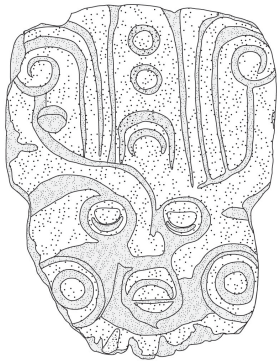
Archaeology in the Middle Belize Valley:
A Report of the 2012 Belize River East Archaeology Project



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Preface and Acknowledgements

Eleanor Harrison-Buck

I initiated the Belize River East Archaeology (BREA) project in 2011. In just two years of fieldwork, our investigations of the BREA study area—a 6000 km^2 region encompassing the lower half of the Belize Watershed—has proven to be an exciting and fruitful research area. This report details our survey findings during a four-week field season in January 2012 and a six-week field season from May 15 to June 26, 2012. Despite the short field seasons, our work in the middle reaches of the Belize River valley was tremendously productive and surpassed all prior expectations, namely due to the tenacity of our small field crew.

I would like to acknowledge my "Dream Team" survey crew who made the January season so successful: Brian Norris, Adam Keading, Satoru Murata, and David Buck. Their incredible survey skills, detailed sketch maps, and mastery of the Trimble GeoXH GPS unit allowed us to quickly and accurately map the many sites that we have identified in the BREA study area. We have now documented some 600 mounds comprising well over 50 different sites. Adam spent many a hot day recording mound after mound at Kaax Tsaabil and Ch'uul'ook (aka. Site 49) while also searching in vain for the elusive Married Woman's Point site, using every mode of transport he could employ (truck, canoe, on foot) to access the general area where we thought this site might be (Based on his persistence, I have no doubt he will locate it!). Some of our survey and reconnaissance during the (very wet) January 2012 season was exceedingly remote and required some overnights, camping out in the jungle, sometimes even pitching tents and hammocks in the midst of standing water. I am indebted to David Buck and BREA volunteer, Tim Divoll, for their fearless trek into the wet, mucky swamps in search of the "overland route." Thanks to them, we located what we believe is the same "natural bridge" crossing over Labouring Creek that the Spanish recorded in their sixteenth century accounts during their travels along a north-south overland route, which once connected the settlements of the New River with those in the middle Belize River valley.

Using our Nikon Total Station, Satoru, Adam, and Brian produced a series of beautiful topographic maps of the sites of Kaax Tsaabil, Ik'nal, and Banana Bank, while also patiently training students in how to conduct site survey and mapping during the January season. I would especially like to thank the James W. Sewall Company for continuing to support the BREA project by kindly offering the *pro bono* assistance of Brian Norris, a top notch surveyor with a knack for finding a site even when he's not looking for one! Everyone on the survey team did a tremendous amount of post-processing of data into ArcGIS to produce a series of incredible site maps, many of which are presented herein. This lengthy post-processing and map-making in GIS was greatly facilitated by the masterful digitizing work of Marieka Brouwer Burg, our GIS specialist on the BREA project. She offered countless hours of her time organizing all the digital files (GIS, photos, drawings, etc) and continued to keep things well managed both in the field

and back at UNH. During the summer season in Belize, she also helped to keep us organized by processing and recording all our incoming artifacts, an enormous task in the lab, which she co-directs with Astrid Runggaldier. I am grateful to both of them for the endless amounts of time they spent processing countless numbers of artifacts with non-stop attention to detail, catching even the smallest of errors. Their diligence in the lab and artifact database organization has both short- and long-term benefits, greatly facilitating our present and future artifact analyses conducted by students, staff, and specialists on the project.

Astrid not only co-directed the lab but also served as an excavation director during both the January and summer field seasons and did a superb job of training our undergraduate students in both field and lab techniques. In addition, we had three volunteers during the summer 2012 season—Jessica Harrison, Ana Maria Diaz Rocha, and Samantha Woods—all of whom offered valuable assistance in field and lab work. I owe a large note of appreciation to the entire BREA staff for sharing their expertise and offering our students valuable training during both the January and summer field schools. During the January season, seven undergraduate students from the University of New Hampshire (UNH)— Taylor Bradbury, Ben Carignan, Logan Cline, Scott Littman, Audrey McCullough, Kerissa Paquette, and Tawny Saez—joined the BREA project as part of an "Archaeological Survey and Mapping in Belize" course. During the summer of 2012, we offered an "Archaeological Field School in Belize" course that was more heavily focused on excavation and artifact analysis. Six undergraduate students—Evelyn French, Katie Garland, Katrina Miamis, Sara Quinn, Kelsie Stevens, and BU student Caitlin Davis—joined the project and were trained by BREA staff in excavation and lab analysis. All of the students offered a great deal of valuable contribution to the field project, and some produced final reports that are published here as individual chapters in the 2012 BREA Interim Report.

I am particularly grateful to the two youngest members of the BREA team—my daughters Eliza & Natalie—who joined us for the January and summer field seasons (despite missing a little bit of school). In addition to a good daily swim in the Banana Bank pool, they climbed pyramids, helped wash artifacts, and, most importantly, provided much joy in our camp, making us laugh each day! Our work in Belize would not have gone so smoothly without the tireless efforts of our hosts at Banana Bank Lodge. The Carr Family and all their wonderful staff took great care of us throughout the January and summer field seasons, getting up at the crack of dawn each day to prepare us a pack breakfast and lunch. They kept us well fed and provided us with delicious meals (even hosting a New Years Eve bash, which some of the BREA staff got to enjoy!). We are truly grateful for all their warm hospitality.

Our fieldwork was assisted by many local Belizeans, including Macario Pau (otherwise known as "Mr. Mac"), Mr. Toni Martinez and his sons Ronnie and Wilbur Martinez, Terrence and Clive Sutherland, David Esquivel, Minor and E. Barrera, Noé Cartagena, and Melvin Torres. We are grateful for all their hard work, rain or shine, during the January and summer field seasons. We also wish to thank the many landowners who granted us permission to investigate archaeological sites on their property. Mr. Jeffrey Roberson, general Manager of Yalbac Ranch, kindly granted us permission to enter the Yalbac property from the southern boundary after we

crossed Labouring Creek on our north-south survey during the January 2012 season. Despite us causing interruptions to his agricultural planting, Mr. Issac Dueck, owner of the property where Hats Kaab is located, allowed us to perform multiple test excavations at this site during both the January and summer 2012 field seasons. Herminino Cartagena was kind enough to let us excavate during the summer of 2012 at the site of Ik'nal, where his farm was located. Additionally, Green Tropics, Ltd., property owners of Kaax Tsaabil, allowed us to map and excavate the hilltop site during the January and summer seasons and have agreed to try to systematically avoid bulldozing and mulching mounds during their expansive clearing of the area over the next few years.

None of the research conducted during 2012 would have been possible without the generous support of the Alphawood Foundation and I am deeply grateful for their support. In addition, the University of New Hampshire (UNH) sponsored the BREA archaeological field school, which provided additional support for the project. Many individuals from UNH deserve a large note of thanks for their help in facilitating the logistics and finances of this research project, namely Cindy Corriveau, Angele Cook, Kay Cichon, and many others in the Purchasing Department and Office of Financial Affairs at UNH. I also appreciated all the efforts and hard work of Lisa Mulvey, who serves as the Director of the COLA Center for Study Abroad and manages a slew of wonderful programs sponsored through UNH, including this one. I also wish to thank Dr. Lisa Lucero who encouraged me to start a project in this part of Belize and who continues to serve as a valued colleague, mentor, and friend. I am especially grateful to Carolyn Stolzenburg who provided continuous administrative support before, during, and after the field seasons in 2012. I also wish to thank Dr. Joe Lugalla, Chair of the Anthropology Department at UNH who has been incredibly supportive of my research and has offered constant encouragement since I arrived at UNH. My permit for the BREA study area was granted by the Belizean Institute of Archaeology as part of the National Institute of Culture and History. I am grateful to the Institute staff, particularly the Director of the Institute, Dr. Jaime Awe, and the Director of Research and Education, Dr. John Morris, for all their guidance, encouragement, and continued support during this second year of the BREA project.

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Edited by Eleanor Harrison-Buck

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Chapter 1

Introduction to the BREA 2012 Season: Further Investigations in the Middle Reaches of the Belize Watershed

Eleanor Harrison-Buck

The Belize River East Archaeology (BREA) project continued to investigate the middle reaches of the Belize Watershed, east of Saturday Creek (**Figure 1.1**). The BREA study area encompasses the watershed of the eastern Belize Valley, between Belmopan and Belize City, and represents an area measuring roughly 6,000 sq. km. For the purposes of sampling such a large area, five transects were chosen for more intensive investigation. However, these boundaries ultimately have become obsolete in our survey methodology, as our team has realized that ancient Maya settlement is virtually continuous along the banks of the Belize River.

January 2012 marked the beginning of the second field season for the BREA project. The survey season extended from January 2-24. Fieldwork continued during a six-week summer season from May 15-June 26, 2012. Once again, both field seasons while brief, were incredibly productive. In our two years of fieldwork, the BREA team has identified and sketch mapped a total of 600 mounds and identified over 50 ancient Maya settlements, including several colonial period sites in the middle reaches of the Belize Watershed (**Figure 1.2**). This report details the results of our survey, mapping, excavations, archival research, and artifact analyses that were all undertaken during 2012.

Background to the Research

The Belize River is a large and navigable waterway with its headwaters in Belize and Guatemala (**Figure 1.1**). The river flows 180 miles (290 km) across central Belize to where it drains into the Caribbean Sea and the entire watershed is around 11,000 sq. km. The mid-to-lower reaches of the Belize River valley are less hilly than the upper reaches and the terrain is a mix of pine-savannah, wetlands, riparian forest, and mangrove swamp along the coast. During ancient times, the Belize River served as a major transportation route, linking Tikal and other large Classic Maya centers of the inland Petén region of Guatemala with coastal trading networks of the Caribbean coast. Ancient Maya settlements along the Belize River valley were economically linked with the Petén region, as well as eastern coastal trade networks that led up the coast to important Late-to-Terminal Classic centers like Chichén Itzá in northern Yucatán.

Within the BREA study area, only the large centers of Saturday Creek (Lucero 1999a, 1999b, 2002), Chau Hiix (Andres 2000, 2002, 2004, 2006; Andres and Pyburn 2004; Pyburn 1998, 2007), and Altun Ha (Pendergast 1979, 1982, 1990) have been previously investigated.

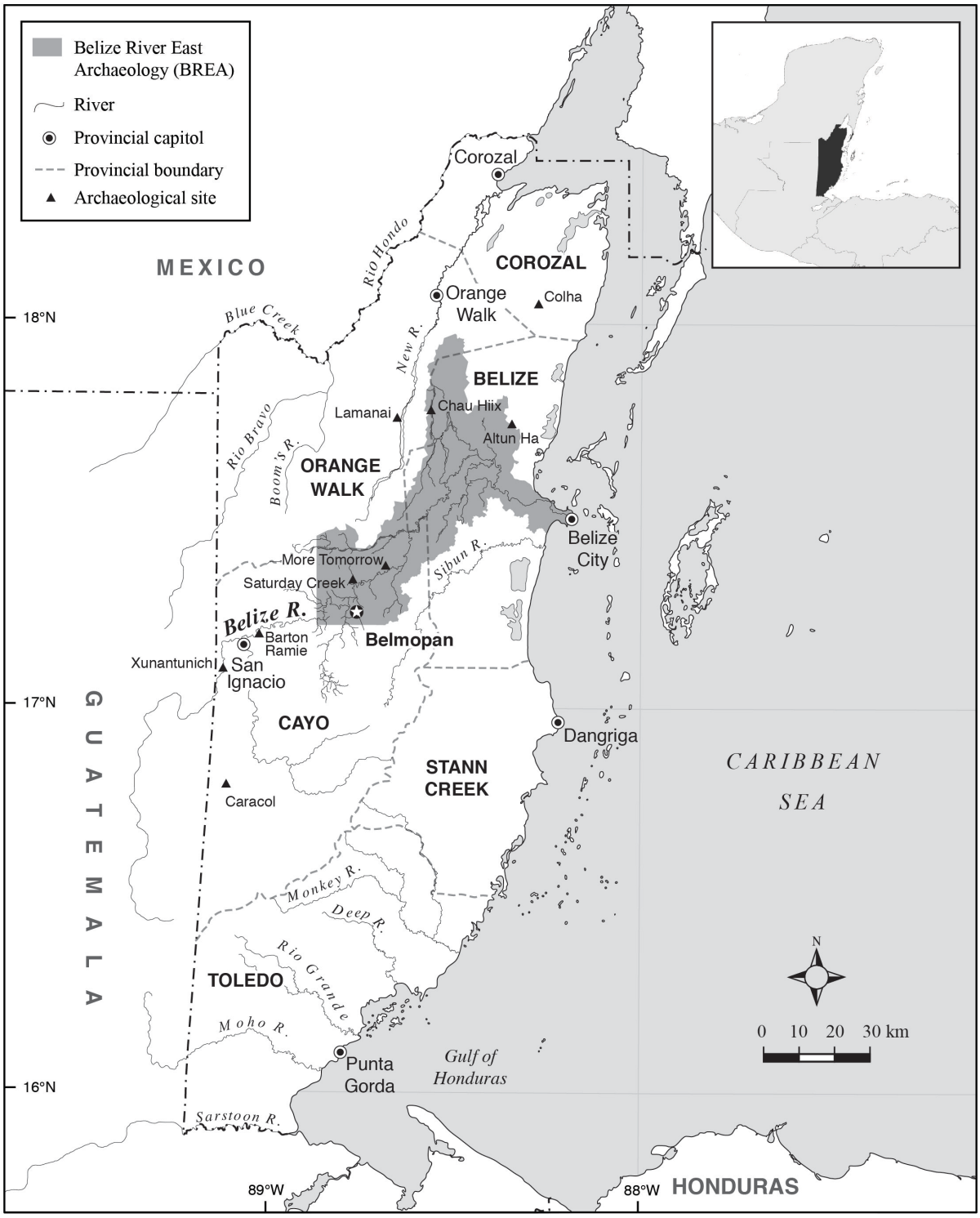

Figure 1.1 Map of Belize showing BREA study area (map prepared by M. Brouwer Burg).

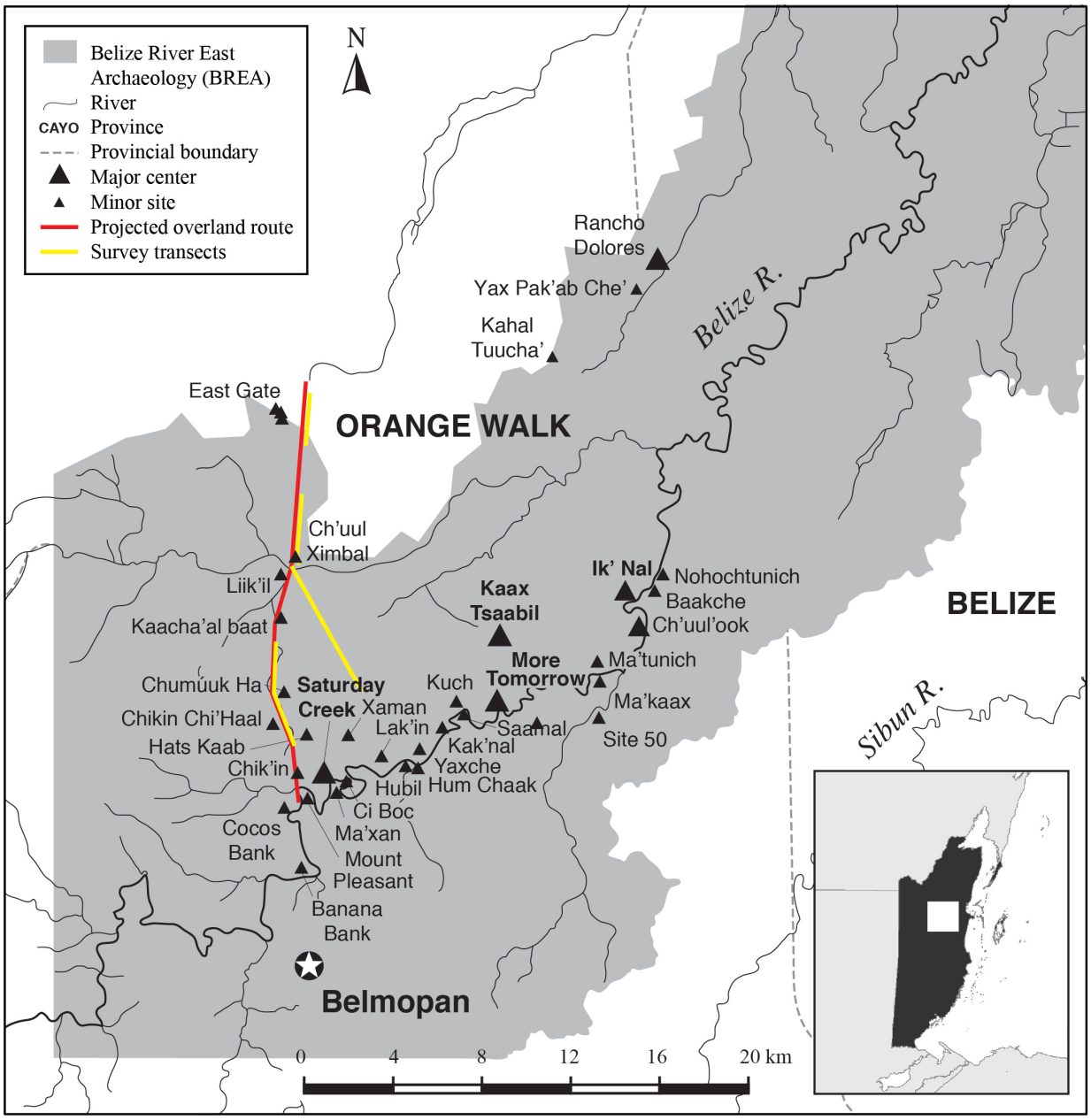

Figure 1.2 Western half of the BREA study area. Projected north-south overland route in dashed red line and our survey transects in solid yellow lines (map prepared by M. Brouwer Burg).

Surprisingly, the area along the eastern arm of the Belize River remains largely unexplored despite the key role this section of the river valley played in the movement of coastal commodities and luxury goods, like cacao, in ancient and colonial times. More extensive archaeological investigations have been conducted in the upper reaches of the Belize River valley around the archaeological sites of Xunantunich, Cahal Pech, Baking Pot, and Barton Ramie (see **Figure 1.1**). Sites here show strong connections with the Petén region to the west in

both their architecture and ceramic styles. Sites, such as Xunantunich, have yielded evidence of conflict and overthrow of the ruling elite at the end of the Late Classic period (Stanton et al. 2008:240; Yaeger 2010). A similar pattern of conflict and warfare at the end of the Late Classic period also has been found in the upper reaches of the Sibun Valley (Harrison-Buck et al. 2007). In contrast, sites in the lower parts of the Sibun Valley, closest to the coast, seem to flourish during the Late-to-Terminal Classic transition and show the introduction of northern Yucatec traits during the ninth century Terminal Classic period (Harrison-Buck 2007, 2012; Harrison-Buck and McAnany 2013). I propose that a similar pattern may exist in the Belize Valley. Whereas sites in the upper reaches more closely affiliated with the Classic Peten centers decline around the same time by the end of the Classic period, I suggest that sites in the mid-to-lower Belize Valley will show a similar late florescence during the Terminal Classic due to their close proximity to the coast and their allied relations with coastal trading partners, connecting them to prosperous networks in northern Yucatan. If so, I would expect to find an influx of northern Yucatec traits in the local architecture and ceramics, along with some northern imports at sites in the eastern half of the Belize Watershed. One of the primary goals of the BREA project is to test this hypothesis and further our understanding of the Late-to-Terminal Classic transition.

2012 Field Work

Survey and Mapping

During our January season, the BREA team continued to survey the area along the main trunk of the Belize River between the sites of Banana Bank and Ik'nal (**Figure 1.2**). The following May when we returned to the study area and were shocked to find that the area around the hilltop site of Kaax Tsaabil, one of our largest settlements just north of the Belize River, had been completely cleared by Green Tropics Ltd., with some of the surrounding low-lying mounds damaged by their machinery. Other instances of clearing were observed for parts of the site of More Tomorrow—land that was apparently sold off by the village of the same name. Half of the largest mound complex had been stripped of forest and the surrounding area plowed. While such clearing improved our visibility immensely, it also made these sites more vulnerable to destruction.

