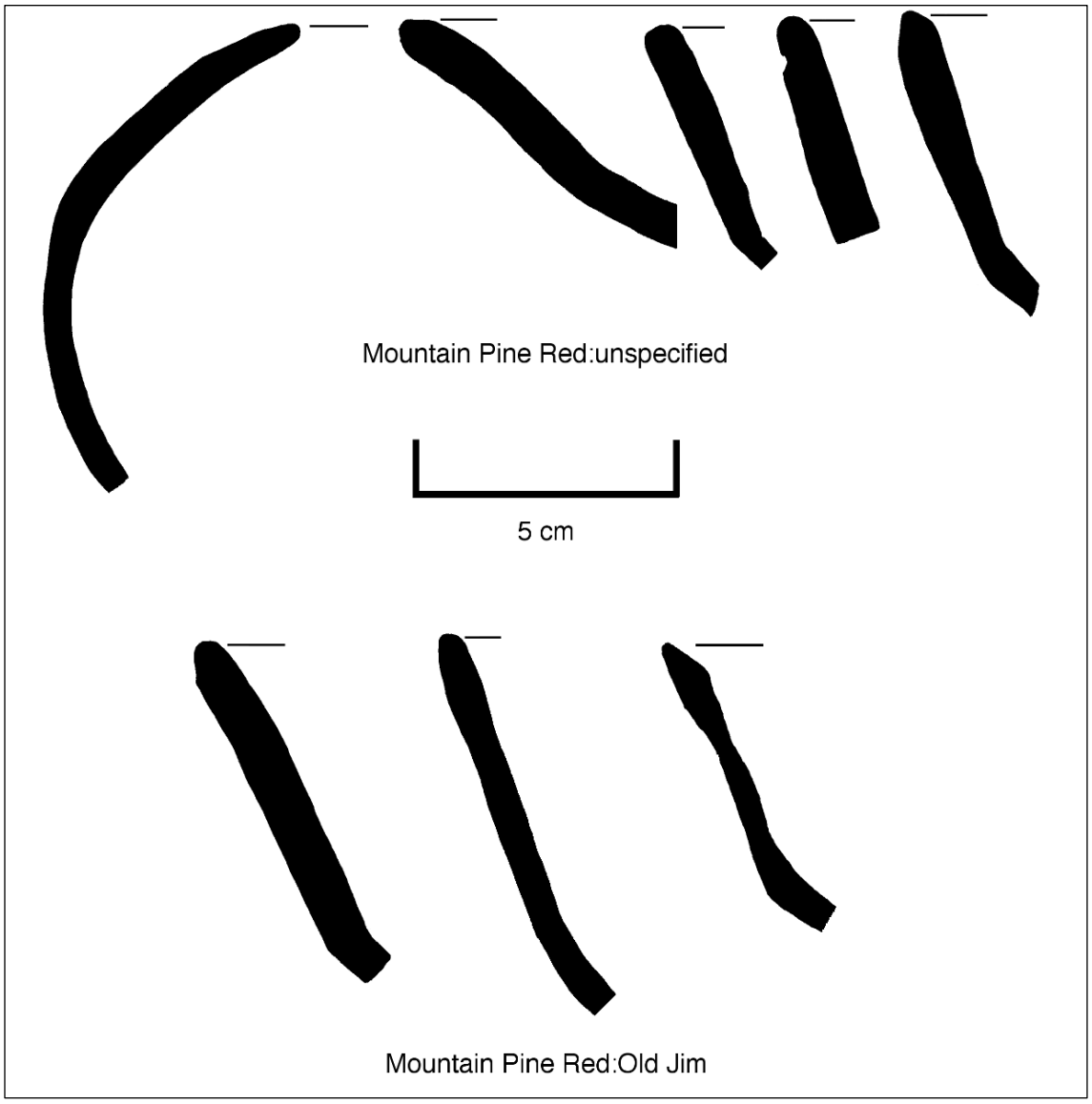


Figure C29. Mountain Pine group rim profiles.

Group: Mount Maloney
Ware: Pine Ridge Carbonate

Mount Maloney Black (Samal) (Gifford 1976:243; Thompson 1942:6; See also LeCount 1996:Figure 5.6)
Vessel forms: Bowl
Lip forms: Bowl, flat, flat-lipped, grooved, grooved-lipped, interior beveled, pointed-lipped, square
Rim diameters: 20 cm, 43 cm, 32.5 cm (14 measurements)
Thickness: 0.55 cm, 0.8 cm, 0.7 cm (17 measurements)
Quantity: 10e (285 g), 7s (395 g), 17t (680 g)
Intrasite distributions and frequency: Actun Lak (16t, 612 g), Actun Naj Che (1t, 68 g), noted at Actun Bosh Tunich
Representative general distribution: This type and all of its temporal varieties are closely affiliated with the settlements within the territory of the Xunantunich polity, beyond which they are replaced by red-slipped calcite wares, particularly those of the Garbutt Creek group discussed above (e.g. Ashmore et al. 2004; Connell 2000, 2010; LeCount 1996, 2010a, 2010b; LeCount et al. 2002). It is noticeably absent in Barton Creek cave and Roaring Creek assemblages, although it does have some presence in the eastern Sibun region (e.g. Awe and Helmke 2007; Harrison-Buck 2007; Mirro 2007).

Description: Fugitive, flat black slip on tall, incurving walled bowls with carbonate temper. The rims of this variety are diamond shaped when viewed in profile, but often contain further minor elaboration such as the addition of grooving, a lip, or beveling. The slip appears on the interiors of vessels and sometimes on exteriors, but in both cases, it is heavily eroded. One specimen with orange paste was polished on its interior, on top of which the black slip was applied. Its weathered condition gives the appearance of mottling, although whether this effect was intentional or accidental is unknown.

Mount Maloney Black (Hats' Chaak) (Gifford 1976:243; Thompson 1942:6; See also LeCount 1996:Figure 5.6)
Vessel forms: Bowl
Lip forms: Bowl, flat, flat-lipped, flat-grooved, flat-thickened, grooved, grooved-lipped, rounded-flat, square, square-grooved, square-lipped
Rim diameters: 23 cm, 50 cm, 34.5 cm (34 measurements)
Thickness: 0.5 cm, 0.9 cm, 0.65 cm (42 measurements)
Quantity: 16e (323 g), 32s (2391 g), 49t (2713 g)
Intrasite distributions and frequency: Actun Lak (44t, 2517 g), Actun Naj Che (2t, 50 g), Actun Nohoch Tunich (2t, 146 g)

Description: Fugitive, flat black slip on tall, incurving walled bowls with carbonate temper. The rims of this variety are oblique, which creates a small lip on the vessel, but they often have further elaborations as suggested above in the large number of lip forms.

The slip appears on vessel interiors and sometimes on exteriors, but in both cases, it is heavily eroded. Bands of red slip are present on some vessel interiors or exteriors just below the rim. One partial, heavily eroded vessel was recovered that has yellow-colored paste and is gritty to the touch similar to eroded British Honduras Volcanic Ash wares. Nevertheless, carbonate temper was identified from a fresh break. No other known Mount Maloney Black specimens from anywhere in the greater Belize Valley area have volcanic tempering. In fact, Thompson (1942:6) notes specifically that the lack of that tempering agent is one of the defining characteristics of this type. Both chipped rims and calcium carbonate-coating cave growth are common, and a biconically-drilled mend hole appears on one specimen. I was unable to measure the diameters of several vessels because their openings are oblong or otherwise aberrantly shaped.

Mount Maloney Black (Tsak') (Gifford 1976:243; Thompson 1942:6; See also LeCount 1996:Figure 5.6)
Vessel forms: Bowl
Lip forms: Bowl, flat, flat-lipped, square, square-grooved, square-lipped
Rim diameters: 18 cm, 50 cm, 32.5 cm (7 measurements)
Thickness: 0.4 cm, 0.85 cm, 0.7 cm (9 measurements)
Quantity: 6e (75 g), 4s (247 g), 10t (322 g)
Intrasite distributions and frequency: Actun Lak (8t, 229 g), Actun Naj Che (1t, 19 g), Actun Nohoch Tunich (1t, 75 g)

Description: Fugitive, flat black slip on tall, incurving walled bowls with carbonate temper. The rims of this variety are horizontal, creating a T-shape in profile sometimes with additional minor elaborations, such as grooving, or the creation of a small lip. I was unable to measure the diameters of several vessels because their openings are oblong or otherwise aberrantly shaped. Smudging was noted on one specimen, and another had calcium carbonate growth on it.

Mount Maloney Black:Unspecified (Gifford 1976:243)
Vessel forms: Bowl, jar
Lip forms: Bowl, flat, flat-lipped, grooved, grooved-lipped; Jar, flat, flat-lipped, grooved-lipped, rounded-flat, square-grooved, square-lipped, tooled
Rim diameters: Bowl 19 cm, 55 cm, 28 cm (7 measurements); Jar 14 cm, 27 cm, 18.5 cm (7 measurements)
Thickness: 0.3 cm, 0.85 cm, 0.65 cm (9 measurements)
Quantity: 290e (2643 g), 23s (1519 g), 313t (4162 g)
Intrasite distributions and frequency: Actun Jcheehem (5t, 498 g), Actun Lak (266t, 3218 g), Actun Naj Che (23t, 262 g), Actun Nohoch Tunich (18t, 177 g), Actun Xtuyul (1t, 8 g), noted at Actun Balam, Actun Bosh Tunich, and Crystal Palace

Description: Fugitive, flat black slip on calcite tempered incurving walled bowls. Thin walled globular jars with compact gray or orange paste and slightly glossy black slip are also common. These latter forms tend to have constricted, out-flaring necks, and open forms are absent from the current assemblage. Overall, this category is the residual grouping of Mount Maloney Black sherds that are insufficiently diagnostic for LeCount's (1996:146) chronological microseriation of the type detailed in the three entries above to be used.

An identification problem arises with some jar body sherds because patches of both red and orange occur on some of the more complete specimens that are otherwise slipped black. By themselves, such non-black colored sherds could be typed as Tinaja Red (Smith and Gifford 1966:163), or perhaps San Antonio Punctated-incised (Bill 1985:186), but the presence of the black Mount Maloney slip on some indicates that either of those classifications is problematic for body sherds. Furthermore, the former is a Peten Gloss Ware, and the latter Pine Ridge Carbonate, indicating different production technologies. Nevertheless, the issue is not a concern from a chronological perspective because both are Late to Terminal Classic period types. In order to account for these differences, I classify only all black sherds as Mount Maloney and group the remainder into a general "Late Classic period globular jar" category. Although not chronologically significant, making this separation has a substantial quantitative impact on the current analysis because they account for an additional 596 total specimens weighing 6951 g.

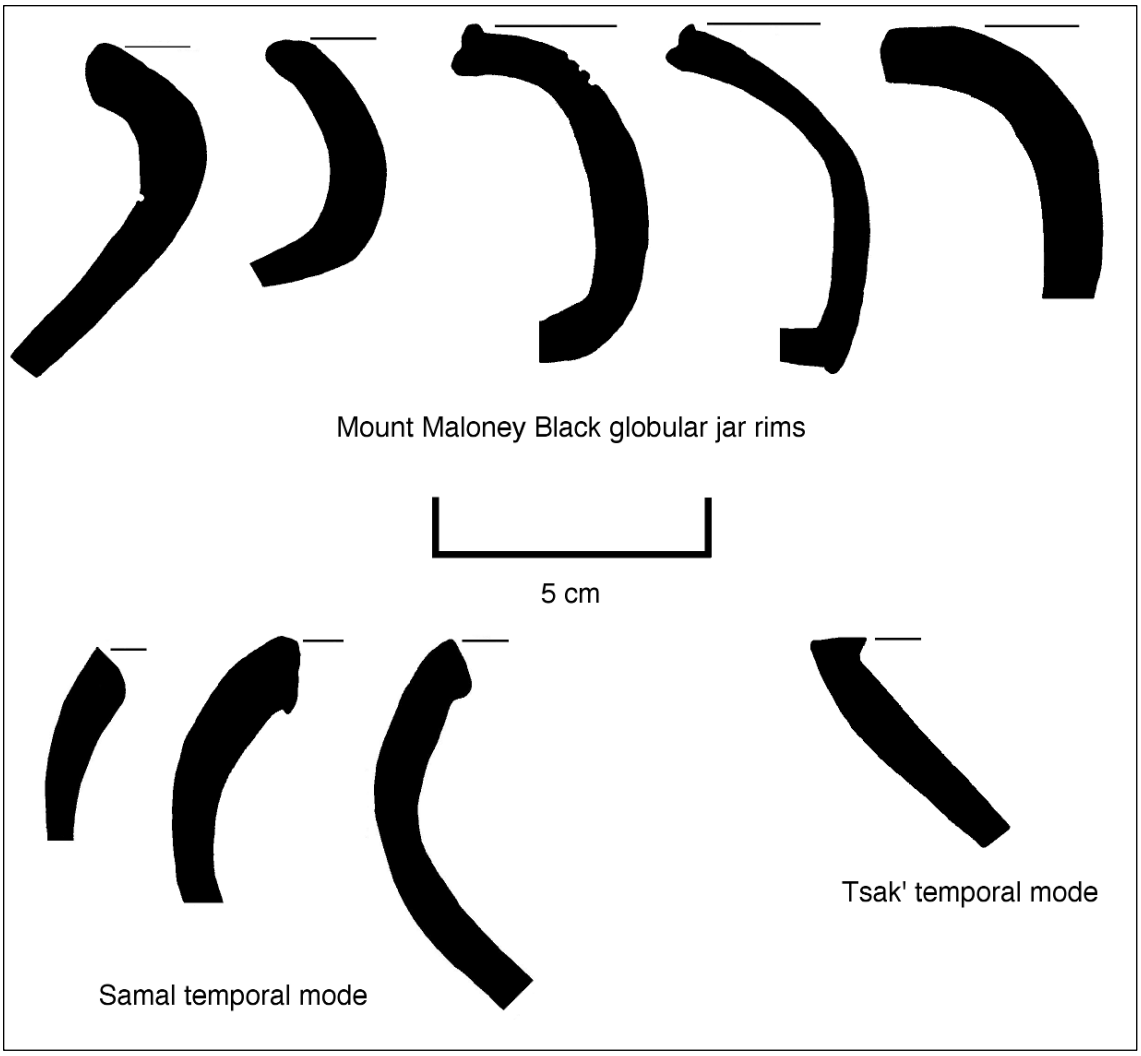


Figure C30. Mount Maloney Black group rim profiles.

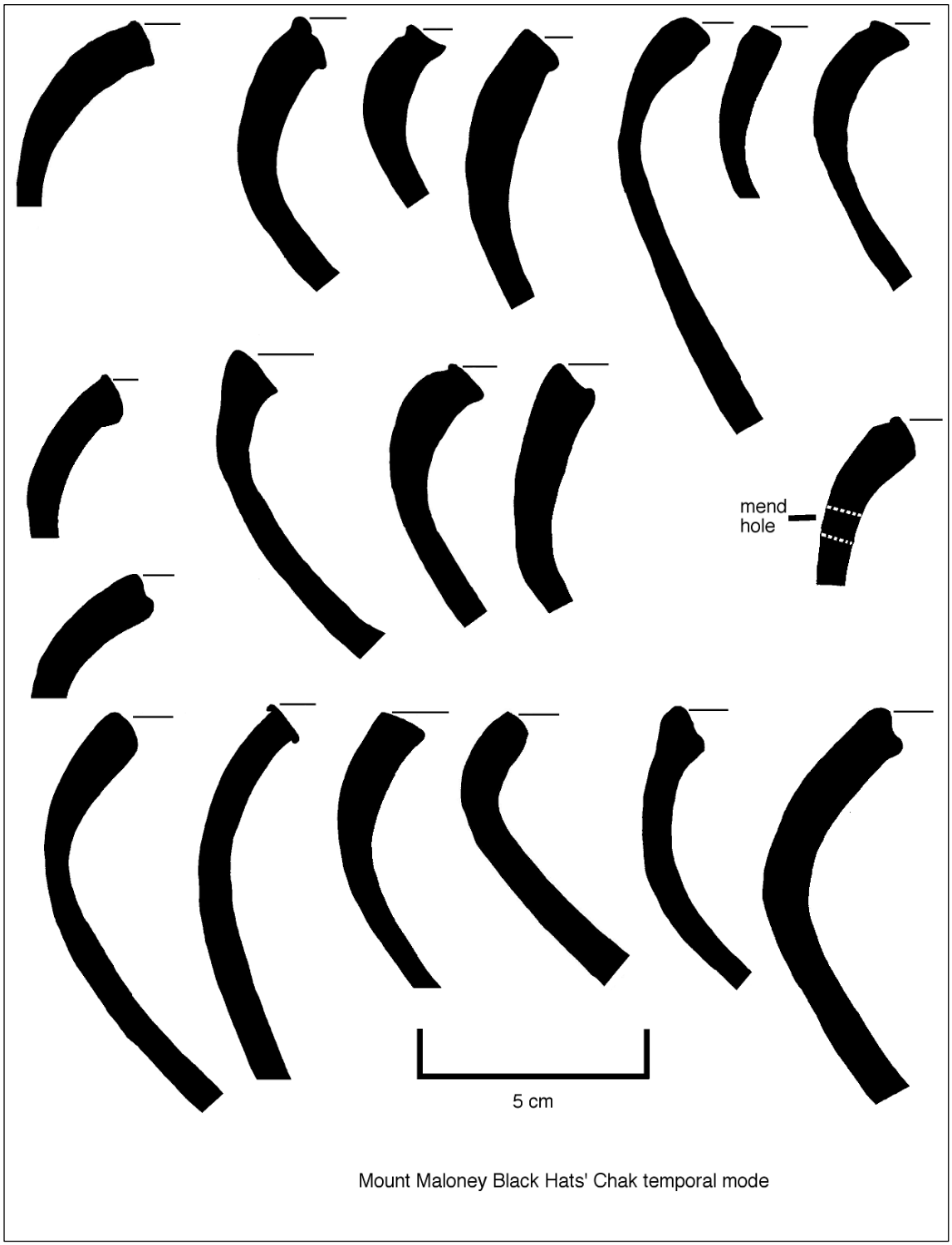


Figure C31. Mount Maloney Black Tsak Hats' Chak rim profiles.