The BREA team surveyed as far west as Banana Bank, as far north as the Yalbac property, and as far east Ik'nal on the north side of the Belize River and as far east as Mahogany Heights property on the south side of the Belize River (across from the site of Ch'uul'ook) where we believe the site of Married Woman's Point is located (**Figure 1.2**). In this relatively small portion of the BREA study area, we have identified just over 50 ancient Maya sites and several colonial sites thus, primarily located along the main trunk of the Belize River. However, some tributaries and lagoons also show signs of ancient settlement. Sites were defined based on the distribution of discrete groups of mounds clustering within a given area. However, we found that in many cases separating the settlements along the main trunk of the Belize River posed

some challenges. Ancient settlement appears to be virtually contiguous along the portion of the Belize River where we focused our survey in January, between the Belize River confluences with Saturday Creek and Labouring Creek.

During the 2012 season, numerous settlements, both large and small, were documented in the western part of the study area by the BREA survey team. One of the largest sites we have identified in this area is Kaax Tsaabil (**Figure 1.2**). The site of Kaax Tsaabil consists of a series of architectural complexes that were built up on a series of natural hill slopes, located roughly 2 km north of the Belize River (refer to **Figure 1**.**1**). Proximate to this large site is a cavernous modern quarry that appears to have taken out at least one of the four main hilltops with ancient Maya structures on top. Local informants tell us that there were at least four or five structures that were destroyed when the area was quarried by Mennonites in the area. In January 2012, it came to our attention that the hilltop site of Kaax Tsaabil and 7000 acres surrounding the site that were in bush had been sold to the company Green Tropics Ltd. and they would begin clearing the land that spring. This prompted us to spend most of January mapping the site of Kaax Tsaabil with a Total Station (**Kaeding, Murata, and Norris, Chapter 2**). At this time, we met with the landowners who agreed not to clear the hilltop and would try to avoid bulldozing the mounds in the surrounding low-lying areas.

When we returned in May 2012, the area around the hilltops had been denuded of vegetation and many more mounds were visible in the surrounding low-lying areas. Our survey team in May, led by Adam Kaeding, surveyed and sketch mapped this "hinterland" settlement, including a substantial acropolis-type architectural group that was identified to the south of the hilltop site core. The dates associated with this architectural group are unknown, but an Early Classic date is a possibility based on the configuration of the mound complex. A concentration of Terminal Classic material was observed on the surface, associated with one of the mounds just off to the side of this acropolis complex. Unfortunately, this and other mounds in this low-lying area surrounding the hilltops were partially damaged in the clearing conducted by Green Tropics Ltd. (see **Kaeding, Murata, and Norris, Chapter 2**).

During the January and summer seasons, the BREA team surveyed and mapped the modest-size settlements of Banana Bank and Ik'nal using the Total Station (**Murata and Kaeding, Chapter 3**). The latter site was the focus of excavation during the summer 2012 season (**Harrison-Buck, Chapter 8**). Intensive survey and sketch mapping using our GeoXH GPS unit was conducted at Ch'uul'ook (also known as Site 49), where over 60 mounds were identified (**Keading, Murata, and Buck Chapter 4**). We believe that the large center of Married Woman's Point, recorded in the archives at the Institute of Archaeology, is located in the vicinity of this settlement on the opposite side of the river. However, access to this area made this difficult to ground truth during the summer 2012 season and we plan to return to this area during the January (dry) season. Reconnaissance directly across the river from Ik'nal revealed two modest-size settlement groups (Sites 54 and 55), which we have named Baakche and Nohochtunich, respectively (**Figure 1.2**). The latter was notable for its pyramidal platform composed of large and elongated limestone block masonry that was partially exposed on the

surface. Additionally, Hubil (Site 53) is a small site that was identified during reconnaissance near the terminus of the Rock Dondo Road, just west of Hum Chaak. This small mound group contained surface finds, including a conch shell and ceramics that appear to date to the Preclassic period (see **Kaeding, Murata, and Buck, Chapter 4**).

Also during the January 2012 season, we conducted additional pedestrian survey along a projected north-south overland route, which was recorded by the Spanish in the sixteenth century. **Figure 1.2** shows the projected north-south overland route in red and our pedestrian survey transects in yellow. When the survey team reached Labouring Creek, they detected a travertine dam, which was the only noticeably high spot and may be the "natural stone bridge" that the Spanish described in their ethnohistoric accounts in their trek south toward the Belize River (Jones 1989:138, 312 [Note 35]; see also Scholes and Thompson 1977:45). Around this crossing at Labouring Creek, a cluster of ancient Maya sites were identified, along with a good deal of Colonial period artifacts, which were found scattered on the surface (see **Buck, Harrison-Buck, and Divoll, Chapter 5**).

Site Investigations

Elsewhere, I argue that the north-south overland route recorded by the Spanish may have entered the Belize River near the site of Saturday Creek (Harrison-Buck 2010). Directly across the river and possibly part of Saturday Creek are the settlements we refer to as Ma'xan and Mount Pleasant (**Figure 1.2**). Mount pleasant is directly across the river from Saturday Creek's western hinterland settlement, which we call Chi'k'in and a low-lying floodplain locally referred to as Otley's Flat. In this floodplain area, two different locals told us that they found (on two separate occasions) a total of five Spanish coins. Otley's Flat is virtually devoid of settlement, with the exception of three low mounds that line the riverbank (**Figure 1.2**). Unfortunately, no one could produce the coins they had found nor were they able to recall the dates on them. Nevertheless, in our continued search for Spanish colonial remains we conducted a test excavation and surface collection around the only mound group visible in Otley's Flat during the January 2012 season. Our investigations yielded primarily ancient Maya artifacts (Terminal Classic and Postclassic material) as well as a high density of British colonial material. No Spanish colonial artifacts were apparent in the assemblage. However, while conducting surface collection in the vicinity of the excavation unit, Adam Kaeding discovered a Spanish coin on the surface of the recently plowed fields with a date of 1785 (**Kaeding, Chapter 6**). Heavy plowing of this low floodplain has obscured the archaeological contexts and it may never be known how or why this many Spanish coins came to be deposited in this particular location, but we plan further investigation in this area in the future.

The size and function of structures in the middle Belize Valley vary considerably, from low house mounds measuring less than a meter in height to non-residential pyramidal structures measuring as high as 12 meters or more. One of the more substantial, non-residential groups is the site known as Hats Kaab. This mound group resembles other E-Group configurations found

at sites, like Uaxactun and Tikal (Aimers and Rice 2006; Woods and Harrison-Buck 2011). During the summer 2011 season, Hats Kaab was mapped with the Total Station (Kaeding and Murata 2011). This E-Group was the focus of excavation during the January and summer 2012 seasons. It is unusual because of its enormous size, which in terms of aerial extent appears to far exceed all known E-Groups in the Maya Lowlands, including the two at Uaxactun and Tikal (**Runggaldier and Brouwer Burg, Chapter 7**).

Other ceremonial architecture was identified at the site of Ik'nal. Here, another circular shrine was identified, similar in configuration to the one investigated at Hum Chaak (Harrison-Buck 2011) and also bears resemblances to several circular shrines found in the Sibun Valley, just to the south (**Harrison-Buck and Quinn, Chapter 9**). The structure at Ik'nal was the focus of excavations during the summer 2012 season and demonstrated that the building was not residential, but held a ritual function (**Harrison-Buck, Chapter 8**).

As noted above, some of the largest monumental architecture identified thus far in the middle Belize Valley is found at the ancient hilltop site of Kaax Tsaabil. Built up on a natural rise, these masonry buildings appear much more imposing than most of the settlement in this area, which are situated on the low-lying areas proximate to the Belize River and its tributaries. At Kaax Tsaabil, we have identified at least three large platforms with multiple buildings, including range structures, a main central plaza group circumscribed by structures including a pyramid measuring about 12 meters in height. Plaza B was the focus of excavation during this summer 2012 season. We placed two excavation units (Operations 14 and 16) on two different structures in Plaza B. Operation 16 was placed in a corridor between two structures on the western mound in Plaza B and a rich assemblage of Terminal Classic artifacts were revealed on the surface, suggestive of a termination deposit (**Murata et al., Chapter 10**). In contrast, very few artifacts were found over top of the range structure where a staircase was exposed on the southern side of the northern range structure in Plaza B. Here, we placed Operation 14, a long 2 x 14 m excavation unit that was placed on the central axis of the structure. Excavations revealed at least two different construction phases consisting of a stairway with another later stairway built overtop. At the top of the structure, excavations revealed an unusual burial and a possible termination of the main elite residence, both dating to the transition between the Terminal Classic and Early Postclassic (**Murata et al., Chapter 10**).

Analytical Investigations

Assisted by BREA staff members, a number of the undergraduate students participating on the BREA project as part of a University of New Hampshire archaeological field school carried out a series of analytical investigations of different artifact classes. During our 2011 and 2012 investigations, we have recovered a wealth of obsidian from both surface collection and excavations. The sites that yielded the greatest amounts of obsidian are Ik'nal, Otley's Flat, and Ma'xan and are the focus of an analytical study that demonstrates long-distance trade routes with the Guatemalan Highlands, where most of the obsidian likely stems, were well established by the Preclassic and continued to provide a regular supply of material, including cores, through

Postclassic times (**Garland and Brouwer Burg, Chapter 11**). Chipped stone made of locally available chert served as another important source of material for tool making at settlements in the middle Belize Valley. The material remains analyzed from Operaton 2 at Ma'xan suggests that the inhabitants of this small plaza group were producing utilitarian tools that were probably destined for local household use, rather than for trade in an external market like we at other sites, such as Colha (**French, Chapter 12**). Most of the groundstone tools found in surface collection and excavations conducted in the middle Belize Valley appear to be made from locally available gray and pink granite, which comes from the nearby Maya Mountains. Following a mano typology developed by Gordon Willey (1972), an analysis of the goundstone assemblage from Hats Kaab, Hum Chaak, Ik'nal, Ma'kaax, Ma'tunich and Ma'xan suggest that a diverse array of granite mano types persist at these sites from Preclassic to Terminal Classic times (**Miamis and Harrison-Buck, Chapter 13**). When more immediate sources of stone were used, it was not limestone, but river cobbles that were occasionally selected for mano production, readily available in the Belize River and its tributary creeks adjacent to these middle Belize Valley sites.

In addition to our undergraduate students, we had one research specialist join the BREA project during the January 2012 season, who conducted a soils study. Dr. Serita Frey, a soils specialist and professor in the School of Natural Resources and Environment at UNH, came down to collect soil samples at different sites throughout the eastern Belize Watershed to address a number of different research questions, including issues related to ancient soil fertility and the possibility of identifying a biomarker for cacao in soils (**Frey and Knorr, Chapter 14**).

Conclusions

In my final chapter of the report, I discuss our future directions and goals of the BREA project, both long-term and immediate plans for the upcoming season, which will build upon our work from 2012. We plan to hold a lab season for artifact processing and analysis in 2013, but plan to also continue the survey, mapping, and excavation of select sites in the middle reaches of the Belize Watershed along the western half of the BREA study area during future seasons.

One of our long-term research objectives is to develop a more comprehensive settlement history for the eastern Belize Watershed and better understand its broader relationship with other parts of the Maya Lowlands, including the upper Belize Valley and Peten region to the west, as well as areas to the north where some of the largest tracts of perennial wetlands exist in all of Belize. Here, modified wetland features have been recorded (Pyburn 2003) and our own inspection of satellite imagery has revealed much more extensive wetland modification than previously known, with extensive canals, ditched fields, and hydrological features that will be the focus of future BREA investigations.

Our research is revealing a deep history of the eastern Belize Valley, which begins in the Preclassic and continues through Colonial times (Harrison-Buck et al. 2012). Given the continual occupation, this area offers an ideal context in which to review the changes taking place during periods of significant cultural transformation in Maya history—first during the

Preclassic-Classic transition, then later during the so-called Classic Maya "collapse" period, and finally during the Spanish Conquest in the sixteenth and seventeenth centuries. Through our continued investigations in the eastern Belize Valley, we aim to expand our understanding of the social, political, and economic changes that occurred in this area through time and reveal the rich cultural and environmental diversity that this area has to offer.

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Section I

Survey and Mapping

Chapter 2

Survey and Mapping the Hilltop Site of Kaax Tsaabil

Adam Kaeding, Satoru Murata, and Brian Norris

BREA team members located the hilltop site of Kaax Tsaabil on the project's first day of survey. Having returned frequently, we have noted dramatic changes in the landscape surrounding the site. These early visits have been discussed elsewhere (Harrison-Buck 2012:6; Kaeding et. al. 2012). The 2012 season brought the most dramatic changes yet. In January 2012, the BREA project returned to Kaax Tsaabil with the express purpose of mapping in detail the architectural features of the site center.

In the process of creating this map, we learned the true extent of the danger then facing the preservation of this, the most monumental site that we have encountered within our study region. Specifically, we were informed that the entire area was slated to be clear-cut, burned, bulldozed, and actually ground to a predetermined level with equipment more destructive than any that had been previously introduced to the region. Some members of the deforestation/development program's advance teams seemingly joked that by the summer there would be nothing left in the area for us to study.

Given the destruction that we had previously witnessed throughout the site and the amount of time and effort that we had already invested, BREA team members did not take this comment lightly. Instead, we immediately drafted a plan of protection for submission to the Belize Institute of Archaeology, and started scheduling our summer season to focus in part on a targeted excavation program within the site center. These intentions were augmented further when, upon our arrival for the summer season, we found that the site center had, in fact, been minimally preserved but that the surrounding area was indeed as denuded as we had been warned. This large-scale deforestation exposed some of the remainder of the site which extends in nearly every direction and includes other massive monumental complexes. We were again prompted to change our plans on the spot to include an extensive GPS reconnaissance of the now exposed and very heavily damaged extensions of the Kaax Tsaabil site beyond its center.

Objectives

As noted in the introduction, our objectives at Kaax Tsaabil changed frequently as a result of the tragically extensive damage to the site and its environment. The following list condenses those objectives as they developed through time from before our January mapping season until we arrived at the site in May:

1. To collect detailed total station data in order to better assess the three dimensional relationships between architectural features within the site core.
2. To extend our understanding of the major architectural features of the site center through the extension of reconnaissance in the immediate area.
3. To assess and document the greater extent of the site itself in the immediate area which had been recently exposed by deforestation.
4. To surmise the extent of the site beyond that which has been so far exposed in order to be better prepared for future protection/preservation efforts.

Description of the Research

According to our research objectives as well as the ongoing and imminent threats posed to the site, we approached our research with three separate and complementary methods – total station mapping, excavation and GPS-aided pedestrian reconnaissance. The total station mapping and GPS pedestrian reconnaissance are discussed below; for more information concerning excavation, see Chapter 10.

Total Station Mapping

Our January season was dedicated to the detailed topographic mapping of the site center that had previously been recorded only by sketch maps during times of variable visibility. To that end, we returned with two mapping teams each including at least one experienced senior BREA staff member, two to three University of New Hampshire students enrolled in an Archaeological Survey course, and three local laborers. Each team was equipped with a Total Station (one Nikon NPL-352 and one Topcon Total Station) connected to a data collector (a Carlson Explorer and a TDS Ranger). This equipment allowed all of the data collection to be conducted at a sub-decimeter level of internal precision. It also allowed for rapid data collection along with immediate visualization of mapping coverage, easy and rapid download and backup.

This research was initiated by the authors of this article before the arrival of the full mapping teams through the establishment of a data control survey loop. By establishing two single points and acquiring the GPS coordinates using a Trimble GeoXH handheld GPS, we then measured our distances between the two points with a total station and corrected for the difference (for a more detailed treatment of this method, see Murata 2012). Then, using one of these two initial points as a backsight for the other, we continued extending that precision in a counterclockwise loop taking precise, three dimensional, measurements of control points (rebar stakes hammered firmly into the ground) that we established at the furthest distance visible given vegetation and topography. We carried through with this process around the entirety of the central complex that we had identified through earlier survey efforts. This resulted in a loop of five control points that enclosed the great majority of the site center within its circumference. Upon reaching the final control point, we were able to take a measurement back to our original

point and calculate the error that we had naturally introduced in the process of traversing a distance of over 600 meters and a topography spanning a range of more than 15 meters of altitude. This error was measured to .0919 m, which was then mathematically distributed throughout the five control points of the loop allowing for a great degree of internal precision.

From there, the two total station teams began to collect data by setting up their respective equipment on any given control point on the loop and backsighting to any other control point within view in order to establish themselves on the precisely oriented and calibrated survey grid. Each team collected a tight network of measurements in three-dimensions to record the altitude and topography of the mounds themselves as well as the orientations and relationships of any observable architectural, archaeological, or natural features. A third team of the local laborers and a BREA senior staff member would continue to expand our understanding of the site center through reconnaissance, deciding where the total station teams would fill in the detailed maps as they progressed. The contour and shaded relief maps shown in **Figure 2.1** are complementary representations of that intensive mapping effort.

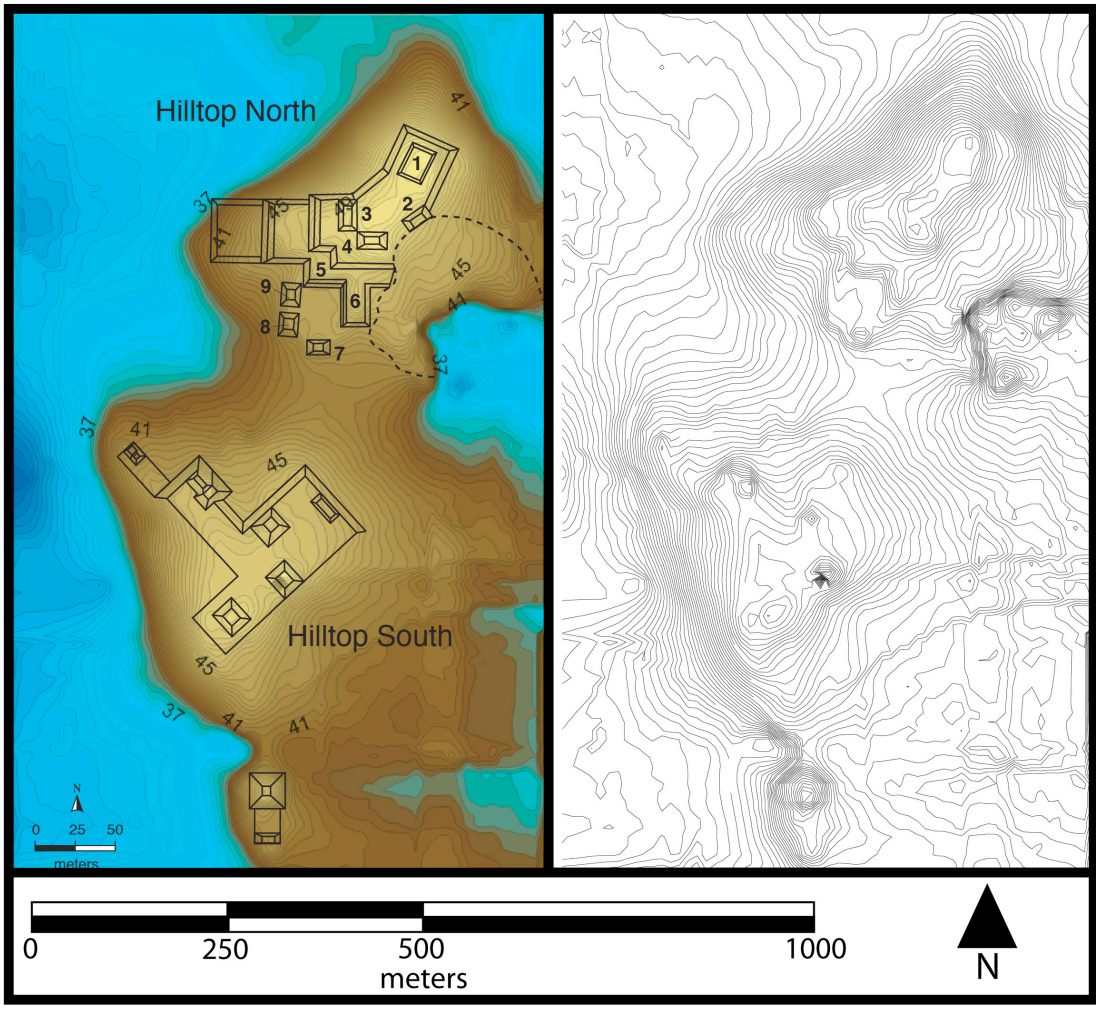

Figure 2.1 Contour and Shaded Relief Map of Kaax Tsaabil (map produced by A. Kaeding).

Within the site center there are two main complexes facing each other on two prominent, presumably mostly natural, rises. The major complex of the two seems to be the one to the northeast as it rises to a higher elevation than the southwestern hilltop, and features more architectural elaboration – including a large terraced construction and a formal patio group, referred to as Plaza A, along with a more informal plaza group (that almost appeared unfinished) on the highest point of the hill where at least four mounds could be discerned (**Figure 2.2**).

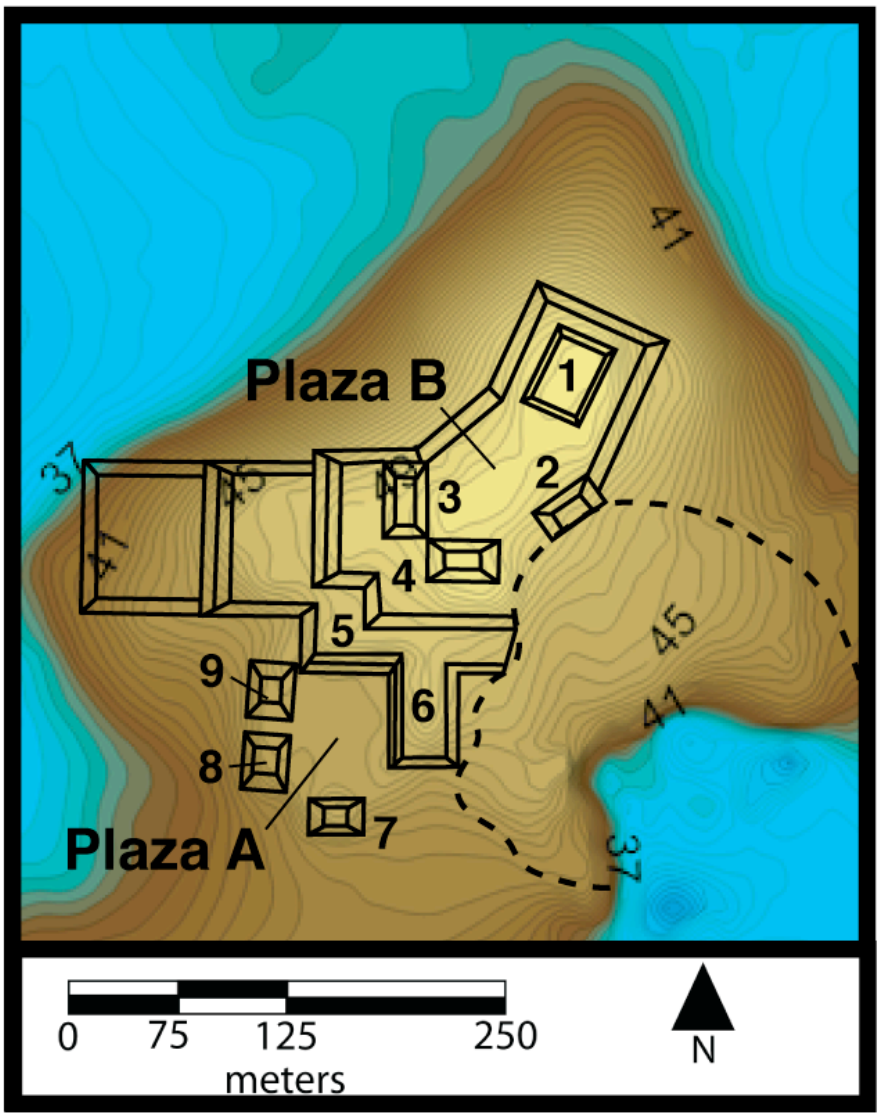

Figure 2.2 Plazas A and B at Kaax Tsaabil (map produced by A. Kaeding; modified by M. Brouwer Burg).

The palace complex to the southwest of the main one in the above image slopes generally in the direction (northwest) of the major complex but without any obvious architectural orientation that suggests intention beyond potential but ambiguous terracing. It is possibly that this is a less-modified, natural rise as the slope also gradually declines to the northeast. At the bottom of the northeastern slope, there is a water feature that was initially interpreted as an *aguada.* Upon closer inspection, though, that water was found to be running unfitting with its designation as an *aguada*. The water actually runs out of this feature toward the north suggesting that it may be better interpreted as a spring.

At the top of this secondary prominence, the peaks are augmented by artificial structures. There is also a residential complex of three structures facing into a central plaza area. The largest of these structures is on the southeastern (and highest) edge of this prominence. It is difficult to say with certainty what accounts for that southeastern edge; that is, it could be natural, archaeologically augmented, or, equally if not more likely, the product of very recent quarrying activity associated with building the access roads for local industrial-scale farms.

To the south of that residential complex the prominence narrows to a thin strip running between two relatively precipitous drops. The southern end of that narrow strip reaches the tallest and only pyramidal structure so far detected at the site center. The topography of the southwestern hilltop plaza complex and the pyramid is shown in **Figure 2.3**.

Every one of the structures discussed above has seen some degree of looting activity. Most of these are deep trenches directly through what must have been interpreted as the centerlines of the structures, from their bases to their peaks. There are shattered and discarded artifacts along the sides of these trenches and some of those discard piles include indisputable evidence of destroyed burials. Beyond this, there are two randomly placed rectangular pits through plaza floors that, we have learned, were places chosen by the people in charge of the quarrying efforts to test the integrity of the building material. Finally, an entire area to the south of the main palace complex and east of the secondary palace complex has been entirely removed by quarrying activities. In this case, the destruction has not simply damaged or even leveled the structures that certainly existed there; it has left deep pits in their place. This is what we could expect for the entire site according to the impression provided to us by local informants. As a result, we drafted and proposed an area of protection for the site including what we had mapped as well as the extent of the site that we had personally encountered but not mapped and a conservative prediction of the extension of the site beyond what we had seen. This proposed protection area is shown in **Figure 2.4**.

GPS –Aided Pedestrian Reconnaissance

The Belize Institute of Archaeology agreed with our assessment and implemented it among the developers, who largely stayed clear of the site center that we had mapped. The predicted site extensions, however, were not avoided. Instead, upon our arrival in May we found that the entire plot had been cleared to the north, south, and east from the edges of our detailed

map (**Figure 2.4**). This clearing exposed associated construction no less than a kilometer away, and some of this architecture was as complex and monumental as the site center.

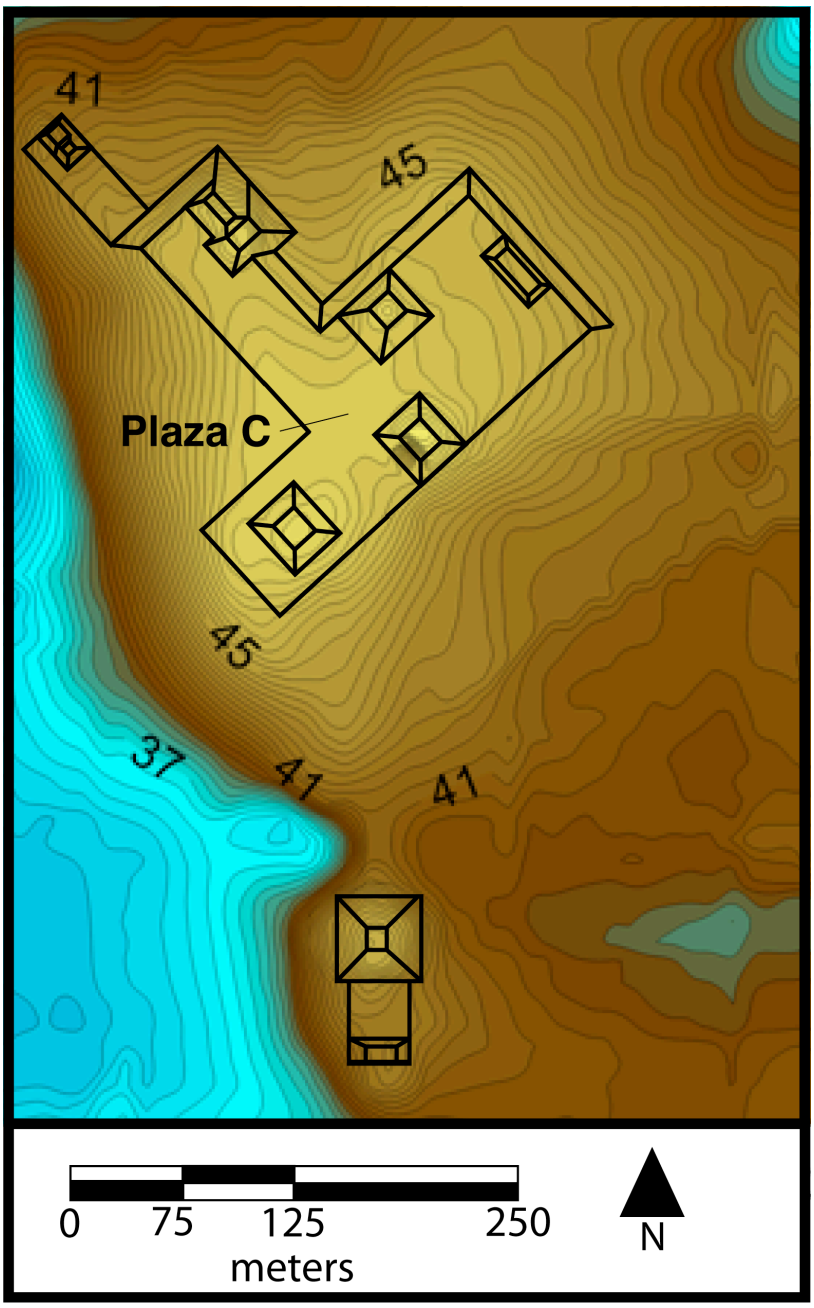

Figure 2.3 Southwest Complex at Kaax Tsaabil (map produced by A. Kaeding).

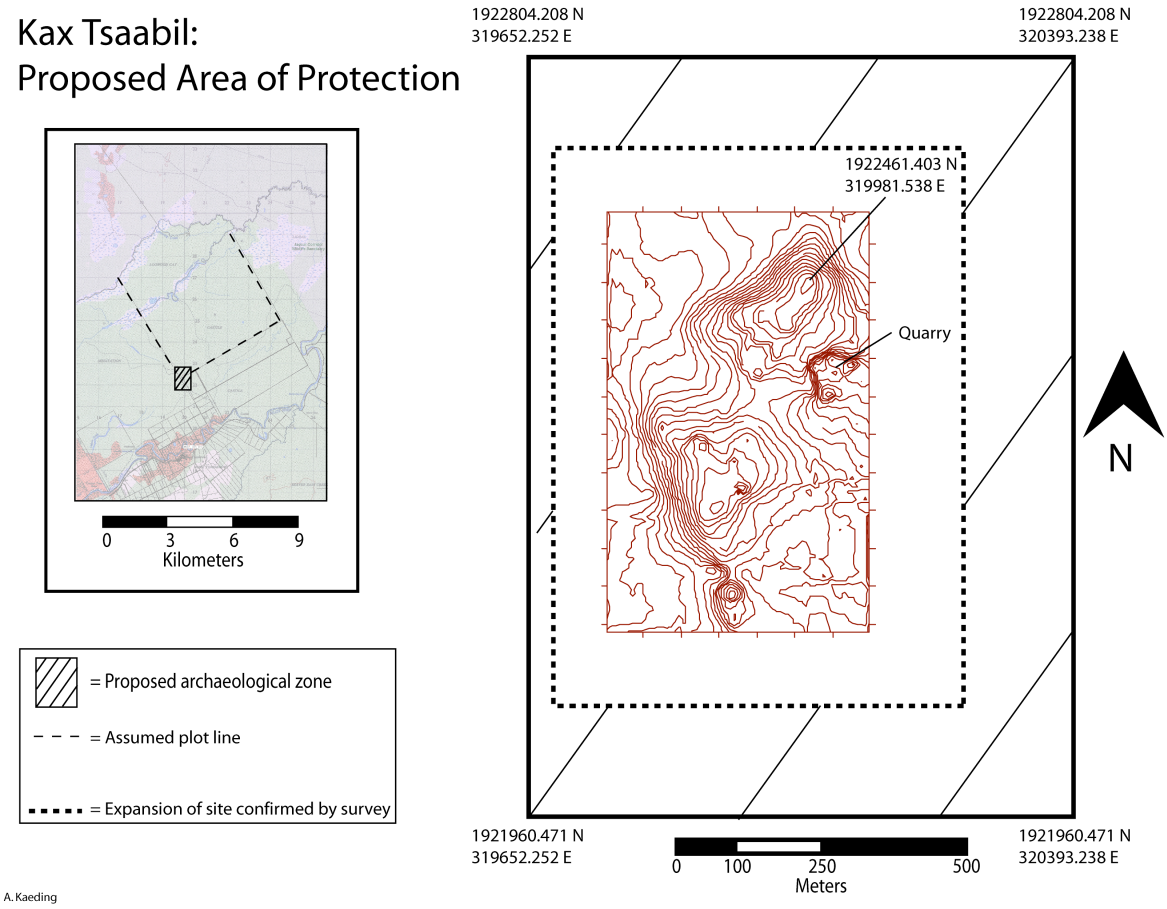

Figure 2.4 Proposed Area of Protection at Kaax Tsaabil (map produced by A. Kaeding).

Upon our initial inspection, we found that beyond the devastating destruction to the site associated with the preparation for agricultural endeavors, most of these newly exposed structures had also seen large-scale, seemingly recent, looting activities. Using a Trimble GeoXH GPS unit we attempted to mitigate as much of this ongoing destruction as possible by collecting two-dimensional GPS coordinate data for the expanse of the site by which to tie in sketch maps, archaeological impressions, and surface collection. Often these were simply point data, but when warranted a line was recorded to estimate the circumference of the larger structures and complexes. The result of overlaying the sketch maps onto the GPS data in relation to the site center mapped in January is shown in **Figure 2.5**.

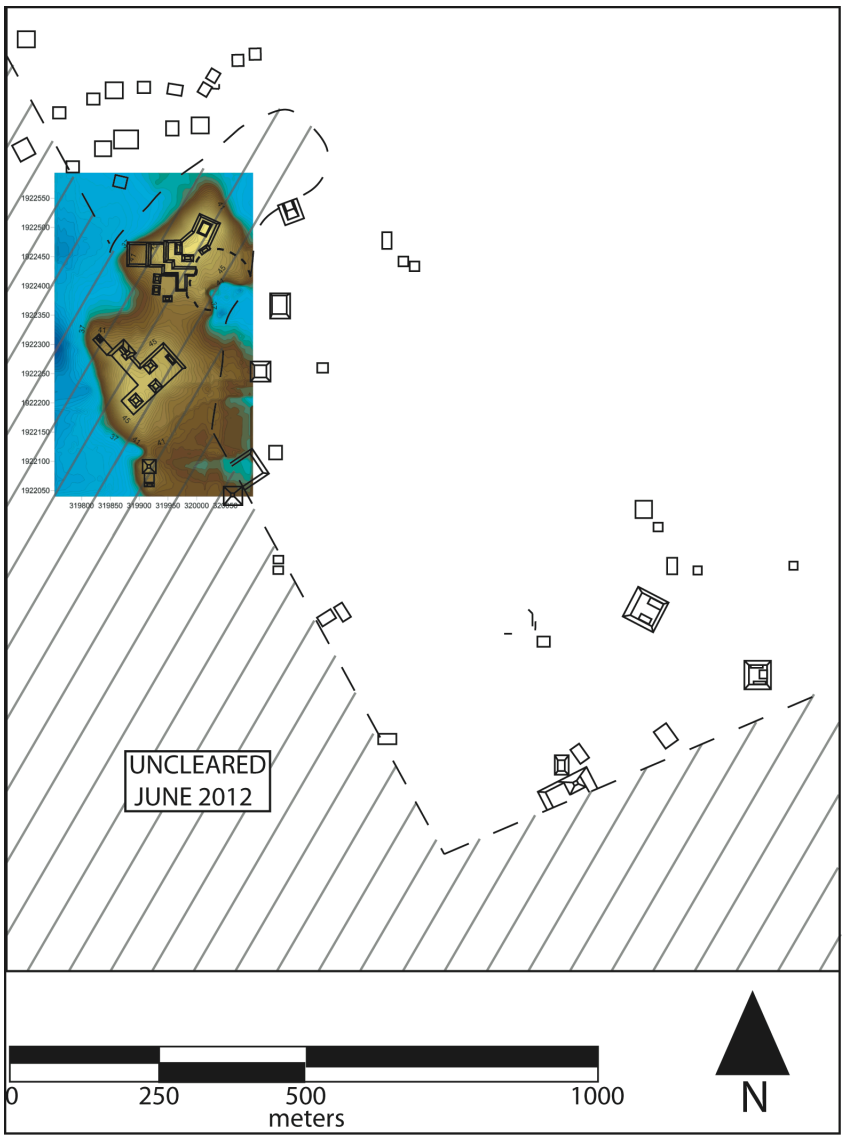

Figure 2.5 Extended Settlement at Kaax Tsaabil (map produced by A. Kaeding).

Settlement density clearly diminishes to the east relatively near the site center. Likewise, heading north of the site center we see two nearly linear arrangements of relatively small mounds – none of which have the four-structure and plaza arrangement of a residential complex. Heading to the south, on the other hand, settlement continues with large complexes, often with the residential arrangement. At the southern edge of what has been exposed, stands another pyramid with associated structures. This pyramid also directly abuts a running water feature.

Beyond the line of what has been cleared to the south, the land slopes rather dramatically and could suggest the end of the site's expansion; however, this has not been confirmed in our reconnaissance. Likewise, as the line of clearing has not extended any further to the west than we had already investigated, we cannot say for certain where the site boundary lies in that direction. There are, however, at least two large structures just beyond the vegetation line that

can be observed from the cleared area suggesting a continuation of the site in that direction. These, like so many of the others, have also been looted.

Figure 2.6 is a slightly altered version of **Figure 2.5**, with a dotted-line circle calling attention to an area devoid of structures.

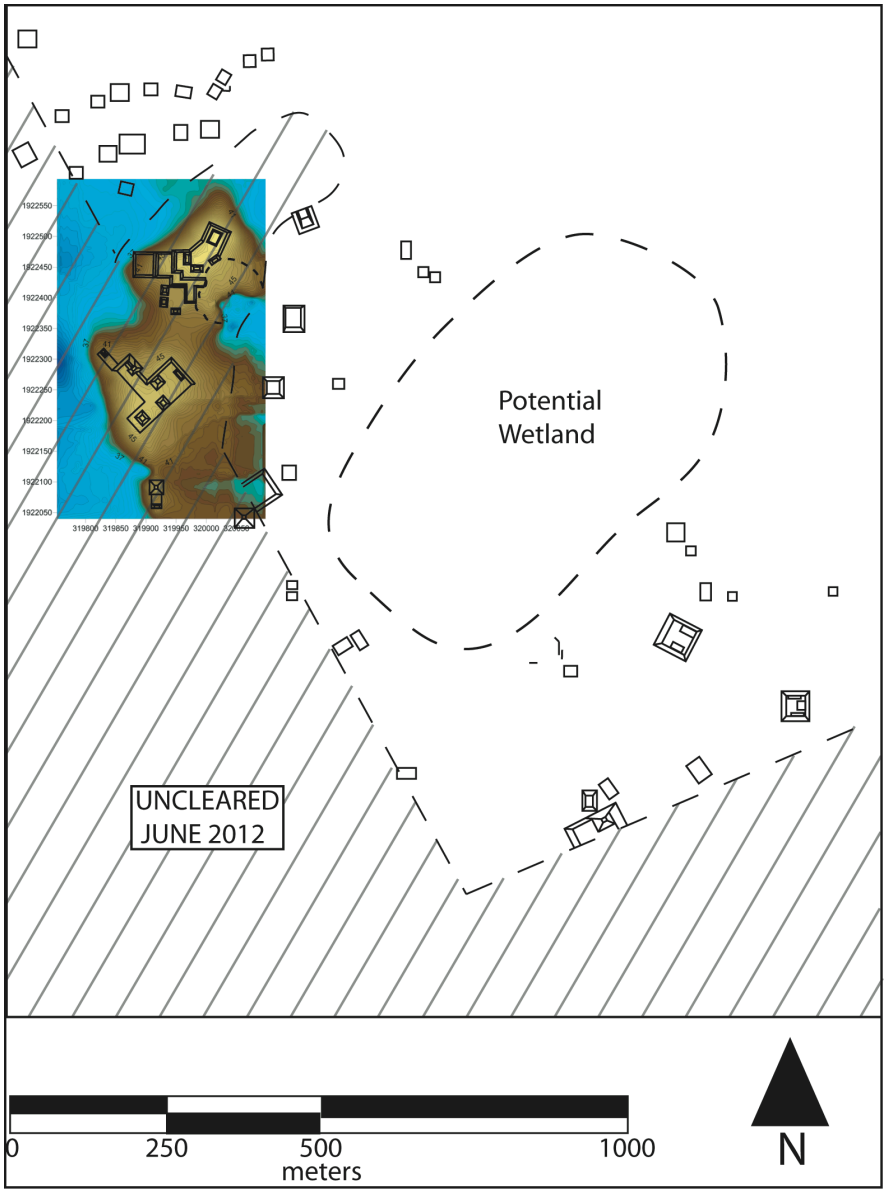

Figure 2.6 Potential Wetland in Proximity to Kaax Tsaabil (map produced by A. Kaeding).