Group: Saxche-Palmar
Ware: Peten Gloss

Paixban Buff-polychrome (Smith and Gifford 1966:160)
Vessel forms:
Lip forms: Dish, interior beveled, vase
Rim diameters: 32 cm
Thickness: 0.8 cm
Quantity: 4s (183 g)
Intrasite distributions and frequency: Actun Lak (3t, 104 g), Actun Hayach Naj (1t, 79 g)
Representative general distribution: Paixban Buff-polychrome is an unusual Peten Gloss ware type that tends to be found in low frequencies in the Southern Maya Lowlands. In Guatemala it appears in the Tayasal Paxcaman Zone (Chase 1984:35), at Tikal (Culbert 1993:14), and Uaxactun (Smith and Gifford 1966:160). It is little reported in Belize, but five sherds were recovered at Barton Ramie (Gifford 1976:251).

Description: Red, orange, and black polychrome decoration on buff slipped out-flaring dishes. A cylinder vase was also identified for this type. The paste is the same color as the buff slip, and contains some calcite and other unidentified black inclusions. Four sherds from three vessels were identified, labeled here for ease of discussion as Specimens 1, 2, and 3. The exterior rim and basal break of Specimen 1 are decorated with horizontal black lines. The body of the vessel displays black and orange rectangles that are separated by a V-shaped patch of buff slip. Diffuse red vertical lines evenly divide the orange rectangle. The interior of the vessel has a thick horizontal orange line extending down from the rim, below which is another thin line of the same color. A zoomorphic being begins below the two lines and appears to have continued onto the vessel base. The creature is likely avian, as evidenced by visible feather-like motifs. Nevertheless, the overall interior decoration has largely been obliterated by use ware, and the figure may just as likely be a humanoid with a feather headdress. A review of published illustrations of this type from Uaxactun and Tikal indicates that both human and animal figures are exceedingly rare for this type. Instead, they often have complex geometric motifs, making this sample from Actun Lak unusual. Some smudging suggests the damage may be attributed to ceremonial use. Specimen 2 has no visible exterior decorations, but that surface is heavily smudged. Its interior has a base buff to cream slip that is further

decorated with two horizontal red lines, one thicker than the other, and two long black rectangle shaped motifs that appear to originate from the same spot. Specimen 3 is a cylinder vase base that has a buff to cream base slip on its interior and exterior. The remainder of the decoration appears on the outside of the vessel and includes a thin horizontal line along the basal break, and geometric designs and dots on its body, all of which are various shades of red.

Palmar Orange-polychrome (Gifford 1976:214)
Vessel forms: Vase
Lip forms: Vase, rounded
Rim diameters: 12 cm (1 measurement)
Thickness: 0.6 cm (1 measurement)
Quantity: 1e,t (42 g)
Intrasite distributions and frequency: Actun Lak (1t, 42g), noted at Actun Hayach Naj
Representative general distribution: This type, and the closely related Saxche described below are the prototypical Late Classic period polychromes that are ubiquitous in the Maya Lowlands during that time and, as such, no effort is made to trace either to a particular site.

Description: Red and black designs on polished orange slipped cylinder vases with in-sloping walls and calcite paste. Decorations consist largely of horizontal lines on vessel interiors and exteriors. Specimen is both burned and has fire clouding on its interior. This type is closely related to Saxche Orange polychrome discussed below. Some ceramicists combine the two categories while others maintain that vessel form distinguishes them, and that the current type is slightly later than the other (e.g. Gifford 1976:206, 249; Sabloff 1972:123). I follow Sharer (1994:691), who identifies Palmar Orange as Late Classic, Tepu 2 orange-slipped polychrome cups, vases, plates, and bowls with out-flaring walls. Saxche belongs to the Tepu 1 sphere and is comprised of round-sided bowls and large tripod plates and dishes.

Saxche Orange-polychrome (Smith and Gifford 1966:162)
Vessel forms: Dish
Lip forms: Dish, rounded, interior beveled
Rim diameters: 21 cm, 27 cm, 29 cm, 29 cm (4 measurements)
Thickness: 0.6 cm, 0.7 cm, 0.85 cm, 0.9 cm (4 measurements)
Quantity: 6e (86 g), 2s (186 g), 8t (272 g)
Intrasite distributions and frequency: Actun Jcheehem (1t, 160 g), Actun Lak (6t, 68 g), Actun Nohoch Tunich (1t, 44 g)

Description: Red and black designs on polished orange slipped out-flaring dishes with calcite paste. Both tripods and unsupported bases are present. Decorations consist largely of simple lines and geometric shapes on vessel interiors and exteriors. The specimen from Actun Nohoch Tunich provides an ideal example of the variety of decorative motifs found on this type. It has an interior red rim that is framed by a thin horizontal black line. The red paint continues onto the exterior of the vessel, and is also framed on that side by a pair of thin black horizontal lines, below which begins an area of indeterminate geometric shapes, another thin black line, an undecorated area, and then a final thin black line at the basal break. Fire clouding, smudging, and extensive use ware are common on all specimens (see description of Palmar Orange polychrome above for relationship between that and the current type, and the method used here for distinguishing them.)

Sibal Buff-polychrome (Smith and Gifford 1966:163)
Vessel form: Indeterminate
Lip forms: rounded
Rim diameter: 16.5 cm (1 measurement)
Thickness: 0.55 cm (1 measurement)
Quantity: 1e,t (30 g)
Intrasite distributions and frequency: Actun Lak (1t, 30g)

Description: Orange slipped interior and black exterior on a bowl or vase form with in-sloping walls and fine, sandy paste (**Figure C32**). The black decoration is disrupted by a wide band of buff to orange slip just below the rim that provides a background for a red colored PSS text that was applied in a fine calligraphic style (see Boot 2005; Coe 1973; Grube 1991; Houston et al. 1989; Houston and Taube 1987; MacLeod 1990; Mathews 1979; Stuart 1989 for discussions of PSS texts). The hieroglyphs likely comprise the first and last words of the dedicatory text for this vessel, as discussed below. One of the glyph collocations is complete, and approximately half of the other remains, and they measure 3 cm and 1.5 cm wide respectively. These two measurements suggest that each block in the complete text averaged 3 cm wide. Considering this calculated per-glyph average width with the vessel diameter, the original text most likely consisted of five blocks. As such, I label the two extant collocations as "A" and "E" in reference to their respective reconstructed locations (**Figure C33**).

Glyph A consists of a semi-legible prefix and a heavily damaged main sign. The prefix consists of a rounded top component, a horizontal bar-like element in the middle,

and a "u" shaped bottom piece. This arrangement closely resembles of the *a/ah* syllables that start two PSS texts on a vessel recovered from Uaxactun (**Figure C34**; Coe and Van Stone 2005:106). The syllable prefixes on the initial glyphs of those vessel texts consist of rounded zoomorphic heads, below which are single horizontal elements. A third component of both prefixes is a "u" shaped design at the base. These similarities indicate that the prefix on glyph block A is a variant of the same element. Furthermore, although the main sign on of glyph block A on the Actun Lak sherd is badly eroded, its extant elements resemble the "mirror" grapheme found on other initial signs of PSS texts on other vessels (**Figure C35**) (e.g. Coe 1973; Grube 1991; Stuart 1989). Maya scribes used the glyph to announce that the proceeding text describes the manner in which the particular vessel was decorated (Stuart 1989).

Glyph block E remains in much better condition than A. It is composed of a syllable prefix that resembles *hi-/yi-*, and a main sign that I was unable to identify (**Figure C36**). The position of glyph E as the final statement in the PSS suggests that it may be part of the name of the scribe who painted it, or it may refer to the contents of the vessel. Alternatively, the use of the initial glyph in position A, in addition to the appearance of the *yi-* syllable in the presumed fifth position in the PSS suggests that a more secure reading for this collocation is *yich,* "its surface [for writing]" (**Figure C37**; e.g. Coe and Van Stone 2005:101). If this latter reading is correct then the entire text of the vessel likely stated simply that the vessel surface was prepared and painted.



Figure C32. Rim profile, line drawing, and photograph of Actun Lak PSS sherd.