This is no sampling error. In fact, this area sits considerable lower than the rest of the site and ranges between swamp and standing water nearest its center. According to conversations with local informants, the modern industrial scale farming practices in the area often first establish drainage ditches that might pull water from low-lying areas for years before the next stages of

cutting and clearing are initiated. It is quite possible that this area was, in fact, a fairly substantial wetland until rather recently. This may explain some of the running water in the rest of the area, the overall settlement pattern seen in the above maps, and may have been part of the reason that this location was selected for such a large, monumental, and expansive site.

Interpretations and Conclusions

The data recovered during the survey efforts this year, both mapping and reconnaissance, have lent further evidence to our understanding of the monumentality of the site. The scale and elaboration of monumental architecture recorded at the site's center speak to the massive wealth and status of the elite residents of Kaax Tsaabil (more on this topic in Chapters10 and 11). Elaborate palace complexes facing each other on what we assume are originally natural slopes in association with at least three pyramids spread throughout several kilometers represent the biggest site by far that we have encountered in the region. In fact, the site of Kaax Tsaabil is reminiscent of the Belize Valley sites from further upriver and not expected in our survey area.

Beyond the site center, we now have a better understanding of the distribution of settlement. While the pattern to the north of the center is interesting (as are the artifacts that have been noted and occasionally collected from the surface) it is somewhat understated compared to that immediately to the south. Perhaps an elite residential settlement pattern emerged in view of the ceremonial site center and along the edges of the wetlands. Perhaps the pyramid and associated complex to the south marked the southern edge of this particular, higher-status pattern.

All of the settlement data and architectural relationships that we have recorded in 2012 have only bolstered rather than detracted from our earlier interpretations of the site. Kaax Tsaabil is actually more anomalous in the region in terms of size and elaboration than we had originally surmised. This speaks further to the importance of the location. As we noted before, site has fallen victim to extensive modern quarrying – leading us to suppose that it may have been a limestone source in antiquity as well. Now the site is home to the most expensive and expansive agricultural investment in the region. Presumably this speaks at least on some level to its fertility. Our growing understanding of its water resources makes it an even more attractive area for occupation. Finally, our earlier interpretations of the site included the fact that it is situated quite a bit further north from the Belize River than many of the other sites we have located. We have offered that perhaps Kaax Tsaabil was a key site on at least one of the overland, north-south travel and trade routes that connected the Belize River (the major access into the Petén) to the Yucatán. We now know that Kaax Tsaabil extended even further to the south toward the river than we had thought, with elaborate monumental architecture as far as we have so far been able to record.

As it will in any discussion of Kaax Tsaabil, one final conclusion warrants mention. In our 2011 assessment of this site, we noted that it faced an incredible threat due to development

and quarrying; greater, even than the extensive looting. Sadly, like so many of our other theories related to this site, this prediction has also only gained legitimacy. The site is very literally destroyed yet still offers a great deal to the dedicated researcher with an appropriate strategy. Unfortunately, how long this will be the case remains to be seen. Likewise, the destruction that we recorded at Kaax Tsaabil over the course of a few months is not isolated to that site. Instead, similar agricultural pursuits are being planned for much of the study region and, undoubtedly, throughout Belize. Kaax Tsaabil has grown in its role as a symbol of how much we have yet to lose.

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Chapter 3

Mapping Ik'nal and Ta'as Mul (Banana Bank)

Satoru Murata and Adam Kaeding

The sites of Ik'nal and Ta'as Mul, also known as Banana Bank in the IA site records, were mapped during the Summer 2012 season using more expedient modes of survey and mapping than that employed at the site of Kaax Tsaabil (see Kaeding, Murata, and Norris, Chapter 2). The small settlement of Ik'nal is the second site to be mapped by the BREA team that includes a circular structure, originally identified by David Buck and Brian Norris during the January 2012 season. Once identified, intensive excavation of the circular structure was planned for the summer 2012 season. However, access to the site becomes difficult with the onset of the rainy season at the beginning of June. Therefore, it was decided that a rapid mapping session needed when the summer season began in May. Murata and Kaeding initiated and completed the mapping of the site alone in the span of a few days. In contrast, the Banana Bank site, located within the premises of Banana Bank Lodge, which also has served as the BREA field camp during the 2011-2012 field seasons, was mapped in a single day by students who were assisted by staff during the January 2012 field school as part of their "final exam." In this chapter, we summarize these two mapping programs and present the resulting maps.

Ik'nal

The site of Ik'nal is located along the middle reaches of the Belize River on the west side, around 2.7 km north of the confluence of the Belize River and Beaver Dam Creek (**Figure 3.1**). The site is accessed by a dirt road that extends north from the eastern terminus (as of summer, 2012) of the Mennonite road, which, in turn, extends from Saturday Creek. The dirt road is but a cut through the jungle with no pavement of any kind, so once the rainy season begins, it quickly deteriorates into a treacherous, muddy, mush.

The site is currently under active utilization by Mr. Herminino Cartagena who is one of a number of local farmers who have small-sized milpas (using pole-and-stick agriculture) along the dirt road leading to the site of Ik'nal. The west and northern portions of the site were being used as a corn *milpa* at the time of our arrival, which posed a slight problem with the mapping program. Mr. Herminino allowed us to selectively clear the mounds (although we had to harvest as we went; he even gave us costale bags!). There was a perishable shade structure where some of the workmen camped that is located on the top of the main structure towards the western edge of the platform summit, which contributed to the relative low density of surveyed points to the northwest (see **Figure 3.2**). A sizable pit exists at the summit of the mound, which could be tree fall or more likely a looters' pit.

Two "stations" were established using the Total Station and a Trimble GeoXH GPS unit, following the method outlined in a previous report (Murata 2011:50-52). Station 1 (the "base station") was placed on the east side of the dirt road, around 10 m southeast of the circular structure. Station 2 (the "backsight point") was placed farther down the road, around 73 m northeast of Station 1; the topography of the area made this location the farthest feasible spot to place the backsight point. It should be noted that, since the distance between these two points is relatively small, the angular error for the present map is likely to be much greater than some of the other maps we have created in the BREA project.

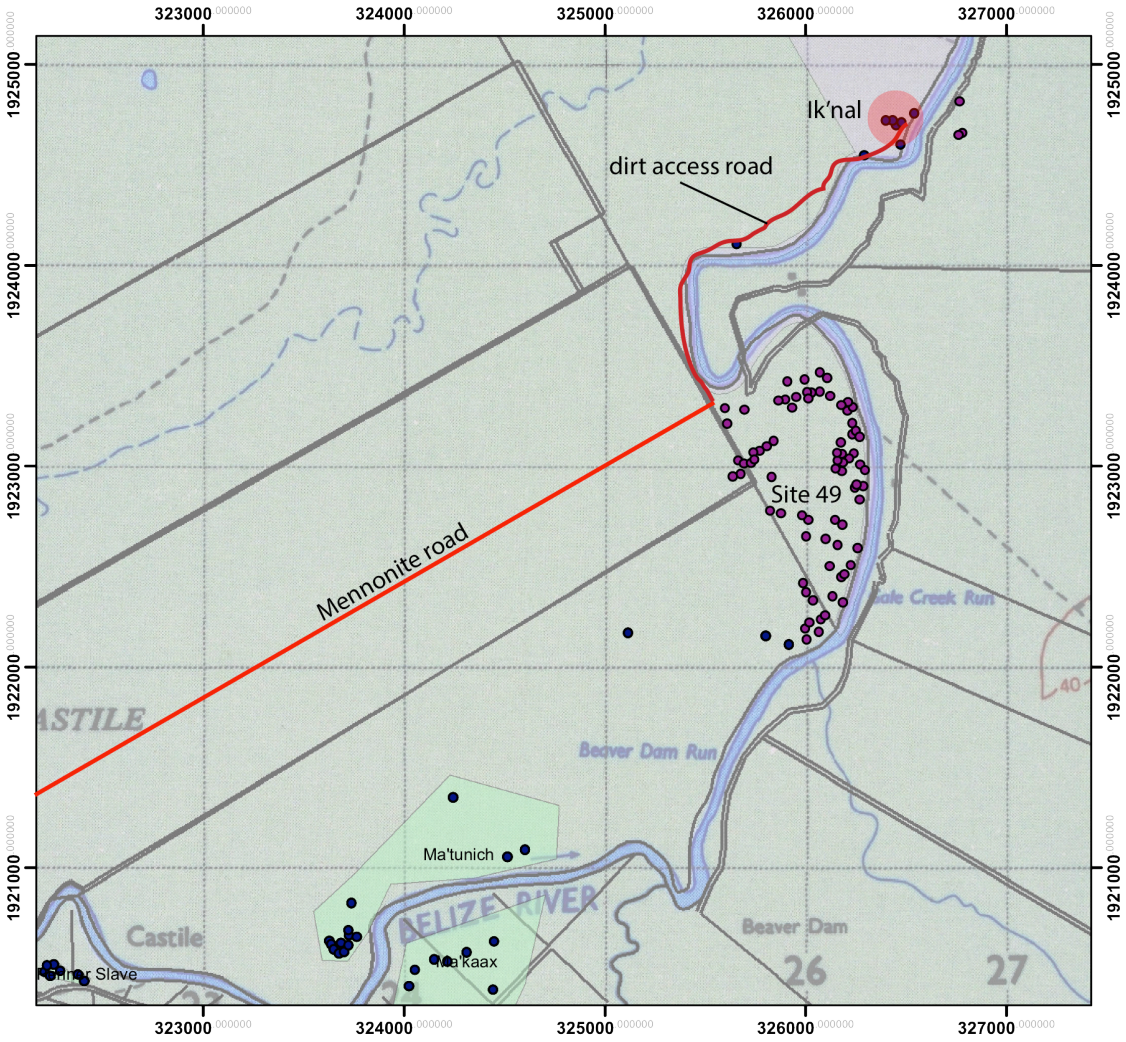

Figure 3.1 Location of Ik'nal on the Belize River (map prepared by S. Murata).

A third, Station 3, was placed near the summit of the main structure in order to map the western half of the site, the view to which is obstructed from Station 1. Rebars were used to mark all three of these stations in hopes that all or some of them can be used in the future to extend the map and/or to correct for its errors. The UTM coordinates and elevations of these

three semi-permanent markers are listed in **Table 3.1**.

In just one day, the authors collected 371 points in an area of about 6,000 m^2. A topographic map and a digital elevation model (DEM) were generated from these points using ArcGIS 10.1 (**Figure 3.2**); from these, a preliminary architectural map was created (**Figure 3.3**).

Table 3.1 The UTM coordinates and elevations of the three mapping stations.

	Northing	Easting	Elevation
Station 1	1924698.00	326487.00	26.00
Station 2	1924748.00	326541.00	25.00
Station 3	1924698.99	326454.51	29.95

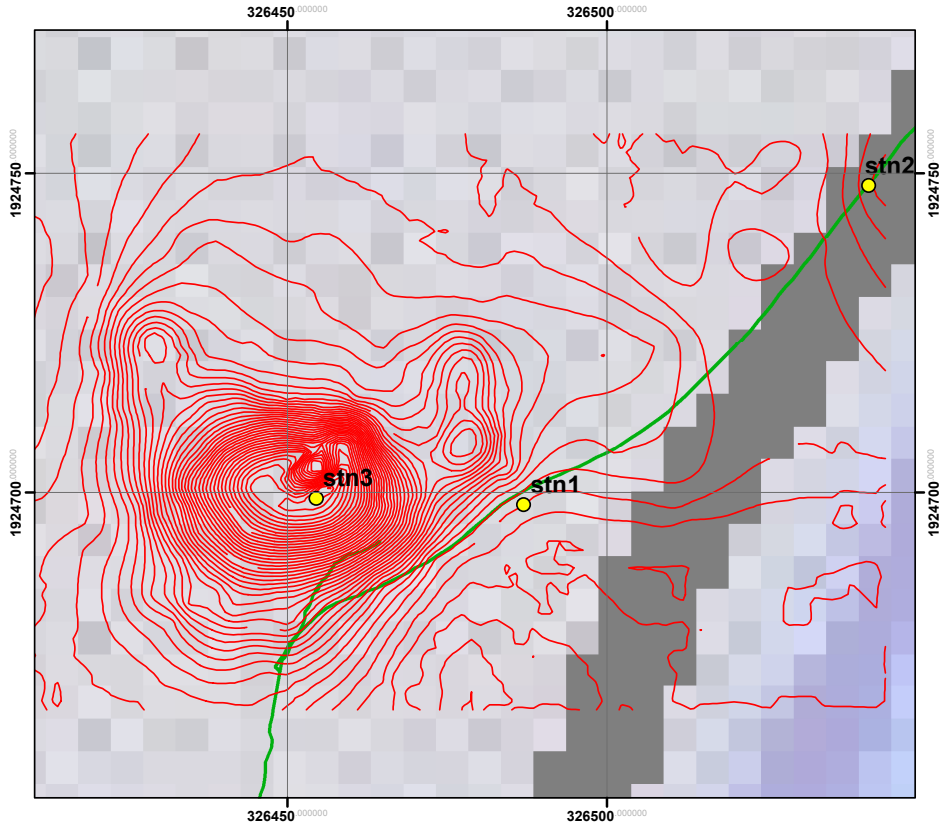

Figure 3.2 Topo map of Ik'nal showing the different locations of the three Stations (map prepared by S. Murata).

The overall orientation of the site, while difficult to ascertain, appears to be 21.5˚ west of north, as evidenced by the platform extending to the northwest from the main structure. The circular structure rests on a platform that extends to the northeast, and a low platform, in turn,

extends due north from the circular structure, seemingly incongruent with the rest of the site, suggesting that the northerly extension was a later addition. Harrison-Buck's excavation of the circular structure supports the conclusion that the northern platform extension was a later addition. However, she argues that this platform along with the main elite residential structure may both have been cardinally oriented, and that only the northwestern platform extension was oriented 21.5˚ west of north (see Harrison-Buck, Chapter 8 and **Figure 8.1**). Further excavation is needed in order to confirm the true orientation.

Outside of this main plaza group, we found a mound-like rise in the field a few hundred meters to the west, but all indications were that it is a natural formation, perhaps an ant-hill. There was little indication that the site extends into the jungle, away from the river (i.e., to the west and north). In our survey of other sites in this vicinity, we have found that other mounds are all positioned along the river very close to the edge of the high bank. Therefore, while a more inland expansion of the site is not out of the question, it seems likely that Ik'nal is part of a string of sites that extend along the Belize River, perhaps a satellite to the larger site of Ch'uul'ook (Site 49) to the south (see **Figure 3.1**; see also Kaeding, Murata, Buck, and Norris, Chapter 4).

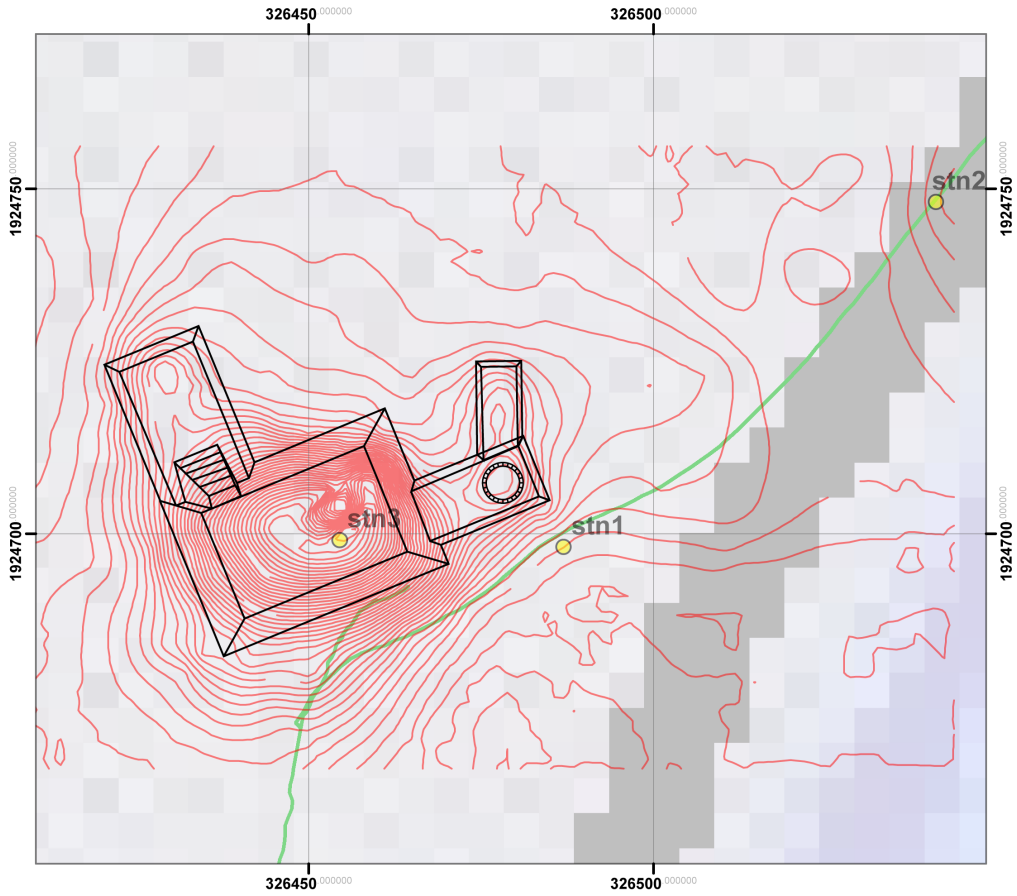

Figure 3.3 Rectified map of Ik'nal (map prepared by S. Murata).

Ta'as Mul (Banana Bank)

The Banana Bank site, or Ta'as Mul, is a small plazuela group located within the premises of the Banana Bank lodge near Roaring Creek Village (**Figures 3.4 and 3.5**). The lodge also has been the base camp for the BREA project since its inception in January 2011. While we had always known about the site, perhaps due to its proximity and the sense that we could map it at any time, we actually did not get around to doing so during the first two seasons. During January of 2012 we decided to rectify this situation and map the complex, while also providing the perfect training exercise for our field school students. Assisted by BREA staff, students worked in pairs to map the plazuela group as part of their "final exam" for the season, producing a series of beautiful maps presented here.

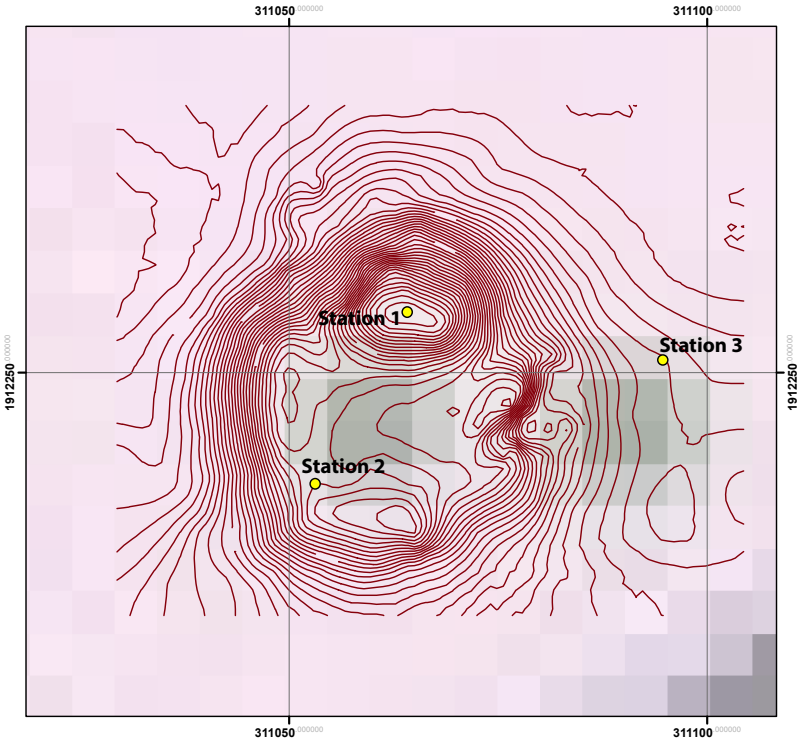

Figure 3.4 Topo map of Ta'as Mul (Banana Bank) showing the different locations of the three Stations (map prepared by S. Murata).

Similar to Ik'nal, three stations were used for the setup (**Figure 3.4**). Station 1 was placed on top of the main structure of the plazuela group, and a backsight point was placed around 200 m due west, using the same method outlined in a previous report (Murata 2011:50-52). Using these two points, Station 2 and Station 3 were placed to be used for the actual mapping of the site, Station 2 being on-mound near the southwest corner of the platform, and Station 3 being off-mound to the east (**Figure 3.4**). These stations were *not* marked with semi-permanent markers—i.e., rebars—as the site is on private land, and the area is constantly being trampled by horses belonging to the lodge. Over the course of two days, three pairs of students

spent the same amount of time each mapping the same mound, each collecting around 200 points. These points were combined into one master file containing 622 points in an area of around 3,650 m^2, contributing to an atypically detailed topographic map of the structure.