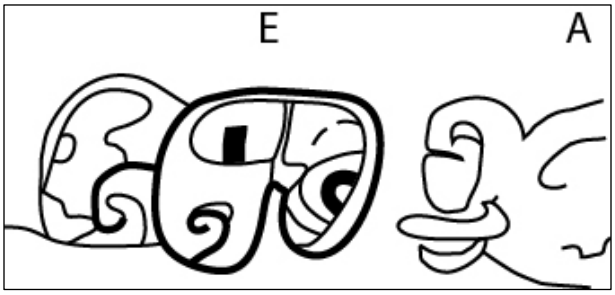


Figure C33. Actun Lak PSS sherd labeling glyph blocks.



Figure C34. a. Photograph and drawing of Actun Lak PSS sherd glyph block A prefix; b. *a/ah* syllables from Uaxactun vessel (adapted from Coe and Van Stone 2005:106, 157).

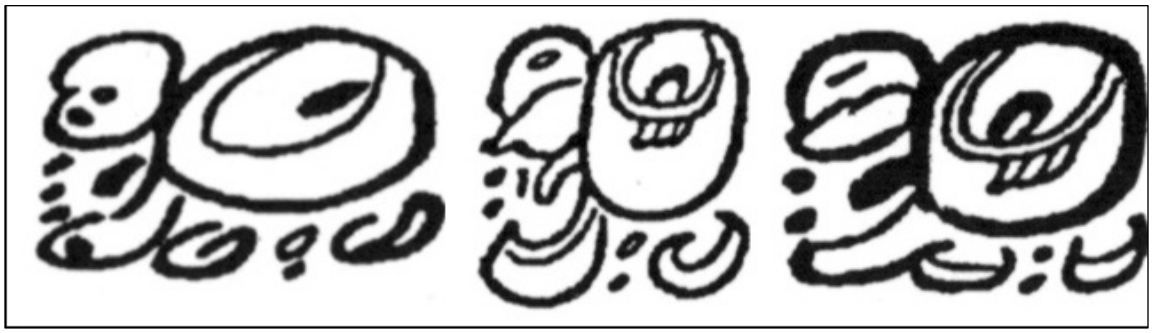


Figure C35. Examples of PSS Introductory glyphs with "mirror" grapheme (adapted from Stuart 1989:Figure 5).



Figure C36. Actun Lak PSS sherd glyph block E photograph and line drawing.

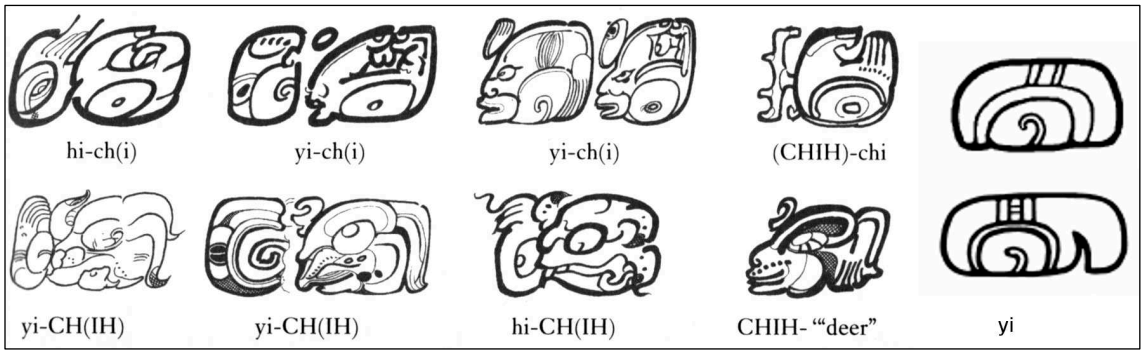


Figure C37. Examples of *yi, yich*, and *hich* glyphic collocations (adapted from Coe and Van Stone 2005:101,157).

Tunich Red-on-orange (Gifford 1976:252)
Vessel forms: Vase, lid
Lip forms: Vase, rounded; Lid, rounded-lipped
Rim diameters: Vase, 15 cm, Lid, 14 cm, 18 cm
Thickness: 0.35 cm, 0.45 cm, 0.4 cm (4 measurements)
Quantity: 2e, (21 g), 1s (25 g), 3t (46 g)
Intrasite distributions and frequency: Actun Lak (3t, 46 g)

Description: Vase, or possible "brandy snifter" form, with in sloping sides and conical lids that are all slipped orange and have red painted rims. One of the lid sherds has use ware on it.

Zacatel Cream-polychrome (Smith and Gifford 1966:164)
Vessel forms: Dish, vase
Quantity: 2e,t (15 g)
Intrasite distributions and frequency: Actun Lak (2t, 15 g)

Description: Base cream slip with additional black painted decorations on cylinder vase and dish forms. One of the specimens is slipped on its interior and has a black band running along the exterior basal break. The second specimen is a cream slipped body sherd that has an additional two thin vertical black painted lines.

Saxche-Palmar Group Indeterminate (Smith and Gifford 1966:160, 162)
Vessel forms: Bowl and dish
Lip forms: Dish, rounded
Thickness: 0.65 cm , 0.75 cm (2 measurements)
Quantity: 6e (31 g)
Intrasite distributions and frequency: Actun Lak (3t, 20 g), Actun Naj Che (1t, 3.6 g), Actun Nohoch Tunich (2t, 7.2 g), and noted at Slate Cave

Description: This is the residual category for the Saxche-Palmar group. It contains specimens that are either too eroded, burned, or insufficiently diagnostic to be able to assign them to a type. Most of the remaining visible decorations are red and black painted horizontal lines on orange, cream, or buff base slip. A few of the specimens are decorated on only their exteriors indicating that they may be tecomate-like bowls. Another piece is part of a hollow round support. Fire clouding is common on these specimens.

Group: Sotero
Ware: Unspecified

Sotero Red-brown (Gifford 1976:210)
Vessel forms: "Brandy-snifter," dish
Lip forms: "Brandy snifter," rounded; Dish, rounded
Rim diameters: Dish 19 cm (1 measurement)
Thickness: 0.9 cm (1 measurement)
Quantity: 14e,t (138 g)
Intrasite distributions and frequency: Actun Lak (14t, 136 g), Actun Naj Che (1t, 2 g)
Representative general distribution: This is a rare type that has wide-ranging connections to the greater Southern Maya Lowlands. It resembles some Copan, Tikal, and Palenque pottery, although in some cases only in concept (Gifford 1976:211). In Belize, it had been identified at Baking Pot (Audet and Awe 2004:53, 2005:359); Barton Ramie (Gifford 1976:210), the Caves Branch area (Wrobel et al. 2009), and the Upper Roaring Creek Valley (Awe and Helmke 2007:35)

Description: Brown to red-brown slip on brandy-snifter-shaped, and other indeterminate pedestaled vessels. The paste is orange colored and brick-like with hematite and cleaved calcite tempering. Pedestal bases were the most common parts that I recovered, and one specimen has fire clouding and smudging on the interior base of the container suggesting that it may have been used as a censer. Another of the pedestal base sherds has a large chip removed suggesting that it was symbolically "killed."

Orange Walk Incised (Gifford 1976:214)
Vessel forms: Vase
Quantity: 8e,t (31 g)
Intrasite distributions and frequency: Actun Naj Che (8t, 31 g)

Description: Identical to Sotero Red-brown described above with the addition of deep oblique channel fluting on the vessel body. All of these sherds came from the same provenience and many refit suggesting that they are all part of one vessel.

Group: Teakettle Bank
Ware: Peten Gloss

Teakettle Bank Black (Gifford 1976:202)
Vessel forms: Bowl
Lip forms: Rounded-thickened, flat,
Rim diameters: 25 cm, 29 cm (all measurements reported)
Thickness: 0.7 cm, 0.9 cm (all measurements reported)
Quantity: 1e (19 g), 3s (43 g), 4t (62 g)
Intrasite distributions and frequency: Actun Lak (4t 62 g)
Representative general distribution: Overall, this type is rarely reported in the literature and seems largely restricted to cave sites in the Belize Valley, even though it was originally described from samples recovered from Barton Ramie settlement (Gifford 1976:202). It is present in Barton Creek and Petroglyph caves (Mirro 2007:107; Reents-Budet 1980a, 1980b), and it has been noted as a possible type in Actun Halal rockshelter on the Vaca Plateau, south of Xunantunich (Ishihara 2001b:Figure 2).

Description: Well-smoothed glossy black slip on the interiors of bowls with rounded to gently incurving walls. The slips are poorly applied on most of these specimens, giving the sherds a mottled appearance, but exteriors are undecorated. Gifford (1976:202) notes that this type is similar to Balanza Black described above, but is more poorly made and slightly later in time.

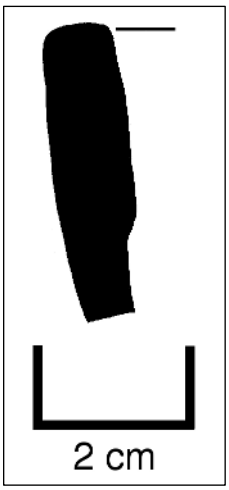


Figure C38. Teakettle Bank Black rim profile.

Group: Tu-tu Camp
Ware: Uaxactun Unslipped

Tu-tu Camp Striated (Gifford 1976:235)
Vessel forms: Bowl, jar
Lip forms: Bowl, rounded; Jar, grooved
Rim diameters: Jar, 19 cm (1 measurement)
Thickness: 0.8 cm (1 measurement)
Quantity: 119e,t (2041 g)
Intrasite distributions and frequency: Actun Lak (93t, 1637 g), Actun Naj Che (16t, 254 g); Actun Nohoch Tunich (10t, 150 g)
Representative general distribution: Tu-tu Camp group is commonly found in most cave and settlement contexts throughout the Belize Valley. As such, I make no effort here to trace the material to specific sites.

Description: This group is similar to Cayo except that it has extensive, randomly applied striations on its exterior. Surfaces are often heavily speckled with exposed calcite tempering and fire clouding is common. Few rims from this group were identified suggesting that the decoration is limited to the neck and body.

Group: Vaca Falls
Ware: Pine Ridge Carbonate

Discussion: Gifford (1965:373) and LeCount (1996) observe that the Vaca Falls group dates primarily to the Terminal Classic period at Barton Ramie and Xunantunich respectively.

Vaca Falls Red (Gifford 1976:235)
Vessel forms: Bowl
Lip forms: Flat, flat-lipped, rounded
Rim diameters: 27 cm, 45 cm, 36 cm (4 measurements)
Thickness: 0.75 cm, 0.9 cm, 0.85 cm (4 measurements)
Quantity: 3e (70 g), 1s (49 g), 4t (119 g)
Intrasite distributions and frequency: Actun Lak (3t, 109 g), Actun Nohoch Tunich (1t, 10 g), noted at Actun Balam
Representative general distribution: Barton Creek Cave (Mirro 2007:109), Chechem Ha Cave (Moyes 2006a:387), Petroglyph Cave (Reents-Budet 1980a, 1980b), Roaring Creek Valley (Awe and Helmke 2007:36), the Sibun Region (Peterson 2006; Harrison-Buck 2010) Xunantunich (LeCount 1996:388)

Description: Dark red slip on thick walled coarse calcite tempered bowls with rounded walls, and diagnostic flat, lipped rims similar to the Tsak' phase variety of Mount Maloney Black. Fire clouding and smudging appear regularly, and one of the rims was chipped indicating that it had been symbolically "killed." This group is likely derived from the earlier Garbutt Creek and Yalbac Ceramic groups (Gifford 1965:373).

Group: Yaha Creek
Ware: Unspecified

Yaha Creek Cream (Gifford 1976:214)
Vessel forms: Bowl, jar
Thickness: 0.65 cm (1 measurement)
Quantity: 5e,t (57 g)
Intrasite distributions and frequency: Actun Lak (1t, 19 g), Actun Xtuyul (4t, 38 g)
Representative general distribution: This group is rarely reported, but it has been noted at Barton Ramie, where it was first described (Gifford 1976:272). It also has been noted at Chan (Kosakowsky 2012:Table 3.3), and the Valley of Peace region (Kinkella 2004: Table 1).

Description: Thin, cream to orange-cream slip on jars and bowls. Only body sherds of this type were recovered in the Pacbitun karstscape, therefore little can be said about its forms and other modal patterns.

Group: Yalbac
Ware: Pine Ridge Carbonate

Yalbac Smudged Brown (Gifford 1976:244)
Vessel forms: Bowl
Lip forms: Flat, interior beveled, pointed, rounded, rounded-lipped
Rim diameters: 21 cm, 46 cm, 32 cm (14 measurements)
Thickness: 0.5 cm, 0.8 cm, 0.65 cm (19 measurements)
Quantity: 26e (686 g), 2s (194 g), 28t (880 g)
Intrasite distributions and frequency: 26e (686 g), 2s (194 g), 28t (880 g)
Representative general distribution: Barton Creek Cave (Mirro and Mirro 2001:Table 3); Barton Ramie (Gifford 1976:244); Minanha (Lamourexu-St-Hilaire and Iannone 2012:215); Petroglyph Cave (Reents-Budet 1980a:64, 1980b), Yalbac (Baltus and Otten 2009:221)

Description: Smudged dull brown wash on hemispherical medium- to thick-walled bowls with carbonate tempered paste. The decorations on this type are heavily eroded and often only appear on vessel interiors. Interior fire clouding and smudging are common suggesting that these vessels were used as containers for burning offerings. The rim of one specimen was extensively chipped, suggesting it had been symbolically "killed." Overall, the form, rather than the type is common in the Pacbitun karstscape assemblage and seems to be related to the Garbutt Creek group as discussed above.

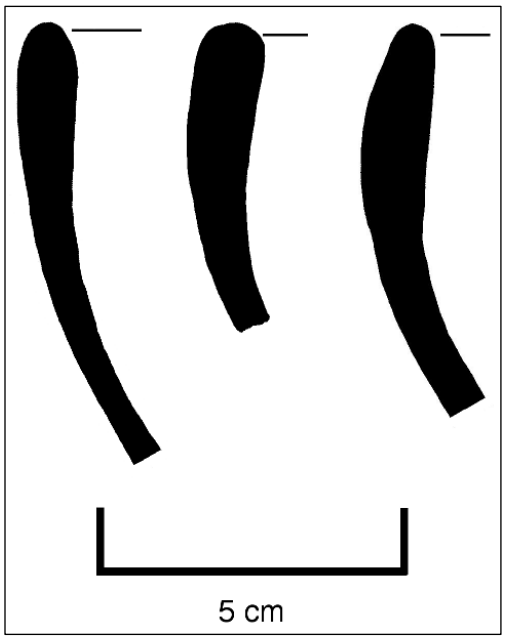


Figure C39. Yalbac Smudged Brown rim profiles.

Early Postclassic period (A.D. 900-1200)

Group	Complex	Ware	TVM
Augustine	New Town (early)	Unspecified	Augustine Red Swallow Black-on-red
Daylight	New Town (early)	Unspecified	Daylight Orange: Daylight
More Force	New Town	UU (?)	More Force Unslipped

Group: Augustine
Ware: Unspecified

Discussion: Until the 2013 field season, New Town ceramic material had yet to be recovered in Pacbitun's settlement (Healy 1990a:259; Healy, Hohmann, and Powis 2004:208). The presence of the Augustine Group ceramics in the karstscape are thus significant because they demonstrate ritual continuity through to the Early Postclassic period, suggesting that the region may not have been completely depopulated as previous studies have suggested (e.g. Healy 1990a; Healy et al. 2007; Healy, Hohmann, and Powis 2004).

Augustine Red (Adams and Trik 1961:125-127, fig. 41, see also Sharer and Chase 1976:291)
Vessel forms: Dish
Lip forms: Dish, rounded
Rim diameters: 18.5 cm, 39 cm (2 measurements)
Thickness: 0.7 cm, 0.95 cm, 0.9 cm (5 measurements. all but one thickness measured between 0.9 cm and 0.95 cm)
Quantity: 12e (438 g), 4s (164 g), 16t (602 g)
Intrasite distributions and frequency: Actun Lak (5t, 223 g), Actun Naj Che (1t, 55 g); Actun Nohoch Tunich (10t, 323 g)
Representative general distribution: The Augustine group is one of the two horizon markers of the early facet of the New Town ceramic complex and, although is centered on the Peten Lakes region in Guatemala (e.g. Adams and Trik 1961:125; Chase 1984:37; Rice 1987:165), it is also prevalent in the Belize Valley and has been identified at Barton Ramie (Sharer and Chase 1976:291), Baking Pot and Tipu (Aimers 2004).

Description: Shallow, flat-bottom dishes with out-flaring walls and hard, fine-textured pinkish tan paste with fine calcite tempering. The surfaces were well smoothed prior to the application of a reddish-orange slip that covers all interior and exterior surfaces down to the basal break. Pieces of bases have hollow foot scars, although no supports were recovered. This lack of feet is unfortunate, because they are one of the most diagnostic modes for identifying this type. Interior smudging is prevalent suggesting that these vessels were used as censers. One specimen has a thin horizontal incision just below the rim of the exterior of the vessel. The same sherd has a chipped rim indicating that the vessel had been symbolically "killed." Most of the specimens in this group have sharp basal breaks leading to flat bottoms. The only two exceptions are one that has a basal ridge, after which the base nearly doubles in thickness. The second exception is a basal ridge sherd that is decorated with pyramid-shaped impressions.