The plazuela is oriented around 9° east of north, and is a compact platform with architecture in the four cardinal directions, making it almost the archetypical "plaza" group (**Figure 3.5**). The northern structure is the tallest, and the eastern structure has witnessed disturbance, which could be a looters' pit, but more likely, judging from remnants of a concrete slab, it is due to some kind of modern construction activity.

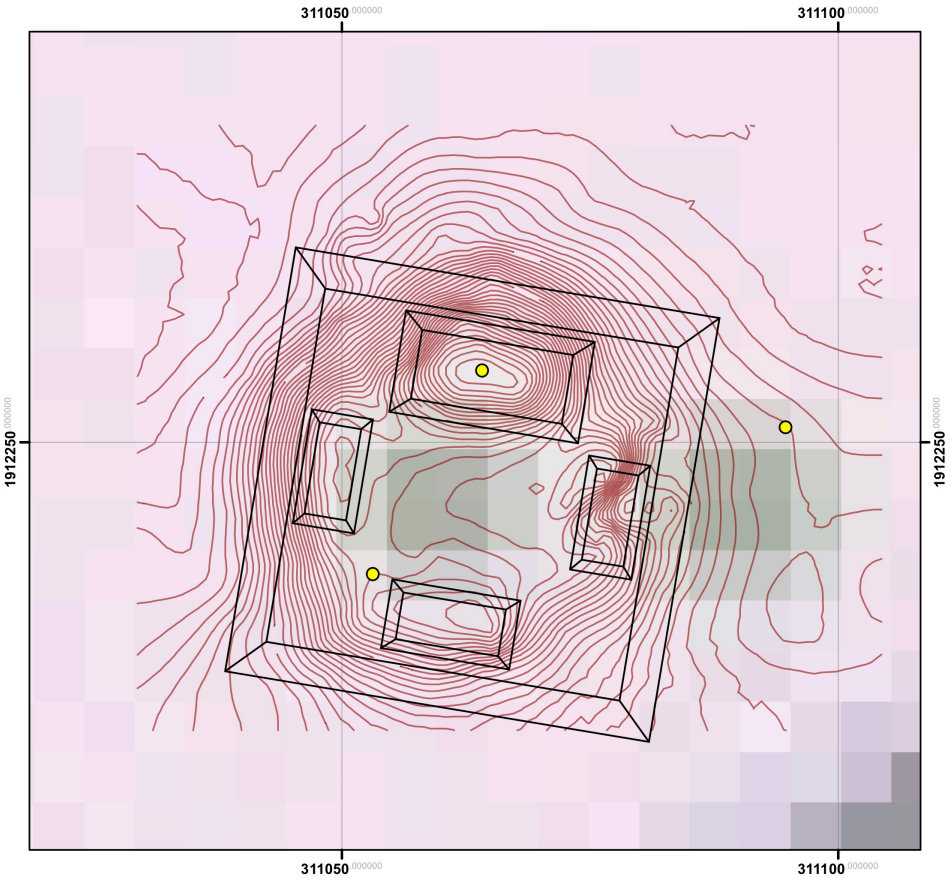

Figure 3.5 Rectified map of Ta'as Mul (map prepared by S. Murata).

The plaza group is located around 200 m north of the Belize River, with cabañas and other structures of the Banana Bank lodge in between. We have located at least one more Maya mound in the premise, just behind the building used by the BREA project as housing as well as storage space. Moreover, Mr. John Carr, the owner of the lodge, has found numerous Maya as well as historical artifacts in a cultivated field to the east of the lodge, located at a bend of the Belize River called Mount Pleasant Run (**Figure 3.6**). Thus, Banana Bank likely was part of a larger community centered around the bend of the river, which, in turn, may have been a part of a larger network of sites that include the regional center of Saturday Creek 6 km downstream.

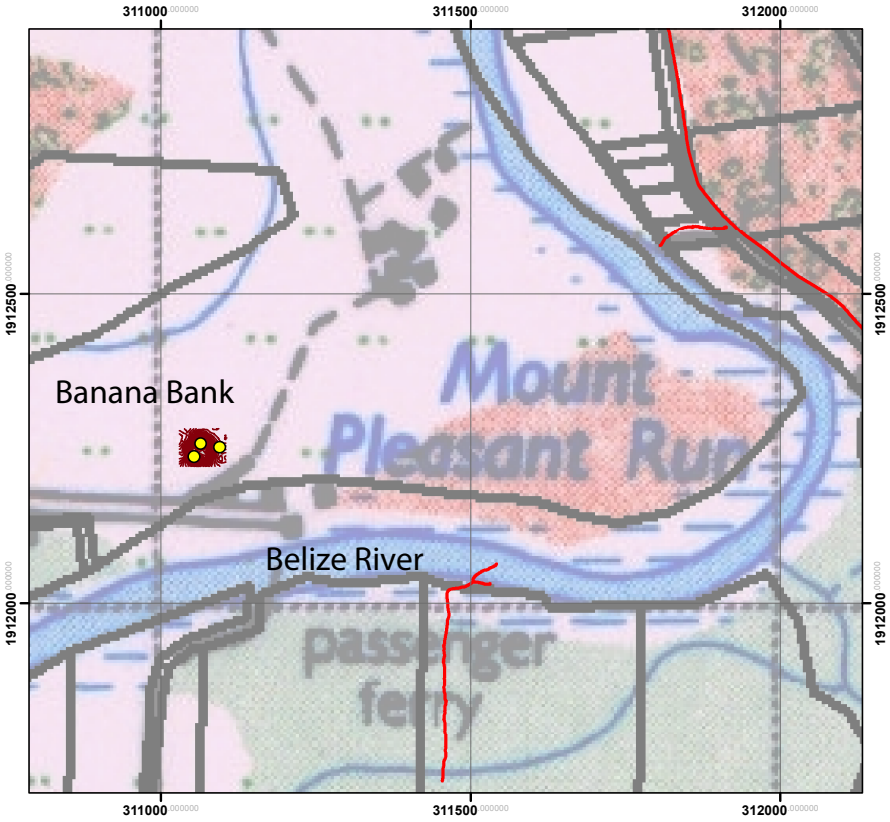

Figure 3.6 Map showing location of Mount Pleasant Run in relation to the site of Banana Bank (Ta'as Mul; map prepared by S. Murata).

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Chapter 4

Ch'uul'ook and Other Settlement in the Middle Belize Valley

Adam Kaeding, Satoru Murata, David Buck, and Brian Norris

The BREA Project's main initiative is to continue an ever-expanding survey of the eastern Belize River valley, documenting sites throughout its watershed. One of the first observations made in this effort was that of the nearly ubiquitous nature of dense settlement along the riverbank ranging from tightly grouped house mounds to quite substantial monumental architecture. As more area has been surveyed and more settlement documented by the BREA team, our initial impressions have become further refined and nuanced. For example, though confirmation will require further quantitative analysis, both the density of settlement and the size of architectural investment seem to be greatest nearest oxbows and bends in the river.

One of the most substantial river bends in the area so far surveyed is near Beaver Dam Creek where the Belize River turns from flowing eastward and begins to head north towards its confluence with Labouring Creek. The inside of that bend is included among the seemingly endless cleared and planted Mennonite fields that have continued to sprawl along mainly the left bank of the river in this area. Accordingly, BREA team members have in passing noted numerous mounds in the area since the earliest phases of the project. Several days of this season were dedicated to recording what information could be salvaged from the distribution of mounds in this area, designated Ch'uul'ook, as we have elsewhere within the same agricultural fields.

As always, BREA reconnaissance efforts continued in the same stretch of the river areas less immediately visible. Some of these efforts were directed at relocating a site registered at the Belize Institute of Archaeology as well as within the memories of several of our local informants as Married Woman's Point. While we have not yet convincingly identified Married Woman's Point, the attempts to do so have located several other sites. Those sites will be included in this discussion.

Objectives

1. To continue to document the distribution of architecture along the banks of the Belize River by recording the mounds located in the large bend across from Beaver Dam Creek known as Ch'uul'ook.
2. To register archaeological materials including a small sample collection of surface artifacts and the extent of architectural information that can still be assessed in an effort to mitigate the data lost to frequent, destructive, mechanized, plowing and harvesting practices in the Ch'uul'ook area.

3. To expand our reconnaissance of sites along the Belize River towards the east and identify sites for future detailed mapping and potential excavation.
4. To attempt to relocate the reported large site of Married Woman's Point with an ultimate goal of creating a detailed Total Station map and assessing existing threats to its preservation.

Description of the Research

The methods for BREA survey efforts are rather standardized and effective but simple. In areas of clear visibility BREA staff members will perform a pedestrian mapping survey equipped with a dedicated iPad loaded with the appropriate forms, a small supply of collection bags for representative surface sampling, a field notebook, and, most importantly, the project's Trimble GeoXH handheld GPS. Following a systematic route decided according to observations of features of interest, the BREA staff member will map archaeological features by recorded GPS coordinates for the mounds in that region. When warranted the circumference of the mound will also be registered by recording a line around its base (a feature of the advanced precision of the Trimble GeoxH).

When BREA reconnaissance objectives are aimed at heavily vegetated areas, the survey strategy changes considerably. Experience repeatedly teaches that too much time can be lost without very precise guidance. In some cases, we have identified areas of interest from scrutinizing existing maps and set out to locate them on the ground. More often than not, however, the only way to efficiently navigate to a desired area is to be accompanied by a guide who is intimately familiar with the landscape. In these cases, again, the survey team comes equipped with field notebooks, collection bags, survey forms loaded into a project IPad, and either the Trimble GeoXH handheld GPS or, if that is unavailable, the Garmin GPSMap 60.

The two methods described above will be discussed in specific applications below. The sites of Hubil (Site 53), Ch'uul'ook (Site 49), Baakche (Site 54) and Nohochtunich (Site 55) were recorded with the GPS Pedestrian Survey method (**Figure 1.2**). Of these four sites, Ch'uul'ook was most intensively surveyed and mapped using this method and is presented in greater detail below. The search for Married Woman's Point and the sites encountered in that process (Baakche and Nohochtunich) were recorded by guided reconnaissance.

Hubil (Site 53)

Hubil (Site 53) is a small site that was identified during reconnaissance near the terminus of the Rock Dondo Road, just west of Hum Chaak. This small mound group contained surface finds, including a conch shell and ceramics that appear to date to the Preclassic period (see **Figure 1.2**).

Ch'uul'ook (Site 49)

The site of Ch'uul'ook consists of well over 60 mounds, ranging from about 30 cm to 1.5 m in height, distributed throughout an area of roughly .70 km^2 tucked in a bend of the Belize River. The rough area of Ch'uul'ook in relation to the Belize River is shown in **Figure 4.1**. These mounds were recorded in accordance with the BREA GPS pedestrian survey methods, meaning that the points displayed in **Figure 4.1** are specific UTM coordinates of archaeological features observed on the landscape. Unfortunately, as this landscape has seen years of agriculturally-motivated destruction to including mechanized plowing, planting and harvesting alongside the intentional removal of all large stones, archaeological features are quickly and dramatically distorted. For example, at Ch'uul'ook, the orientation of any given mound or mound complex is nearly impossible to determine from the surface. Given that distortion and the density of the material that remains at the site, the research strategy must be adjusted. Specifically, the array of points in **Figure 4.1** is a conglomeration of points recording the specific location of some features and serving as anchors for other observations that were captured in sketch maps rather than with dedicated GPS points. **Figure 4.2**, then, is an estimation/reconstruction of the distribution of mounds in Ch'uul'ook combining sketched observations with carefully recording geospatial data.

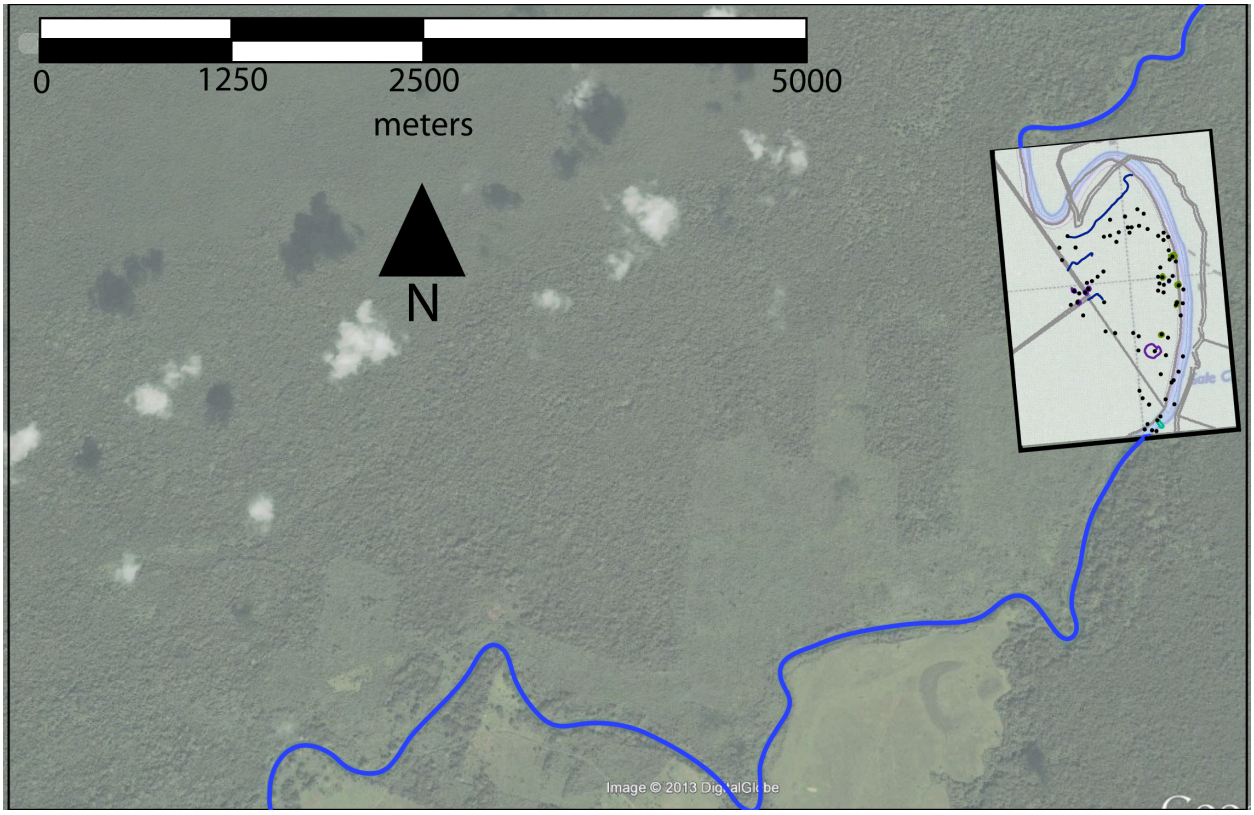

Figure 4.1 Area of Ch'uul'ook with Mounds and Features Indicated with Dots (map prepared by A. Kaeding).

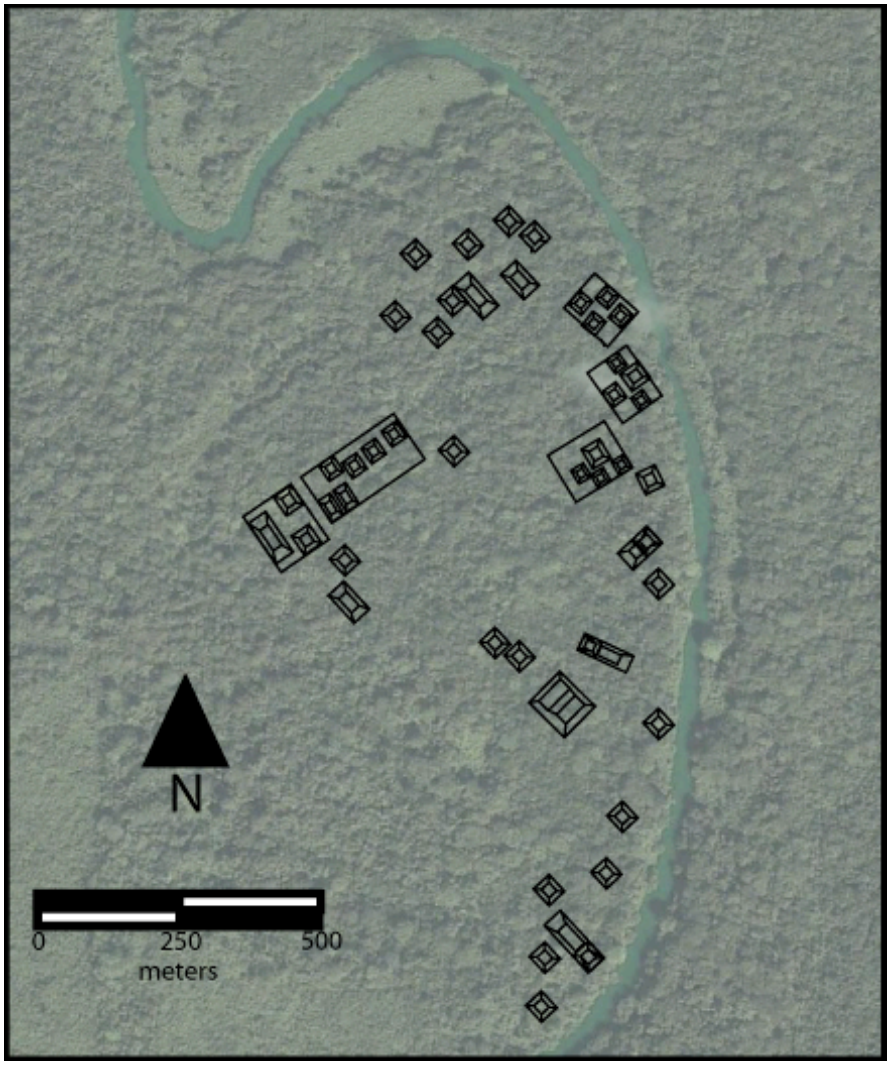

Figure 4.2 Estimated Extent of Structures at Ch'uul'ook (map prepared by A. Kaeding).

The orientations of the structures in **Figure 4.2** are only best-guess representations. The general distribution, however, is accurate, and the density of settlement is actually understated courtesy of the scale of the map. Certain patterns do seem to hold true. One is that the many of the structures do seem to be complexes of structures atop platforms. Another is that the largest structures generally seem to be nearest to the rivers' edge. There is one significant outlier to that pattern represented by the fact that one of the largest clusters of structures is also the furthest inland (west). Observation on the ground may serve to help explain this exception.

The site is notoriously swamped even as it is currently under cultivation. Extended observation of the topography of the site and the specific areas where there is more or less standing water, has led to the suggestion that the landscape is changed significantly from the time of Prehispanic occupation. Significantly, in the middle of the site there are particular areas devoid of structures and wetter than the surrounding areas. **Figure 4.3** represents this area as

potentially a relict or seasonal (and now drained) oxbow. The presence of this feature could establish the inland complex as a high status area, restricted in access from the rest of the site.

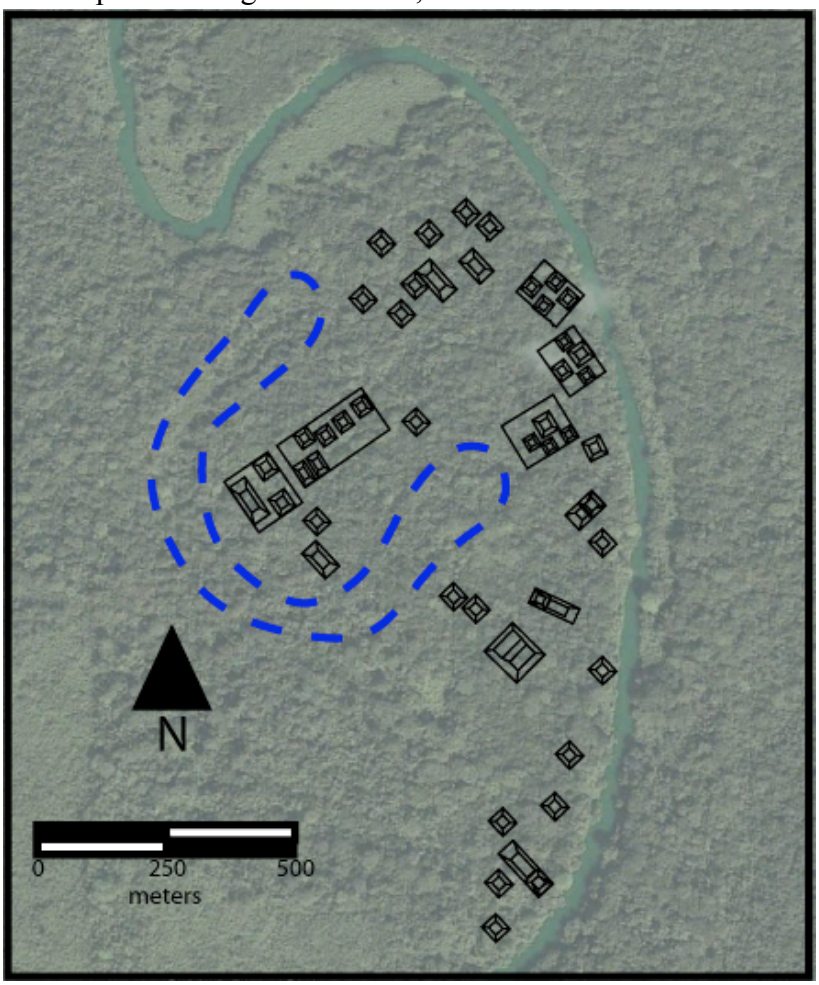

Figure 4.3 Wet Area of Ch'uul'ook, Devoid of Structures (depicted in blue dotted line; map prepared by A. Kaeding).