Swallow Black-on-red (Sharer and Chase 1976:294)
Vessel forms: Dish, plate
Lip forms: Dish, flat-lipped, interior beveled; Plate
Rim diameters: Dish, 26 cm, 32 cm (2 measurements); Plate 29 cm, 33 cm (2 measurements)
Thickness: 0.8 cm, 1.05 cm, 0.9 cm (8 measurements)
Quantity: 13s,t (579 g)
Intrasite distributions and frequency: Actun Lak (all)

Description: This type is the same as Augustine Red described above with the addition of black paint on rims and some basal breaks, as well as having a plate form. Both vessel forms have out-flaring walls, sharp basal breaks, and hollow, round foot scars are present on all base sherds. Incisions occur on all rim sherds, approximately 1 cm down from the lip of the vessel, and some just above basal breaks. Smudging, some of which is runny, is on the interior bases and walls of most specimens.

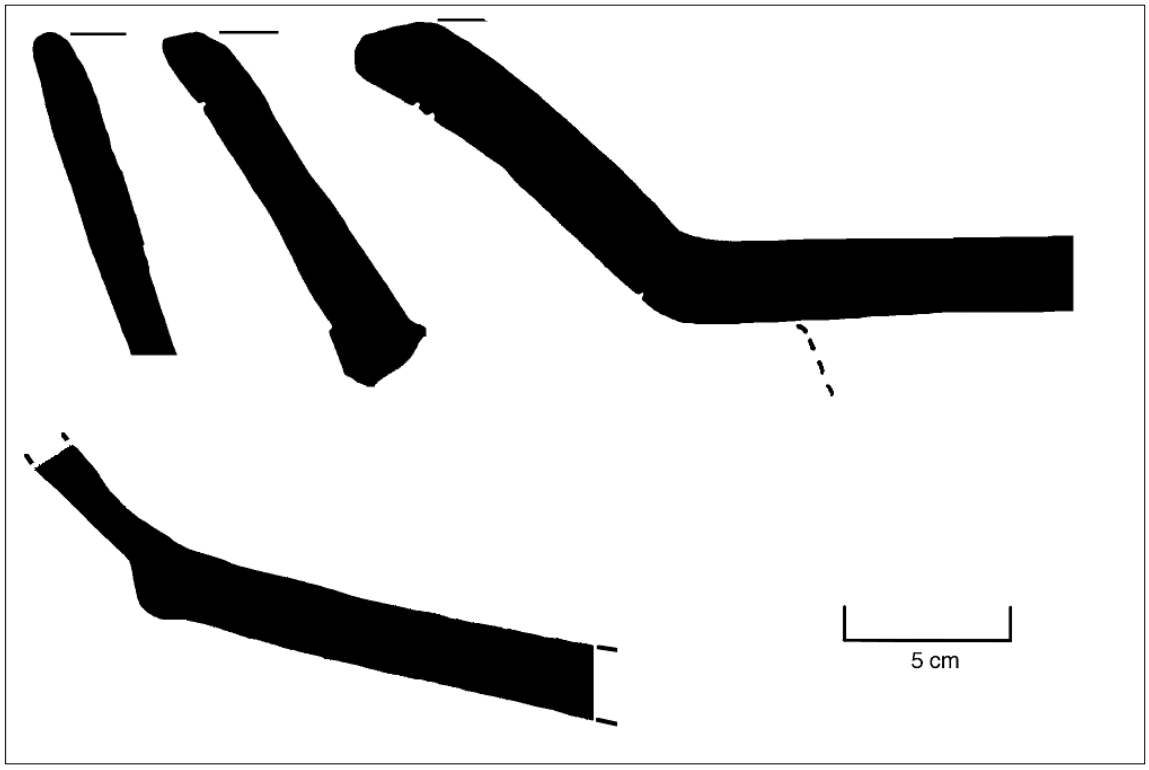


Figure C40. Augustine Group rim profiles.

Group: Daylight
Ware: Unspecified

Discussion: Having only recovered one sherd of this type makes a discussion of broader patterns difficult. Nevertheless, its presence in Actun Nohoch Tunich further evinces continued use of that rockshelter into the early Postclassic period.

Daylight Orange:Daylight (Sharer and Chase 1976:300)
Vessel forms: Dish
Quantity: 1 e,t (3 g)
Intrasite distributions and frequency: Actun Nohoch Tunich (1t, 3 g) noted in Actun Xux (see description)
Representative general distribution:

Description: Bright glossy orange slip with waxy feel on hard paste similar to Augustine group described above but with larger calcite tempering. Only one body sherd was recovered, making any discussion of broader patterns at this time impossible.

Group: More Force
Ware: Uaxactun Unslipped (?)

Discussion: Having only recovered one sherd of this type makes a discussion of broader patterns difficult. Nevertheless, its presence in Actun Lak further evinces continued use of that cave into the early Postclassic period.

More Force Unslipped (Sharer and Chase 1976:305)
Vessel forms: Bowl
Lip forms: flat
Rim diameters: Bowl 17 cm (1 measurement)
Thickness: 0.65 cm (1 measurement)
Quantity: 1s,t (103 g)
Intrasite distributions and frequency: Actun Lak (1t, 103 g)
Representative general distribution:

Description: Unslipped, poorly smoothed brownish, poorly compacted paste that is poorly fired. The one recovered specimen has incurving walls indicating a tecomate-like form. Irregular pyramidal shaped appliqué pellets line the upper rim on the exterior of the vessel. Fire clouding and smudging are absent.

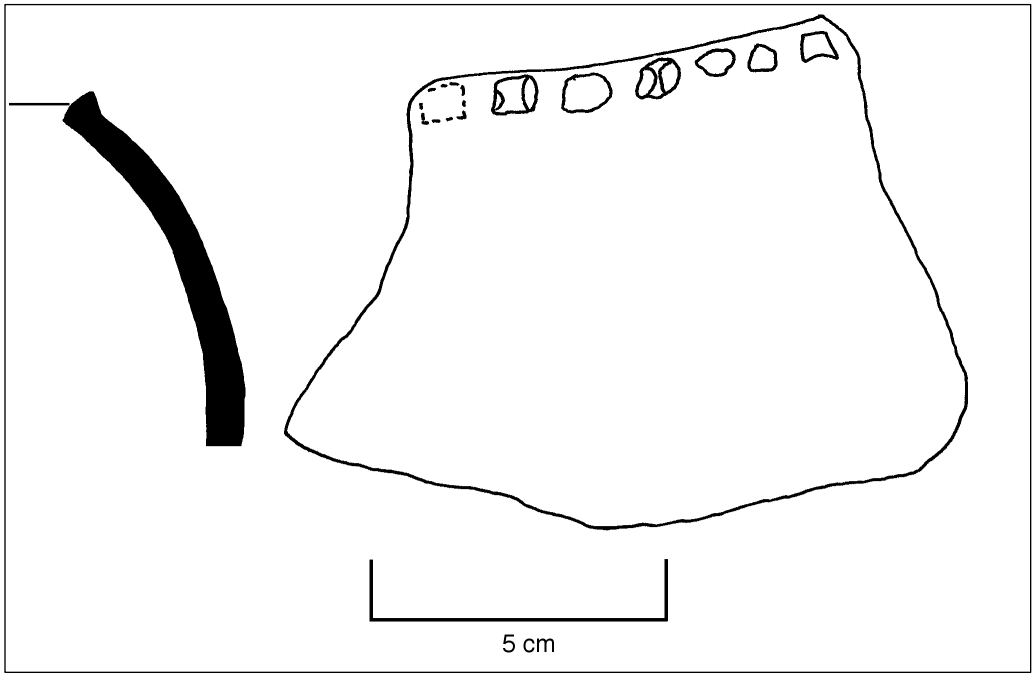


Figure C41. More Force Unslipped rim profile.

APPENDIX D

STORIES OF THE SAN ANTONIO SUPERNATURAL WORLD

As is often the case with anthropological work, a mention made in passing by the people we work with opens up completely unexpected avenues of inquiry. Such an occurrence resulted in the contents of this appendix, which has previously appeared in modified forms in the PRAP progress reports (Powis 2012, 2013; Spenard 2012b; Spenard and Parker 2013). I include these stories because they inform about a contemporary Maya community's worldview and ideas of the landscape. My curiosity about this topic began when some equipment was temporarily misplaced while excavating in Actun Lak on an otherwise particularly productive day near the middle of the 2011 field season. While I was looking around for the missing gear, one of the crew suggested that maybe Diego took it. Confused since there were no "Diegos" on the team, I asked for clarification. The crew informed me that Diego is a mischievous guardian of the jungle, mountains, and caves, also known as the Duende, or Alux (Ah-loosh; Aluxob pl.), names that are regularly interchanged, and done so here (**Figure D1**). I continued to ask about Diego as that field season progressed, only getting minor tidbits about him and his behavior, typically nothing more than his desire to cause minor mishaps and general tomfoolery, like the missing gear. Due to these responses he quickly became a comic scapegoat for the team when any of us had any unexpected, or unpleasant experience, heard an unusual noise, or were unable to locate one of our tools. Nonetheless, his name-

recognition among the local PRAP crew, and his role as protector of the wilds led me to believe that there was more to this trickster than simply causing mischief.

My suspicions were proven correct when the focus of my project moved out of Actun Lak and onto reconnaissance. While walking through the countryside, my collaborators pointed out to me objects or particular formations on the landscape where the Alux could be found, and any related stories about them. These stories do not form a narrative, but rather the figures below tell some about Diego and his world. As such, I have placed the anecdotes in the captions, because they are directly tied to those particular landscape objects or features. The images appearing below represent a small contribution towards understanding the Aluxob in San Antonio. The frequency and diversity of stories about them that the PRAP team told to me suggests that much more remains to said about them as we continue working in the village. Overall, these stories show that that the Aluxob are playful beings whose actions help shape the landscape around San Antonio.

A brief background discussion about Diego's origins and cross-cultural appearances is in order before moving on. He is a common figure in modern Yucatec Maya folklore in Belize, coming alive when a farmer petitions a community elder to make one to protect his fields. (Craig 1998:1). The process takes several days during which a figurine is molded from clay mixed with various substances including rain water, corn, and the blood of various animals, decorated with animal parts such as owl's eyes, and then elaborately costumed (Craig 1998:1-2). Lastly, the elder places the figurine in a cave, tree hollow, or similar orifice, becoming the home of that being. From then on, the

Alux protects the farmer's land from animals, poor harvests, and other calamities, in exchange for ritual compensation. The farmer's family will fall ill if they fail to compensate the being properly (Craig 1998:3). Perhaps the most significant aspect of the material form of these spirits for archaeologists is smashing or burying them beneath rocks destroys them (Craig 1998:4). This practice may help understand why pre-Hispanic Maya figurines are often found shattered.

Supernatural beings similar to the Alux, protectors of the land and natural resources, are common to the Maya area and Mexico. For example, the Yucatec Maya of Chan Kom, Yucatan, also call the beings Alux, describing the beings as tricksters, standing about 1 meter tall with child-like appearances, except they wear beards and crowns (**Figure D2**; Redfield and Villa Rojas 1964:119-120; Figure 2). Moreover, they inhabit the bodies of pre-Hispanic figurines and incense burners, while living in the house mounds surrounding the village (Redfield and Villa Rojas 1964:120). This relationship to archaeological sites is also seen in the Aluxob of San Antonio where they protect ancient artifacts and archaeological sites from looters (Craig 1998:3). The Tzotzil Maya of Zinacantan, Chiapas, believe in a class of evil spirits, collectively referred to as *pukuhetik*, that steal chickens, eggs, and bread, make noise in the middle of the night, and some are shape changers (Vogt 1969:304-305). The beings are known as "Nu Ñu'un" among the Mixtec speaking people of Santiago Nuyoo, Oaxaca. Their names translate as face or place of earth, and they are closely tied to particular locations (Monaghan 1995:99). For example, "ñu'un no'yo" are the "ñu'un of the swamp" (Monaghan 1995:99). Furthermore, they are considered alive and can grow, display emotion, have

council meetings, and go about their days like humans do (Monaghan 1995:98-101). Often they take the form of rocks, although they are also manifest in ancient figurines. Similar to the Alux in Belize and Mexico, they also offer beneficial acts in exchange for proper recompense.



Figure D1. Drawing of Diego "appearing" on maker board during excavations in the Nohoch Tunich rock shelter.

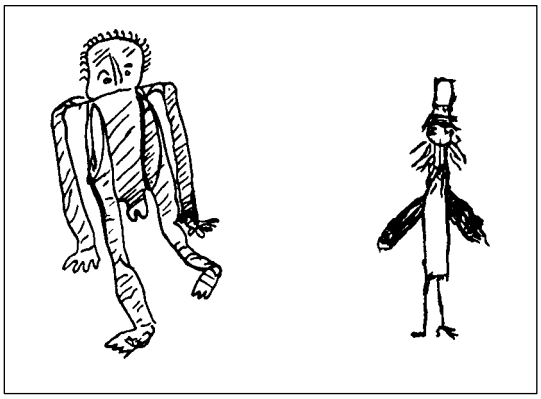


Figure D2. Drawings of Alux recorded in the early 1900s in Chan Kom, Yucatan (Redfield and Villa Rojas1964:Figure 11).



Figure D3. An Alux house. A deformed gumbo-limbo (*Bursera simaruba*) tree in the Alux group near an ancient spring or reservoir. Diego enters his house from the cavity in the picture, but his house is up inside of the tree. He prefers living there because the bottom floods when the rains come.



Figure D4. A Diego or Alux tree. This type of tree (species unknown) is found throughout the forest surrounding San Antono, and is always clear of vegetation beneath because the Alux go to them at midnight and dance, preventing the vegetation from growing.



Figure D5. Diego's playground. This field of boulders, exposed bedrock, and hillocks is a place where the Alux play their games such as hide and seek and chase.

Diego's World Revisited: More Stories from the San Antonio Supernatural World[1]

By Jon Spenard and Megan D. Parker

During the daily grind of moving and screening tons of dirt, hiking through the bush, and investigating the karstscape around San Antonio, we have encountered several supernatural beings through stories and experiences (Speanard 2013a; Spenard 2013b). This short report is about those from the 2012 field season, moving beyond Alux, who was the major character throughout the 2011 field season discussed above, although tales about him certainly were told. We were also introduced to two other beings and supernatural forces we had never heard of previously in San Antonio, the first, *Yum I Ha*, is a water lord, sharing ethnographic parallels with rain spirits. The other is illness-causing evil winds. Each of the three spirits —Alux, water lord, and evil winds— is given their own section below, and the individual tales involving them have been named with titles invented for the sake of this report. Below each tale is an elaboration of it based on other ethnographic contexts. Nevertheless, these discussions should not be considered comprehensive as most of these supernatural beings share many similar attributes, and they appear throughout Central America, and some even extend to the Caribbean islands.

[1] This section originally appeared in the 2013 PRAP progress report and is presented here with minor modifications and with permission from Megan Parker (Powis 2013; Spenard and Parker 2013).

Alux

John's Horse

Story. John has a particular horse whose mane and tale are regularly braided in the middle of the night. The horse's hairs are straight when he goes to bed, but by the morning, they are braided. John and his family believe that Alux comes by at night and braids its hair when they are is sleeping, and this happens fairly regularly.

Discussion. The Yucatec Maya Earth Lord, Tata Duende (Grandfather duende), is also known to prank horses. He likes to pinch them and braid their manes, but in doing so leaves them distraught for several days (Craig 1998:28). The relationship between Alux and Tata Duende appears to be close. They both inhabit caves, are mischievous, have access to wealth, provide success in the hunt, and make unique whistling sounds when people come around (Craig 1998:1-4; Redfield and Villa Rojas 1964:119-121; Spenard 2012a). People who ignore or mockingly imitate the whistles become sick. The main difference between the two beings seems to be that Tata Duende has always existed, while the aluxob are made by shamans to protect fields (Craig 1998).

Encounters with the Alux in Crystal Palace Cave (as told by Megan D. Parker).

During the 2012 field season, I conducted excavation in five caves located in the Pacbitun periphery, including Crystal Palace, the setting of this story (Parker 2013). While excavating in the dark recesses of the cave with Joe and Antonio, I heard what sounded like misplaced footsteps knocking small stones from a ledge, causing a soft clatter in the dark. Joe and Antonio did not react to the sound, and so I dismissed it and went back to work. A short time later, I heard the sound again. I thought perhaps someone had stumbled upon the mouth of the cave, heard us inside, and wandered in out of curiosity. But how did we not hear them enter, and how could they have gotten as far back as we were without a source of light? Joe and Antonio had not reacted to the noise again. I figured that it was an animal of some kind and went back to work thinking nothing of it.

A short time later, I heard the noise yet again. This time, Antonio sat up and called out in the direction of the sound, "Hey! We are over here"! When I asked him whom he was calling out to, he replied, "Alux." Our visitor did not take Antonio up on his invitation, and returning to work, we made small talk amongst ourselves. Moments later, the sound came again! This time from somewhere just past the reach of our lights. Again, Antonio called out, and again there was no reply.

Returning to our small talk, Antonio began telling stories about a cave that people visited to perform various rituals of blessing. A foreign shaman conducted one of the rituals, which involved him making special whistling noise. Antonio repeated the sound

as he told the story. It sounded just like the wind. A few minutes later, Antonio grabbed my hand, imploring me to stop digging, and asked, “Do you hear that”? From somewhere in the cave, we heard what sounded like the wind. The Alux had whistled back to us, as if saying goodbye. We never heard from him again.

Antonio related to Jon that people from San Antonio collect large quantities of copal, corn, and other objects, giving them as offerings to the ancient Maya spirits throughout the year. Furthermore, he reported when people walk through the bush and encounter a cave like Actun Lak with a copal tree growing in front of it, set up their tables (altar), like the screen stands used in our excavations (**Figure D6**). Once the table was ready, they put their calabash full of corn drink on it, and use an ancient mano or modern instrument to grind things up. Rituals like these are done at Offering Cave and Caracol, and people from Mexico and Guatemala frequently join them at these places.