The Search for Married Woman's Point

Several attempts have been made to relocate the site of Married Woman's Point which has been mentioned to us by local residents, is identified (at a nationwide scale) on the site map at the Institute of Archaeology, and is officially registered as a site at the Institute with a description of its architecture and preservation state. Our various sources of information on this archaeological site do at times contradict, but converge on a couple of key characteristics: a) Married Woman's Point features large, monumental, stone architecture; b) the site is located directly on the river bank (with stone architecture apparently visible from the river); c) the site is supposedly in the vicinity of the now abandoned village of Married Woman's Point (although this "point" where the village once stood was surveyed and no site was found nor did locals know about any site there); and d) could really be anywhere south of Big Falls and north of Gale Creek (admittedly an untenably long stretch of land to discuss in terms of survey). With all these

criteria in mind, BREA team members assessed all leads and potential design strategies for ground truthing, including accessibility. Reconnaissance strategies tend to be fairly detailed as access to these areas is often very difficult with challenges including driving hours out of the way to check out different potential access roads, acquiring a canoe and river guide, and fighting through dense riparian growth. To date, all of these methods were employed during the summer of 2012 and none yielded satisfaction in terms of the specific goal of finding a site that we can confidently identify as Married Woman's Point. However, we did encounter a couple of interesting archaeological features along the way that we discuss below.

Figure 4.4 demonstrates the general area that we have surveyed with a satisfying degree of coverage, so that we can confidently assert where Married Woman's Point is *not*. **Figure 4.4** also includes as points of reference some of the known sites discussed in this volume and the general location of the new sites encountered through reconnaissance. The two new sites–

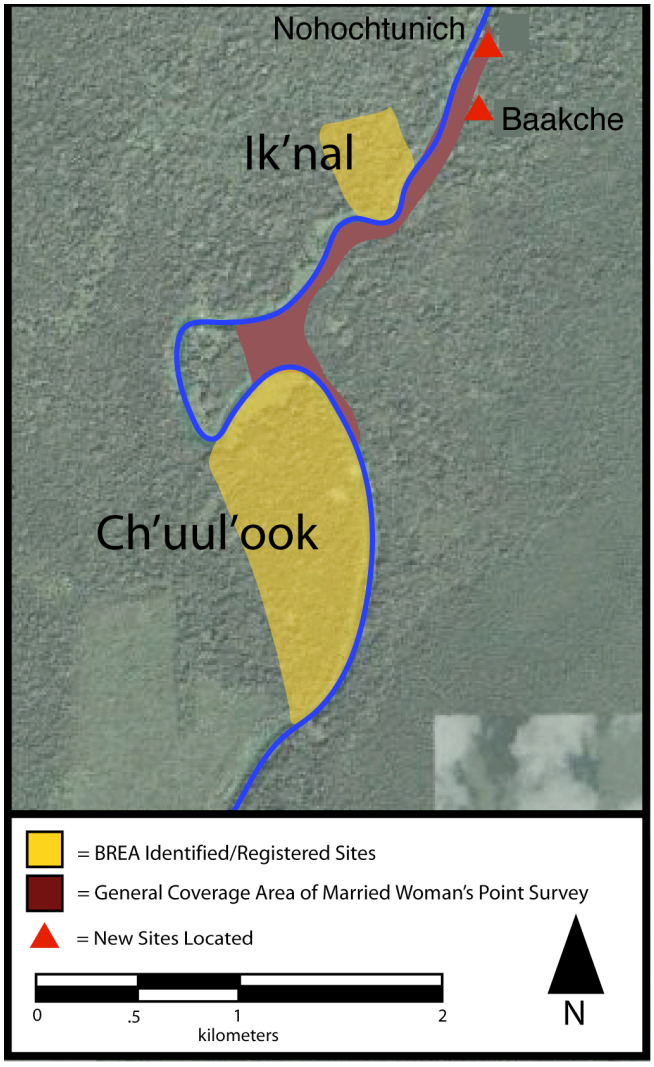

Figure 4.4 Previously Identified BREA Sites and New Sites Found While Searching for Married Woman's Point (map prepared by A. Kaeding).

Baakche and Nohochtunich (**Figure 4.4**)–are located the farthest downstream that the BREA survey teams have recorded thus far. Though survey teams have often moved further afield to investigate particular areas of interest at more distant locations (for example, see Harrison-Buck and Buck 2011 and Buck, Harrison-Buck, and Divoll, Chapter 5), the general pattern has been for reconnaissance to move downstream ahead of the excavation and mapping teams to identify which sites warrant heavier future research investments. To that end, these downstream sites identified during the summer 2012 season will likely receive a more thorough treatment in the future and are only briefly introduced here.

These two sites were recorded expediently and under full vegetation coverage. That being the case, this section will introduce only the most basic, characteristic observations without attempting a full technical description. The site of Baakche (**Figure 4.4**) was the first encountered in our northward reconnaissance trip from Ik'nal. It consists of a relatively modest central mound standing about 1.5 m tall. Given the amount of vegetative ground cover, the lack of observed cultural material comes as no surprise. Just to the north, abutting this mound, though, we crossed a recent tree fall that had upset what may have been a very low house mound or potential plaza. In the debris upset by the tree fall we collected some ceramic samples (awaiting analysis) and clear evidence of a disturbed burial (half of a human jaw being the most compelling of that evidence). No doubt due partly to the environmental setting, no other archaeological features were obvious in this immediate area.

The site of Nohochtunich was far more substantial. Located on a prominence directly on the riverbank (and, in fact, visible from the river), this site seems to be centered on two large mounds connected by a separate linear stone feature. The larger mound is pyramidal but its height is difficult to gauge. On its end east and north faces, where the slope extends down all the way to the river itself, this is a towering monument. From the rear south-facing side, however, it stands around 4 m tall. This southern face is clearly a staircase designed to provide access to the top of the pyramid. This particular staircase is unlike anything we have noted in the BREA study area to date, as the individual stairs are constructed of enormous slabs of limestone; each measuring around 20 cm in thickness and a full 3 m in length (**Figure 4.5**). One of these stones stands upright (though it looks as though it could have performed a retaining function, the fact that it is the only one suggests that it is likely upturned as a result of disturbance) and reaches almost 1 m in width. The rest remain mostly buried but may well bear the same width measurement. **Figure 4.5** shows this architecture composed of megaliths from two angles: the photograph on the left is taken from the eastern end of the easternmost stair, looking back west to our guide, Mr. Marcario Pau, who stands at the other end of that stair, nearly 9 m away; the photograph on the right is facing north from that same eastern corner showing the upturned slab.

Figure 4.5 Megalithic Stairs Found at Nohochtunich (photos by A. Kaeding).

Interpretations and Conclusions

The sites discussed in the chapter above provide further support for two aspects of the regional settlement pattern that have been recognized since the earliest stages of BREA survey. First, almost every reconnaissance trip continues to affirm the great density of archaeologically-attested settlement throughout this region. Ch'uul'ook is an excellent example of that fact. Our understanding of that density is largely dependent on the historical circumstance in which we find ourselves. Like with all of the extensively cleared Mennonite agricultural fields, the density of settlement observed at Ch'uul'ok is largely informed by our ability to simply see it so well. Many of the same mounds of this site would be better preserved if the land had not been cleared and, as a result, those mounds would actually be larger in those environment. Meanwhile, the reputedly massive monumental site of Married Woman's Point that has been reported, recorded, and even labeled on the map remains elusive to our survey efforts. There are multiple factors responsible for this situation but the great variation of visibility in different environments in no small part of the equation. To that end, as always, the rapidly advancing agricultural deforestation remains a reality that we must appropriately and strategically mitigate even as we lament its destruction.

Secondly, the great density of occupation that has been best demonstrated by the smaller mounds visible in cleared fields, but is attested as well by the fewer monumental sites that we include among our database, is river-oriented. Admittedly, the BREA project is river-oriented by both our definition and our strategy, so there is a natural sample bias. Nevertheless, our growing dataset speaks not only to the relationship between settlement density and the Belize River but also to nuances within that pattern. For example, the seemingly haphazard nature of distribution of small mounds alongside and abutting the occasional evidence for residential plazas is similar to that noted at the site of Ma'xan (see Kaeding et al. 2011; Murata 2011; Runggaldier and Harrison-Buck 2011). While a lot of the information necessary for drawing any real comparisons has been lost to the plow, both Ma'xan and Ch'uul'ook share a similar haphazard distribution of mounds of various sizes without any evidence of zoning/planning, a surface covered with a great variety of artifacts, and no real evidence for standardized orientation. For both sites, this existing archaeological signature could fit with a site function dedicated to trade. Both sites are, of course, directly next to the river, but, beyond that, they are both very near similar bends in the river. Again, perhaps these are conditions favorable to the establishment of trade outposts.

Each of these patterns will continue to be tested and refined as the BREA project continues to fill in the banks of the Belize River and, especially, as the project branches further afield. In the meantime, the increase in geographic settlement data provided by riverside survey efforts this season have allowed us to push further downstream, note and reaffirm observations of settlement pattern, mitigate the damage of agricultural expansion, and begin to notice nuances and draw comparisons. While we necessarily must continue to put in the often less-rewarding investment into investigating areas with lower probabilities for high-density settlement, we should not lose sight of the many very compelling research avenues that are informed by continued survey along the riverbanks.

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Chapter 5

The Search for the North-South "Overland Route" and the New Richmond Site: Survey and Reconnaissance Between Saturday and Labouring Creeks

David Buck, Eleanor Harrison-Buck, and Timothy Divoll

At the end of the January 2012 season, we conducted a pedestrian survey along a projected north-south overland route, which was recorded by the Spanish in the sixteenth century. **Figure 1.2** shows the projected north-south overland route in red and our pedestrian survey transects in yellow. According to the Spanish accounts, the north-south overland route stemmed from the headwaters of the New River (Ram Goat Creek) where the Spaniards (led by Maya) docked their canoes and walked across an extensive *pinal*, or "pine ridge" until they reached Labouring Creek, known then as Cancanilla (Jones 1989:138; **Figure 5.1**). They crossed over Labouring Creek on a partially submerged "natural bridge" of travertine stone and continued south toward the Belize River (Jones 1989:138, 312 [Note 35]; see also Scholes and Thompson 1977:45).

The north-south overland route and this crossing point on Labouring Creek may have continued to be used throughout the colonial period as late as the nineteenth century. The short-lived settlement of New Richmond was said to be located along the banks of Labouring Creek in the vicinity of the creek crossing, near the Cut and Throw-Away Creek confluence (Simmons 2001:88). Although the precise location and extent of the settlement is unknown, descriptions suggest it was established by an ex-Confederate named B. R. Duvall from the southern United States and was said to be located at a former "trading post" (Simmons 2001:88). Duvall notes that he found thatch structures still standing and reused them and also notes that he employed Maya laborers, all of which suggest Maya (likely Caste War refugees from Yucatan) were living in the immediate area as late as the 1860s (see also Yaeger et al. 2004).

Harrison-Buck (2010) has proposed elsewhere that the north-south overland route used by Spaniards in the 16th century may have been continually utilized from ancient times on through the late colonial period. To test this idea, the BREA project conducted a pedestrian survey in early 2012 between the ancient Maya site of Saturday Creek, along the Belize River, north towards the confluence of Labouring Creek and Cut-and-Throw-Away Creek. The primary goals of this pedestrian survey were to:

(1) identify the location of the "natural bridge" and creek crossing;
(2) record ancient Maya settlement and associated surface artifacts along the survey route, particularly near the Cut-and-Throwaway Creek and Labouring Creek confluence; and

(3) document historic/colonial period artifacts in this same survey area.

Below we review the ethnohistoric literature and the colonial history documented along the north-south overland route. We then detail the findings of our four-day trek (from January 30 to February 2, 2012) as we walked through swamps and creek-crossings and eventually reached higher ground at the confluence of Labouring Creek and Cut-and-Throwaway Creek at the southern boundary of the Yalbac property in the central Belize District.

Sixteenth Century Spanish Ethnohistoric Accounts

After docking their canoes at the headwaters of Ramgoat Creek, the Spanish reported traveling across an extensive *pinal*, or "pine ridge" until they reached a "natural bridge" made of travertine across Labouring Creek, near the confluence with Cut-and-Throwaway Creek (Jones 1989:138; **Figure 1.2**). Crossing this "submerged natural bridge" they continued south six leagues until they arrived at the Maya site of Lucu, located on the banks of the Belize River (Jones 1989:138; Scholes and Thompson 1977:45). Grant Jones (1989:287-288) notes that this arrival point on the Belize River was named "literally, 'the hamlet where Chantome had been,'" suggesting that this site was no longer occupied when the Spanish arrived (site #17 on **Figure 5.1**). In contrast, Lucu (which appears to be in the same vicinity as Chantome) was "rated an important settlement" by the Spanish (Scholes and Thompson 1977:47), who described it as a "prosperous place with many cacao groves and noted for its annatto and vanilla" (Roys 1957:163). Scholes and Thompson (1977:45) surmised that Lucu was located roughly in the vicinity of Never Delay or Mount Pleasant, former villages that are now farmland under cultivation by local Mennonite farmers (site #16 on **Figure 5.1**).

During the 2011 field season, our survey team identified two ancient Maya settlements at both Never Delay and Mount Pleasant. Test excavations at the Never Delay site, which we refer to as Ma'xan, revealed a long history of occupation with one mound that had a Late Postclassic component, but no Spanish material was detected (Murata 2011; Runngaldier and Harrison-Buck 2011). Pedestrian surveys across the river within the small hinterland settlement area of Chi'kin just west of the Saturday Creek site (**Figure 1.2**) also revealed a scattering of Postclassic material on the surface (Harrison-Buck, personal observation) as well as high densities of colonial artifacts (Kaeding and DeGennaro 2011). Subsequent excavations in this area documented a high density of nineteenth century colonial artifacts (Kaeding and DeGennaro 2011; DeGennaro and Kaeding 2011), including an eighteenth century Spanish coin (see Kaeding, Chapter 6).

It is possible that Never Delay and Mount Pleasant were part of the larger Classic Maya site center of Saturday Creek just across the river from one another. It has been suggested elsewhere that Saturday Creek may conceivably be the "hamlet formerly known as Chantome" with the Contact period site of Lucu perhaps around Chi'kin or somewhere in the vicinity (Harrison-Buck 2010; Harrison-Buck et al. 2012). Based on our examination of a "least cost

path" from Ramgoat Creek to the Belize River, coupled with the excavations conducted in the settlement area of Chi'kin, we believe the projected north-south overland route that Grant Jones and others have proposed is accurate, entering the middle Belize River valley near the ancient Maya site of Saturday Creek (compare Figure 5.1 and Figure 1.2; Harrison-Buck 2010). Further testing in this area is planned in the future.

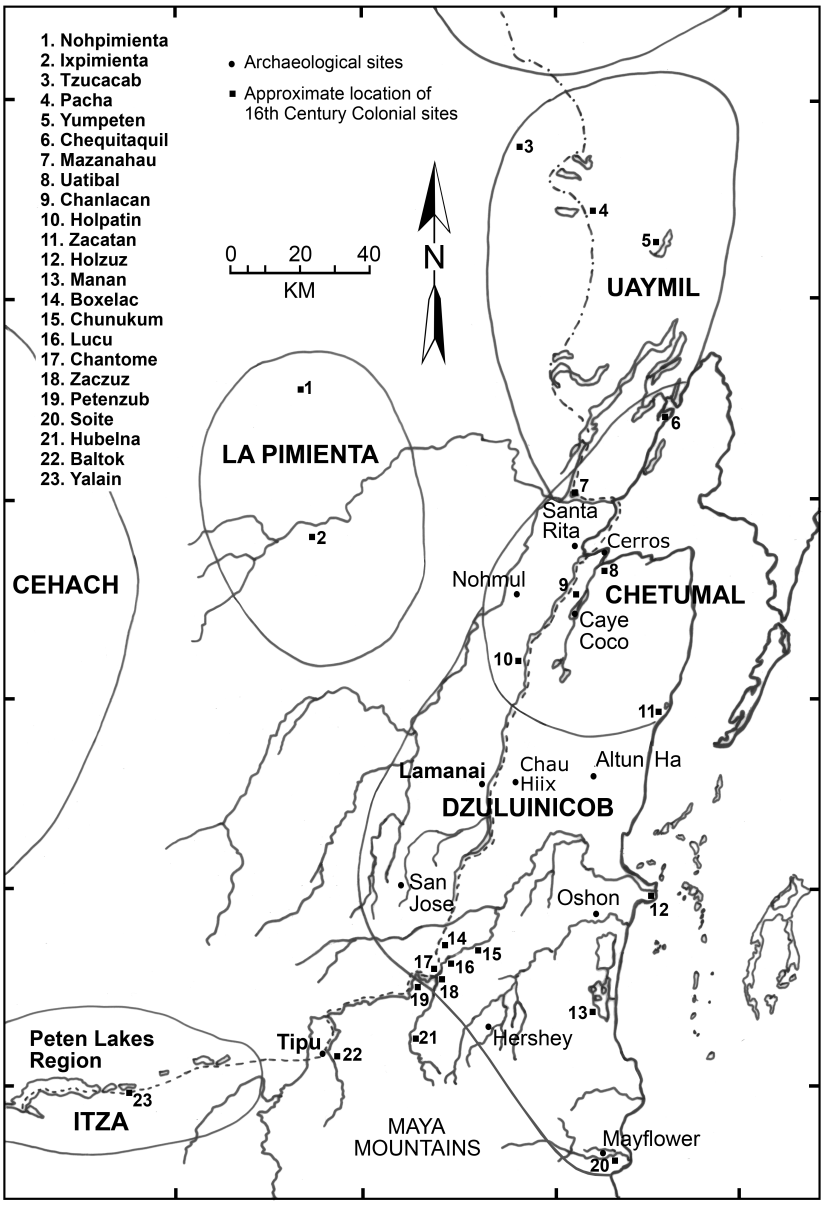

Figure 5.1 Map of "Native Provinces" in the Maya Lowlands at the time of the Spanish Conquest in the 16th-17th centuries. Shows rough locations of Maya contact period sites noted by the Spanish and the project north-south overland route that connected sites on the New River, like Lamanai, with settlements in the middle and upper Belize River valley (*adapted from* G. Jones 1998:Map 2).

Nineteenth Century Ethnohistoric Accounts

For this particular part of Belize River, the nineteenth century is another period to receive significant attention by ethnohistorians (Boland 1977; Jones 1977; Simmons 2001). During the late nineteenth century, particularly during and immediately following the U.S. Civil War, Belize and other countries of Central and South America received many immigrants from the war-torn southern United States (Simmons 2001). As early as 1866, there were monthly steamers leaving from New Orleans, carrying passengers south to Belize City. The steamer *Trade Winds* advertised regularly in the daily *New Orleans Crescent* newspaper, carrying passengers the distance of approximately 900 miles to Belize City and returning to the U.S. with tropical hardwoods and tropical produce grown in Belize. The Reverend B. R. Duvall of Petersburg, Virginia, took passage to Belize on the *Trade Winds* in 1867. After a month-long stay in Belize City that also included touring the interior of the country via the Belize River, Duvall decided to return to the U.S. and recruit other southerners to join him in establishing the Confederate settlement of New Richmond (Duvall 1881; Simmons 2001). Later that same year, Duvall returned to Belize with his wife, three daughters, and son to prepare for settlers that would join him at New Richmond. According to Simmons (2001:87), Duvall decided to establish the settlement along the banks of Labouring Creek, "where it is intersected by Cut and Throw Away Creek."