Figure D6. Screening stand in left center of photo used for excavations.

El Negrito; Yum I Ha; Dueño de Agua; Negro de Agua; Negro de Rio; (Ku Ha?)

Story. This being is like the Earth Lord (Tata Duende?) but of the water.

Discussion. We were given three separate names for this being, El Negrito, Dueño de Agua, and Yum I Ha, and only told that he is like the Earth Lord, but of water. Craig (1998:24) provides a short description of Negro de Agua, or Dueño de Agua, who is assumed here to be the same being. He is a dark-skinned man whose palms and feet are stark white, and sits on a stump or rock by the water's edge in the evenings, guarding over that particular spot. He regularly jumps in the river if approached by people, but in

village of Succotz, near Xunantunich, he has become feared after spotted sitting on a drowned man's stomach in a cave.

Other information about a supernatural being with any of these names is scarce in the ethnographic literature, although the Spanish name translates to "Owner of [the] Water." Street merchants in San Ignacio sell slate pendants decorated with carved profile human heads, wearing simple headbands, offering some leads to identifying this being in other contexts (**Figure D7**). Information labels attached to the pendants read, "Ku Ha Diving God, one who protects divers and gives understanding to the water way." Although the images on the pendants are rather nondescript and the information accompanying such tourist trinkets is generally suspect, their presence demonstrates that knowledge about this being extends beyond San Antonio, and the name may be a local variant for it. Several "water gods" or spirits have been recorded throughout the Maya area, living in or around water bodies. The Lacandon, Hahana Ku, "Much-rains-house God" provides the closest linguistic match to the name given to the spirit in San Antonio. Living on a mountain, Hahana Ku spreads black



Figure D7. Ku Ha slate pendant.

powder on the clouds, causing rain (Thompson 1970:266). The being buys the black powder from Menzabac, or Yum Canan Zabac, one of the creator gods who lives in a cave at the edge of a lake (Thompson 1970:265-266). Thompson (1970:267) and Tozzer (1907:81) report that all of the Lacandon rain gods are associated with hills, caves, and bodies of water. Nevertheless, they disagree over the exact number of these supernatural beings. Thompson (1970:267) reports on five, while Tozzer (1907:93) notes 15, but stating only the ones treating people well are represented among a community's idols, suggesting that the numbers are higher than either his or Thompson's counts.

The rain gods of the Chorti Maya of eastern Guatemala and nearby Honduras and El Salvador are called Chicchan, and they are organized hierarchically (Wisdom 1940:392-397). The major Chicchan are serpent-shaped beings living below bodies of water at the four corners of the world (Thompson 1970:262). Among the lowest are the earth Chichans, living in streams, springs, and lakes (Thompson 1970:262). Yucatec Maya of Chan Kom call thethe rain gods Chaacs. These supernaturals are part of a group that represents and guards all parts of the natural world (Redfield and Villa Rojas 1964:112). Similar to the other Maya groups, the Chan Kom Maya identify multiple hierarchically organized Chaacs. The primary ones live in the four corners, while the lesser ones are distributed throughout the world and referred to by particular attributes (Redfield and Villa Rojas 1964:115).

Yum I Ha is closely related to the Classic period Chak based on his description as the Earth Lord of the water. This being has already been discussed in Chapter 4, but a short description is given here. Overall, the Earth Lord is described throughout the Maya

area and beyond as a cave-dwelling supernatural being who manages all of the wild things of the earth, including animals, plants, and the rains. Individuals make offerings to the Earth Lord when they wants to hunt one of his animals, or use any of his resources (Brown 2005; Cruz Guzman *et al.*1980:116; Maurer-Avalos 1970:223). If he considers the petition sufficient, he allows the resource to be harvested, or the animal to be caught.

Following the analogy of Yum I Ha being like the Earth Lord but of the water, the animals that he may guard are fish. Such a possibility exists in iconography dating back as far as the Late Preclassic period, where Chahk is depicted as a fisherman. For example, he appears on Izapa Stela 1 covered in fish imagery (Coe 1978; Taube 1992a:23). Shown slightly hunched, he lifts a fish-filled basket from which water pours. Similar Chahk fishing scenes appear in the Post Classic period Dresden Codex suggesting that the belief in the god as a fisherman, or lord of the fish, continued throughout the Classic period and into contemporary times (e.g. Taube 1992a:23).

Evil Winds

Three brothers encounter an evil wind

Story. Although people in the village (San Antonio) have different religions now, spirits and forces can still affect them. For example, Javier and his brothers were out walking one night when they suddenly felt a sharp wind come up from behind them, circle around, and then hit one of the brothers, knocking him back. The brother hit with the wind got sick for many days, but eventually got better.

Discussion. Illness causing winds have been reported in the ethnographic literature throughout the Maya area. They may be linked with geological formations, the heavens, and animals, but the ones causing illness are typically the shapeless tools of sinister beings (Love 2011). Many kinds exist and a specific cleansing ritual performed by a healer is the only cure for many of them (Love 2011:137). For example, the Tzeltal Maya of Zinacantan, Chiapas, can be afflicted with 'Ik', Makal ta 'ik', Tup' 'ik', Hok'ob 'ik', or Sikil 'ik' (Fabrega and Silver 1973). 'Ik' or "wind," is typically brought on by bad sources and is considered a major illness, including swelling of the extremities. Its cure is commonly found in drug stores (Fabrega and Silver 1973:247). Makal ta 'ik' means, "closed up wind," and is used to refer to constipation or general pains and the inability to walk, typically in females. It is caused by witchcraft of demons and can be cured with a mixture of water and tobacco (Fabrega and Silver 1973:246). Hak'ob 'ik,' a minor ailment, is an itchy rash caused by a chill. It typically goes away on its own,

although it may also be treated with medicine (Fabrega and Silver 1973:245). Tup' 'ik' or "attack" is a loss of consciousness, considered a major ailment with no cure. Ancestral gods and demons typically caused it, and knowing which can help alleviate some of the symptoms (Fabrega and Silver 1973:244-245). Sikil 'ik', or sikil loloal 'il' is an attack by a cold wind when on a trail that results in chills, and fever, and is considered a major illness. Like the other winds, it is regularly caused by demons or witchcraft, although it may be cured by several different plant remedies (Fabrega and Silver 1973:242). The plants used for curing must be considered "hot," in order for it to be effective. Temperature in this case does not refer simply to the level of agitation of molecules, but rather, a dynamic quality inherent to everything in the world (Vogt 1976:206-207; Breedlove and Laughlin 2000:115). Interacting with objects of varying temperature will influence each of them. Healers need to consider an illness' temperature to determine what class of plants are needed to cure it. For example, roots, greens, and fruits are considered "cold," while those with spicy or bitter flavors are "hot" (Breedlove and Laughlin 2000:115). For example, treating a "hot" illness with a bitter-tasting medicine will make the illness worse.

Winds can take on human-like forms. For example, the Yucatec Maya believe that the Devil disguises himself as a whirlwind (Read and González 2000:167). Among the contemporary Tzotzíl Maya in Chamula, Chiapas, the wind is a female and is among a variety of minor nature spirits, causing mishaps (Gossen 1999:184). Additionally, Astor-Aguilera (2009:173) makes reference to "wind-like persons" who cause harm to people (see also Kearney 1986 for a similar case among the Zapotec). These winds are the spirits

of the deceased, roaming freely about the world, doing both good and harm. Other forms of wind are common throughout Mesoamerica and often associated with deities. For example, there are four wind lords associated with the four directions petitioned during rain ceremonies (Cogulludo 1954; Read and González 2000; Lizana 1893; Love 2011; see also Estrada Cámara 1918; Medina 1975; Irigeoyen 1976; Starr 1908; Thompson 1930; Rejón García 1905). Additionally, winds are often coupled with water spirits and rain rituals due to their association with the clouds (Read and González 2000).

A single lord of the wind, Yumil-ik, is mentioned in ethnographic sources, associating him with one of three gods petitioned during milpa ceremonies (Estrada Cámara 1918 in Love 2011). The winds are sometimes included among the Maya deities associated with a successful harvest (Love 2011). Additionally, the four winds are linked to the four Bacabs, who hold up the sky (Tozzer 1907; Thompson 1970; Love 2011; see also Cogolludo 1954; Taube 1993). The Bacabs were survivors of the previous world, which was destroyed by flood, and are considered to be four manifestations of the god Pauahtun (Taube 1993:69).

Conclusions

People tell stories. They help pass the time, but also help us learn about the world and each other. The stories presented in this report grew out of our introduction to Alux in 2011, a trickster and protector of the wilds who became a topic of conversation throughout the field season (Spenard 2012a). We found that our interest in him led to

conversations in 2012 about other beings that inhabit his world such as the lord of the water and evil winds. As can be seen from other ethnographic sources, some of which we have cited in this report, Diego's World is rich with characters and forces of all kinds, and the more we revisit it, the more we are sure to find.