Duvall's advertisements for the settlement of New Richmond supposedly attracted the attention of more than 200 people who he anticipated would arrive, but they never did. Duvall cites a bad cotton crop in the southern U.S. as the primary reason why these prospective settlers could not buy the passage to Belize and leave the South (Duvall 1881:53). The only other family to temporarily join him at New Richmond was the family of his son-in-law. Establishing a settlement in the remote central region of Belize was difficult for Duvall and his family, particularly without the collaborative assistance of other like-minded settlers. A report in *The Opelousas Courier* (St. Landry parish, Louisiana) dated July 17, 1869, noted that the situation at New Richmond had deteriorated significantly:

> ""Duvall, the founder of the city of Richmond, county of Confederate, colony of Honduras – a city of one inhabitant – has been residing in the said city two years. He finds business a 'leetle dull'."

Shortly thereafter, in November 1869, Duvall decided to return to Virginia, but could not afford to bring the rest of his family back to the U.S. until the following February (Duvall 1881:65-67). The Confederate settlement of New Richmond never became more than a family homestead within the lowland jungles of Belize.

Duvall was not completely alone and isolated along Labouring Creek. Colin McRae, a prominent Confederate and one of the chief financial officers for the Confederate war effort (Foreman 2010), was accused of war crimes and fled the U.S. following the Civil War in 1867

and established his own homestead in Belize near New Richmond. Simmons (2001) notes that the McRae estate was located to the south of New Richmond at the confluence of Saturday Creek and the Belize River. In the area of Chi'kin, closest to the confluence of Saturday Creek and the Belize River, a dense scatter of nineteenth century colonial material was noted on the surface of the plowed fields during our survey of the area. Archival research in Belmopan, Belize conducted by Adam Kaeding and John DeGennaro (2011) further supported the identification of this area as the location of McRae's homestead. This colonial site, which we refer to as the McRae-Stallworth site, was the focus of investigations during the summer of 2011 (Kaeding and DeGennaro 2011). While no Spanish colonial artifacts were noted, there is an abundance of nineteenth century (and possibly seventeenth century) material present. No standing architecture, such as foundation walls, were exposed, but excavations at the McRae-Stallworth site revealed some remnants of bricks and suggest the site may contain the remains of a building foundation that has yet to be identified. Based on an analysis of the artifacts, it is possible this area was the location of a mercantile business that archival records indicate McRae owned and operated on the Saturday Creek property (DeGennaro and Kaeding 2011). McRae lived on the property until his death in 1876. Ethnohistoric accounts indicate that McRae was associated with the town of New Richmond during the two years from 1867-1869 that Duvall and his family lived there. That these two locations anchor the projected north-south overland route suggests this route was still active until at least this time.

Pedestrian Survey From Saturday Creek to Labouring Creek

The reconnaissance team in 2012 was led by David Buck and Timothy Divoll, who were accompanied by two local men from the village of More Tomorrow, Marcario Pau and Harrison Esquivel. The reconnaissance team departed on January 30 from the Mennonite quarry hill just north-northeast of the site of Saturday Creek (**Figure 5.2**). The primary geographic feature between the Saturday Creek site to the south and Labouring Creek to the north is Cut-and-Throw-Away Creek. The route of the pedestrian survey approached the creek from the southeast crossing through lowland swamp forest and a series of slow-moving tributary creeks before reaching the main stem of the creek (**Figures 5.1 and 5.2**). The swamp forest around Cut-and-Throw-Away Creek was dominated by broadleaf species including bullet tree (*Bucida buceras*), santa maria (*Calphyllum brasieliense*), mahogany (*Swietenia macrophylla*) and trees of the family Melastomatacea. Several species of palm including the bay leaf palm (*Sabal mauritiiformis*), warree cohune (*Astrocaryum mexicanum*), and the give and take palm (*Chrysophila argentea*) were abundant in the understory as well as the sedge *Cladium jamaicense*. Although none were observed, the lowland swamp around Cut-and-Throw-Away Creek is a likely habitat for logwood (*Haematoxylon campechianum*) as well.

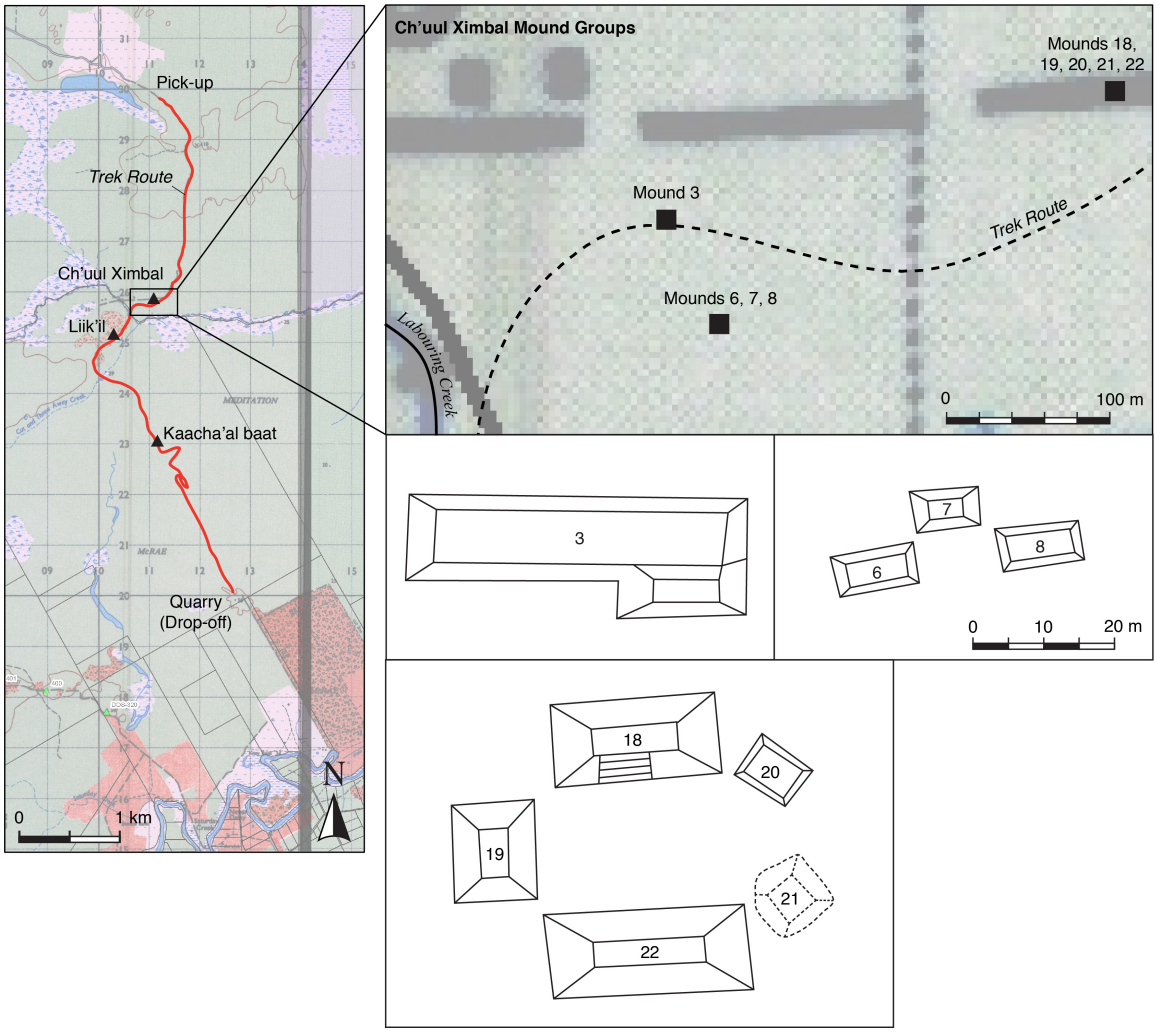

Figure 5.2 Map showing GPS points along survey trek between the quarry to Labouring Creek and then north through Yalbac. Inset maps (A, B, and C) show rectified drawings of structures, including one formal plaza group, mapped at the site of Ch'uul Ximbal, located on the north bank of Labouring Creek (maps prepared by D. Buck and digitized by M. Brouwer Burg).

Ancient Maya Settlement and Associated Artifacts

Approaching Cut-and-Throw-Away Creek: The Site of Kaacha'al baat

The site of Kaacha'al baat was encountered along a logging road, southeast of Cut-and-Throw-Away Creek (**Figure 5.2**). The site consists of two small earthen mounds that are less than 0.5m in height with no clear orientation. However, artifact scatter on the mounds included small fragments of ceramic material, obsidian, and a broken lithic tool (**Figure 5.3**). No additional evidence of ancient Maya settlement was observed on the southeast side of Cut-and-

Throw-Away Creek and a bit farther along this logging road and we encountered a dense swamp. Since our reconnaissance, reports indicate that this area has been extensively cleared as part of a large sugar cane cultivation project by a Guatemalan-based company called Green Tropics Ltd. It is highly likely that additional settlement areas might be found in this region as a result of the recent land clearing that has been conducted, where the planting of sugar cane has already begun.

Figure 5.3 Lithic fragment found along the approach to Cut-and-Throw-Away Creek (Photo by D. Buck).

Between Cut-and-Throw-Away and Labouring Creeks: The Site of Liik'il

On the northwest side of Cut-and-Throw-Away Creek, there is a small limestone ridge that extends towards the confluence of Cut-and-Throw-Away Creek with Labouring Creek. The ridge is approximately 30 m in elevation and is an extension of the larger ridge that appears in **Figure 5.2** as a contour line. We surveyed along the foot of this ridge and also on top of the ridge and found a series of small (approximately 1 m high) earthen-and-stone mounds. We refer to this site as Liik'il (**Figures 5.2)**. One mound at Liik'il, with a line of stone visible on the surface, shows an orientation that is approximately W30N (**Figure 5.4**). Like most of the other structures, this mound is approximately 1-meter in height. Eroded ceramic sherds were found scattered around these mounds and obsidian also was observed. A full survey of Liik'il and the surrounding ridge top was difficult because much of the area had been burned the previous year and large, partially burned trees made walking and visibility across the ridge top difficult. Further reconnaissance in this area is recommended in the future.

Across Labouring Creek and into Yalbac: The Site of Ch'uul Ximbal

A fluvial tufa deposit provided a 'natural bridge' across Labouring Creek. The tufa deposit created a shallow cascading waterfall that stretched across the entire width of the creek, allowing for easy crossing (**Figure 5.5**). The survey continued onto the north side of Labouring

Creek, into the Yalbac property. Yalbac, along with much of central Belize, was heavily impacted by Hurricane Richard in October 2010. As a result, many trees were down and a high density of vines and lianas had emerged, creating a thick layer of vegetation over the area. However, during a full day of survey, we were able to identify a total of 14 mounds, including 2 small plazuela groups, all located within 500 meters of the creek bank. We refer to this site as Ch'uul Ximbal (**Figure 5.2**). Below we provide a brief description of the major structures and plazuela groups identified at Ch'uul Ximbal, along with associated artifacts seen on the surface.

Figure 5.4 Low-lying mound at site of Liik'il located near the confluence of Cut-and-Throw-Away Creek and Labouring Creek.

Mound 3: This is a low-lying (0.35-meters high) range structure with its long axis oriented east-west. The south-east side of the structure includes a small superstructure that is approximately 0.5-meters high (**Figure 5.2A**).

Mounds 6, 7, and 8: These three mounds create a small plazuela group (**Figure 5.2B**). The structures are oriented 10 degrees off cardinal with the long axis of each structure oriented at N80E. The northern structure (mound 7) is the tallest structure with an approximate height of 1 m, with a basal area of 8 x 8 m. Mounds 6 and 8 are positioned to the southwest and southeast of mound 7, respectively. Both mounds have an estimated height of 0.5 m with a basal area of 6 x 10 m. A broken mano fragment was collected from the surface off the southwest corner of Mound 6,

Mounds 18, 19, 20, 21, and 22: This collection of five mounds creates an enclosed plaza

group (**Figure 5.2C**). The northernmost and southernmost structures (Mounds 18 and 22) are the two largest mounds in this plaza group, each with an estimated basal area of 10 x 20 m. Mound 18 is the taller of these two structures with an approximate height of 1.5 m. At least 2 courses of stairs were visible on the interior of Mound 18 (**Figure 5.2C**). Mound 21 included a large collection of stones but no definitive orientation could be determined. It is possible that it represents a circular, all-stone structure similar to others documented at Hum Chaak and Ik'nal (see Harrison-Buck, Chapter 8). As the building was covered in dense bush, the identification of a circular structure at Ch'uul Ximbal remains speculative until further investigation is carried out.

Figure 5.5 The partially submerged fluvial tufa deposit along Labouring Creek provides a 'natural bridge' for crossing the creek (Photo by T. Divoll).

Preliminary Artifact Analysis: Colonial and Historic Material

Approaching Cut-and-Throw-Away Creek

The approach to Cut-and-Throw-Away Creek did not reveal any colonial or historic artifacts. The trail followed a tractor road for approximately 0.75 km before reaching the creek crossing itself. The lowland swamp surrounding the creek likely would have deterred any colonial-era settlers from setting up a permanent camp in this location.

Between Cut-and-Throw-Away and Labouring Creeks

The high ground associated with the ancient Maya site of Liik'il also contained evidence of some historic and/or colonial activity. A cast iron teakettle (**Figure 5.6**) was found associated with one of the small stone and earthen mounds at the site. A scatter of broken glass bottles was also observed in the area. The high ground associated with this area may have provided an area for settlement in ancient as well as colonial times. Duvall mentions in his report on his travels to

British Honduras that when "…some high land or hill, is well cleared and kept free of everything except fruit trees and short grass, the wind will keep all such annoyances (i.e., mosquitos and flies) away, and make your home very pleasant" (Duvall 1881: 41). This high ground, overlooking Labouring Creek, and its confluence with Cut-and-Throw-Away Creek may have made for an ideal location for Duvall and his proposed New Richmond settlement. Future reconnaissance work will focus on a more thorough survey of the hilltop and associated terrain for more evidence of historic and colonial settlement.

Figure 5.6 A cast iron kettle was found at the base of the hill associated with the ancient Maya site of Liik'il (Photo by D. Buck).

Across Labouring Creek and into Yalbac

The area across Labouring Creek where ancient Maya mounds of Chu'ul Ximbal were found also contained a high density of colonial/historic artifacts, particularly glass bottles. Several glass medicinal bottles with distinctive embossed labels were found around the site of Chu'ul Ximbal. Among these was a bottle of "Chillifuge" manufactured by *Finlay Dicks & Co.* of New Orleans (**Figure 5.7**). The bottle was found in-between the plazuela group of mounds 6, 7, and 8 and the larger plaza group of mounds 18,19,20,21, and 22 at the site of Chu'ul Ximbal. Finlay Dicks & Co. applied for and received a trademark for their medicine "Chillifuge" in 1905 (Lillard 1906). The application for the trademark listed Chillifuge as a remedy for "agues or chills and fever, dumb chills, bilious fever, and various allied diseases." (Lillard 1906). The earliest reference we could find of Chillifuge comes from the weekly trade journal *The Chemist and Druggist* (June 24, 1893) where it is mentioned that "F.A. Dicks, Natchez, Miss." requested a trademark on December 6 [1892], which would post-date Duvall and the New Richmond settlement. However, another medicine bottle, labeled "Davis Vegetable Painkiller" that was found near the bottle of Chillifuge dates between 1849 and 1920 could conceivably be associated

with Duvall and the New Richmond settlement. It is a bottle of Perry Davis's pain medicine, which became renowned when it was widely used as a remedy during the 1849 cholera epidemic that spread across the United States (Nickel 2001). Davis's painkiller subsequently gained a global distribution as missionaries carried it with them as cure-all (Nickel 2001). It was manufactured until at least 1920.

Figure 5.7 Fragment of Chillifuge bottle, manufactured by Finlay Dick & Co. Bottle was found on north side of Labouring Creek within the site of Chu'ul Ximbal

A bottle of Kilmer's "Swamp Root" was also found in the same vicinity. Andral Kilmer and his brother Jonas developed and sold Swamp Root out of Binghamton, NY, beginning sometime around 1878 (Nickel 2001). The embossed label on the bottle fragment found at the site of Chu'ul Ximbal reads "Swamp Root – Kidney Liver and Bladder Remedy" (**Figure 5.8**).

In addition to these bottles other notable colonial and historic artifacts that were found include the metal strapping of a large barrel, a chamber pot, the bottom of H. Michelsen Bay Rum from St. Thomas, and multiple other, less distinctive green and brown glass bottles. Both the chamber bot and strapping, presumably from a rum barrel, were both identified on the surface near Mound 8 at Chu'ul Ximbal. It is possible these artifacts were associated with a Spaniard who, according to ethnohistoric accounts, lived in the vicinity of New Richmond and distilled rum, but left before Duvall arrived in 1867 (Duvall 1881:48). While the production of rum is typically associated with European colonists, the consumption of alcohol, as well as the use of medicinal remedies does not appear to be limited to Euro-American colonists. Evidence of both patent medicine and alcohol bottles were found in relative abundance at the nearby Maya site of San Pedro Siris, which was a nineteenth century Caste War refugee settlement (Yaeger et al. 2004:111). Duvall notes that he employed the Maya in the area and that a large number of Maya-style thatch structures were standing on the site, which he reused when he established his settlement of New Richmond. This account suggests that in addition to the one Spaniard, Maya

(likely refugees from the Caste War in Yucatan) were probably living in this area as well, perhaps using this location as a trading post, as Duvall's description suggests. Future lab work will continue to analyze the surface collection from this area in an effort to isolate the period(s) of occupation and the identities of the different occupants who lived in this area over the years.

Figure 5.8 Kilmer's Swamp Root Kidney Liver and Bladder Remedy

Conclusions

In our pedestrian survey, we confirmed what the Spanish recorded nearly 400 years ago—that most of this route consists of wet, mucky swamp. When our team finally reached Labouring Creek, we found a tufa dam, which was the only noticeably high spot to cross Labouring Creek (**Figure 5.5**). We believe this is the same "natural bridge" that the Spanish described in their sixteenth century accounts. Here, we encountered higher ground along either side of Labouring Creek. We identified ancient Maya settlement in both areas of higher ground to the north and south of Labouring Creek, including the sites of Liik'il and Ch'uul Ximbal (**Figure 5.2**). Higher ground straddles the south side of Labouring Creek and west side of Cut-and-Throwaway Creek, where a substantial hilltop was noted. Although we did climb a portion of this hilltop where we identified the mounds of Liik'il, access to the highest part of the hilltop was not possible due to the dense tree fall and survey of this area was not comprehensive. Duvall's mention of New Richmond on a cleared high hill supports the idea that this hilltop may be the location of this short-lived "town" and further survey should be carried out here in the future to test this idea. On either side of Labouring Creek in the vicinity of the Maya mounds we found not only pre-Hispanic artifacts but a good deal of colonial artifacts which date to the colonial period. Most of this material appears to date to the 19th century and may correspond to the settlement of New Richmond.

Duvall mentions that in the vicinity of New Richmond was a thatched structure (that he reused), which he describes as a structure formerly used as a "trading post" (Simmons 2001:88).

Although nothing on the surface looked to us to be from the Spanish colonial period (Adam Kaeding, personal communication February 2012), we believe this location is likely the same crossing along a north-south overland route that was used by the Spanish during the sixteenth century, which connected the New River with the settlements along the middle Belize River. Based on where we have identified the store of Colin McRae on the Belize River, it can be surmised that the overland route may have continued to facilitate not only pedestrian traffic north-south, but also the movement and trade of goods from one "trading post" to another. In turn, McRae's store was directly linked with the Belize River and the many trade items coming from Belize City where the *Trade Winds* steamer stopped regularly on its round-trip passage between Belize and New Orleans.

The concentrations of both Maya and later (18th and 19th century) colonial artifacts suggest that this creek crossing marks an important crossroads for trading activity and that the north-south overland route may have remained an important thoroughfare and established trade route from prehispanic through colonial times. While our reconnaissance did not reveal any 16th or 17th century Spanish colonial artifacts, our survey of the area was certainly not exhaustive and we plan to go back in future seasons to perform additional reconnaissance not only on the highest hilltop, but also around the natural bridge and along the length of the projected north-south route.

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Section II

Site Investigations

Chapter 6

Colonial Investigation at Otley's Flat (Operation 8)

Adam Kaeding

Otley's Flat, named locally in reference to a prior landowner, consists of an upper field and lower terrace on the northern bank of the Belize River in a very high-density settlement area. **Figure 6.1** highlights the location of Otley's Flat, which is directly across the river from the site of Mount Pleasant. The area is bordered to the east by Saturday Creek (and the dense archaeological occupation of that area), and to the west by the ancient Maya site of Coco's Bank. There are a number of dispersed ancient Maya mounds, mostly in the upper field of Otley's Flat and this is considered part of the dispersed western hinterland settlement of Saturday Creek, which we refer to as Chi'kin. We use Otley's Flat as a site name that refers to the ephemeral presence of an historic occupation in this particular area, which is visible on the surface by dense scatters of colonial artifacts that appear to date primarily to the nineteenth century British colonial occupation.

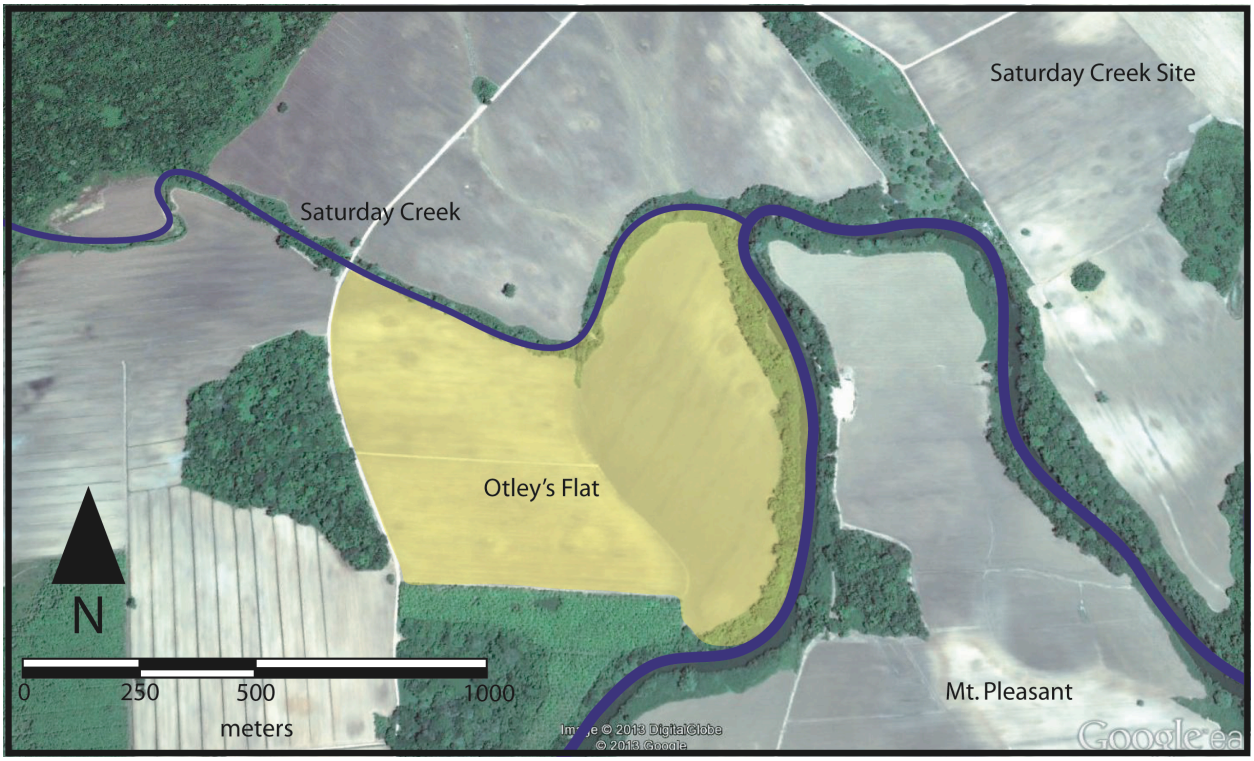

Figure 6.1 Location of area referred to as Otley's Flat (in yellow; map prepared by A. Kaeding).

Otley's Flat stretches south to the river from one of the BREA project's main access roads and has been plowed or planted during each of our research seasons. Many times, therefore, we have passed this field and noticed the many telltale rolling hills that are the remnants of archaeological mounds after the effects of the plow. Looking at satellite images, we have also noticed the soil stains that we recognize as evidence of plowed mounds in this particular field. In this case, we were surprised to find that several structures were located on the lower terrace of Otley's Flat, an area that usually is devoid of mounds. In our general experience these terraces do not seem to have been selected for architectural investment, which we assume was due to the fact that they are occasional high-water flood zones. Yet, as Harrison-Buck (Chapter 1) notes, based on Spanish colonial accounts, these low-lying floodplains may have been reserved for cacao cultivation, which Frey and Knorr (Chapter 14) investigated during the January 2012 season through soil studies. The location of Otley's Flat on the south side of where Saturday Creek enters the Belize River also has been identified as an area of particular interest as it appears to have served as an important cross-roads in ancient, colonial, and historical times (Harrison-Buck 2010; see also Buck, Harrison-Buck, and Divoll, Chapter 5).

Several factors combined to motivate excavation at Otley's Flat. Foremost among these was the possibility that this site would yield evidence of contact period interaction between local Prehispanic communities and early Spanish colonial agents potentially arriving at this cross-roads via a north-south overland route (discussed in Buck, Harrison-Buck, and Divoll, Chapter 5). One of the major goals of the BREA project is to identify evidence for overland trade and migration routes that connected the Belize River and the Yucatán. Along with other lines of evidence, we have been investigating this question through historically documented use and reuse of such routes by Spanish colonial administrators and missionaries. We have referenced the often, vague details provided by these travelers and preserved in archives in an attempt to relocate specifically named sites and reconstruct the routes. In fact, once we are able to pin down any confident anchor points, the rest of the points of the route should more-or-less fall into place according to the distance estimates provided in the Spanish documents.

Any suggestion of evidence that speaks specifically to Spanish colonial presence is of great value to this central research objective of the BREA project. Therefore, we were particularly excited when we heard reports from two different locals that they found (on two separate occasions) a total of five Spanish silver coins around the Saturday Creek site in the vicinity of Otley's Flat (**Figure 6.1**). Unfortunately, no one could produce the coins they had found nor were they able to recall the dates on them. However, as we often find to be so impressively the case, local memory of the landscape remains strong among locals, even when the landscape has been dramatically altered, like Otley's Flat. Both individuals offered to show us right to the areas where they remember making their discoveries and this is what led us to place our excavations where we did, around the only mound group visible on the lower terrace of Otley's Flat. Mention of silver coins potentially inscribed in Spanish provided enough extra impetus for us to target Otley's Flat for excavation in January 2012, with the following objectives in mind.

Objectives

1. To investigate the archaeological signature of a relatively easy-access, high-visibility area with a high-probability for settlement along the Belize River.
2. To more thoroughly investigate the possibility of ancient cacao production and develop a methodology to test for that evidence.
3. To follow up on several local reports of historical artifacts recovered from this surface indicating potential Spanish colonial presence.
4. To specifically seek deposits relating to early Spanish colonial interactions with local Maya communities using a targeted excavation unit.

Description of the Research

Our research strategy was set by the convergence of three specific research goals – a) to investigate the anomalous low-terrace mounds potentially involved in cacao production, b) to follow up on reports of Spanish colonial artifacts, and c) assuming the accuracy of those reports, to target deposits from early Spanish contact with resident communities. **Figure 6.2** is a satellite image of Otley's Flat. The three mounds of the lower terrace are obviously outlined, but the discoloration of the soil is original to the satellite image.

Our guide directed us to the north-northeast side of the northernmost mound as the location that he personally collected at least five silver coins years ago. This information guided us in the placement of our excavation unit. Based on previous experience, we proceeded with the intention of reaching the presumed structure's lowest level retaining wall where we expected to encounter the best evidence of contact period material. We measured out a 1 x 12 m trench along what the estimated centerline of the mound at an orientation of 330° according to our best guess of the orientation of the mound itself. We then developed a strategy to selectively excavate squares (designated A through F from the top of the mound to the bottom) within that trench in order to quickly locate and follow the lowest retaining wall (**Figure 6.3**).

Zone 1

Zone 1 was the plowed surface level extending over Squares A through F (though Squares A and B were left unexcavated). This zone was approximately 25 cm thick. This 25 cm measurement was standard throughout the unit but slightly shallower in Squares E and F because of the fairly pronounced slope difference between the highest and lowest squares. From prior experience in nearby fields we knew to expect a zone of this thickness and so proceeded rather rapidly. We did screen and recover all artifacts, in case the contact zone had been disturbed by the plow and thereby churned up with the rest of the material. The soil was a 10YR 3/3 loose silty clay with a low to moderate number of artifacts recovered. Zone 1 was terminated as we

reached the end of the plow zone, which is strikingly obvious in several areas as the deepest cuts from the plow stand in sharp contrast to the undisturbed contexts beneath.

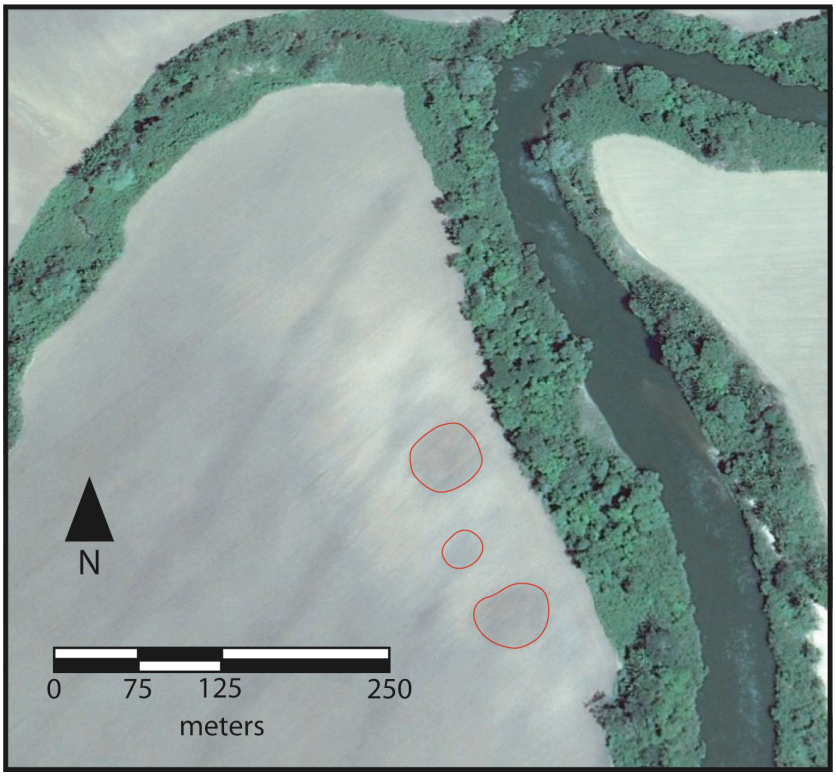

Figure 6.2 Three mounds on low floodplain of Otley's Flat (map prepared by A. Kaeding).

Figure 6.3 Opening shot of Operation 8 prior to excavation (photo by A. Kaeding).

Zone 2

Zone 2 was located directly below Zone 1 throughout Squares C-F (Squares A and B remaining unexcavated). In accordance with the specific goals of this excavation unit, Zone 2 was removed only from Square E. This zone was an average of 4.2 cm thick, extending from an average 93.4 cm below arbitrary datum at the top of the zone to an average 97.6 cm below datum at the bottom. The soil was a semi-compact 10YR 3/3 silty clay. The compactness of the soil was what informed the transition of the zones rather than a change in soil color. During the removal of this zone (20.5 buckets), we recovered a moderate density of artifacts. The transition to a more yellow soil color signaled the end of Zone 2. This zone is interpreted as a contaminated transitional zone between the bottom of the plow zone and the top of undisturbed deposits below. We eventually returned to remove Zone 2 from Squares C and D, guided by our understanding of the stratigraphy provided by excavation in Square E. Moving rapidly through these deposits we found the results to align with that described for Square E below.

Zone 3

Zone 3 was located directly underneath Zone 2 throughout Square E (where we were now focusing all excavation). The ultimate thickness of this zone is unknown as we did not remove it in its entirety from any square in the unit. The matrix was a fairly compact 10YR 4/4 silty clay with a relatively higher artifact count than recovered elsewhere in the unit. It was within Zone 3 that we began to notice slight soil color changes that indicated a potential feature excavated as Zone 4.

Zone 4

Zone 4 appeared under Zone 3 in Square E at 1.1 m below the arbitrary datum. It was an amorphous 10Y/R 4/4 semi-compact soil stain in the southeastern corner of the square. It was excavated in its entirety to 1.8 m below arbitrary datum except for a portion left in section in the baulk wall. While there did seem to be a possible difference in the size of preserved sherds especially nearest the bottom of the feature, nothing else (including its shape in profile) suggested any particular interpretation.

Zone 5 and 6

The objectives of this excavation unit were to locate architectural elements that would serve as a guide in locating the highest probability areas for contact period deposits and potential site use. The field was assumed (and verified) to have been plowed to a depth of roughly 25 cm below the current surface. Our expectations were to encounter these architectural features at that 25 cm transition layer to whatever degree that they had not been disturbed. Upon reaching that level without encountering architecture, and then proceeding through two more zones and an amorphous feature, it became clear that this objective would not be met. We decided to excavate two postholes to be certain of that interpretation. These two postholes, one at the greatest depth

of our excavation in Square E and the other upslope in Square C were designated Zone 5 and Zone 6 respectively.

The Zone 5 posthole was begun at 1.9 m below datum and continued to 2.11 m below datum. Zone 6 began at 32 cm below datum and continued to 1.94 m below datum. While these zones were not sterile (both had very small numbers of sherds), there was no significant change in soil color or texture and there was absolutely no indication of plaster, stone, or any other evidence of architecture. **Figure 6.4** shows the entire unit after the excavation of all zones.

Figure 6.4 Final shot of Operation 8 following test excavation (photo by A. Kaeding).

Surface Survey

While there was very little historical material recovered from the excavation of Operation 8, the historical signature on the landscape is undeniable. While the field is full of large iron machine parts from agricultural pursuits, the evidence for settlement is fairly confined to the riverside. In these areas, there is an abundance of material that at this point of preliminary analysis seems to be of later British Colonial occupation.

While the colonial material is fairly well distributed along the river's edge, there are some areas that appear to have higher concentrations. These higher density surface scatters seemed to be centered on narrow depressions leading toward the river. These narrow depressions could have served as canoe landings or perhaps as points at which to load mahogany logs into the river, but, as none of these theories has been investigated, these remain speculations.

While our excavations failed to recover a substantial sample of historical material and the surface survey seemed to yield evidence of only later colonial period occupation, a single artifact was discovered on the surface both geographically and chronologically between the Prehispanic mounds and the historical surface scatters. A Spanish coin on the surface of the recently plowed fields with a date of 1785 was identified during the course of my surface survey (**Figure 6.5**).

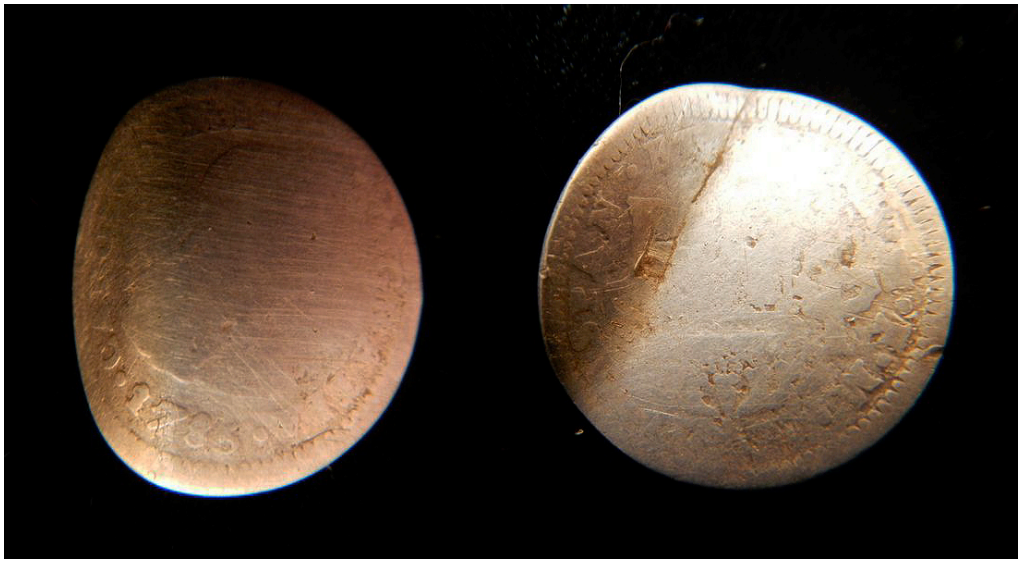

Figure 6.5 Spanish coin found at the site of Otley's Flat (photos by E. Harrison-Buck).

Interpretations and Conclusions

Our investigations yielded primarily ancient Maya artifacts (Terminal Classic and Postclassic material) and, with the exception of the coin, very little historical material, unfortunately. Equally vexing, little to no evidence of intact architecture was encountered. The three mounds on Otley's Flat are certainly not natural constructions as the surrounding landscape is a completely flat field presumably maintained in that form by the fairly regular, extensive flooding that occurs when the Belize runs high and flows backwards against Saturday Creek. One immediate explanation for the results of the excavation is that the recent agricultural pursuits in this area have simple done too much damage to be able to recover intact stratigraphic or architectural data. That is, years of plowing, harvesting, and manually removing all stones that are uprooted in those processes, has left these structures barren of their architectural building materials. We have observed this destructive pattern at other sites in the area, including the nearby site of Saturday Creek just downriver. An alternative explanation is that our excavations may not have penetrated deep enough through the more recent alluvial deposits to expose the Prehispanic Maya architecture. Given that Otley's Flat is low-lying terrace that regularly floods from overbank events from the Belize River, it is possible that stone masonry is present but more

deeply buried by a thick alluvium that has deposited over the years on this terrace floodplain. Our excavation strategy of shallow, but horizontally broad exposure was aimed at finding colonial artifacts, but it is possible we may have to excavate farther down to encounter contact period occupation, if it exists in this location.

In considering thee two possibilities, the absence of historical material on the mound is more easily dismissed as the result of plowing. During these activities, Prehispanic and colonial period surface material is most certainly destroyed, dispersed or churned into the underlying plow zone. While the chance will always persist that deposits are intact beneath the reach of the plow, the period of contact was ephemeral and so the related deposits that we seek are expected to be very thin. Our strategies for locating archaeological deposits from this historical event must be very sophisticated and will continue to be informed by not only fruitful, but also unfruitful excavations like Operation 8.

That being said, in the midst of a field filled with later historical artifacts, we did recover a single Spanish colonial coin. The mere presence of this coin in that field, devoid of any more fine-grained context, does at least speak to the reality of Spanish colonial interaction. Without better archaeological context, we can only surmise at the processes that contributed to its deposit here. We know that currency in the colonial period was often scarce which likely led to the long use-life for coins. In that sense, this coin may have circulated for centuries after it was minted and could have been part of a later logger's transaction. We also know that the Belize River was a hotbed of pirate activity and that the banks of this river housed many of those pirates' camps. This coin may have been a material element of that particular counterculture. Finally, we know that along this stretch of the Belize River, Spanish administrators, laborers, soldiers, and missionaries travelled down from the Yucatán on their way to Tipú, Petén, and countless other points inland. We know that these were often large parties of travelers, and we know that they camped at existing Maya sites along the river. We also know that a handful of very similar artifacts have been recovered from Otley's Flat. While Operation 8 was not an entirely successful excavation, Otley's Flat persists as an area of particular interest in our continued investigation of Spanish colonial contact along the Belize River.

References Cited

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2010 At the Crossroads in the Middle Belize Valley: Modeling Networks of Ritual Interaction in Belize from Classic to Colonial times. *Research Reports in Belizean Archaeology* 7:85-94.

Chapter 7

A Large Late Preclassic E-Group in the Colorado Lagoon System: Further Investigations at Hats Kaab (Operations 7 and 9)

Astrid Runggaldier and Marieka Brouwer Burg

Introduction

The site of Hats Kaab was identified in January 2011 during survey of the sites located beyond Saturday Creek and around the Colorado Lagoon system (Kaeding and Murata 2011). In the subsequent field season in summer 2011, the site was mapped and surface collection samples, including well-preserved ceramics, were identified to the Late Preclassic period (Murata 2011; Woods and Harrison-Buck).

The arrangement of mounds in a configuration consistent with other known E-Groups, and the presence of Preclassic materials warranted further investigation of this group: two Operations (7 and 9) were the focus of excavation in January 2012 and summer 2012, along with a program of systematic surface collection, and empirical observation of the sunrise alignments on the summer solstice of 2012.

The mounds of Hats Kaab belong entirely to the configuration of the E-Group, and it is unclear at this point which settlement they are part of; Saturday Creek lies approximately 1.3 km to the south, Xaman only 0.5 km to the east, and other sites, such as Chumúuk Ha are located further north (**Figure 7.1**). While Hats Kaab is a very large group with respect to other known E-Groups, it is not directly associated with urban settlement like other E-Groups, and may have served a number of communities at the confluence of several crossroads and trade routes.

The Hats Kaab group is completely contained within plowed fields just east of the southern reaches of the Colorado Lagoon, and a packed dirt road to the west and north of its main mound may have already obliterated parts of the group, in particular any mounds that may have enclosed the plaza on its north side (**Figure 7.2**). While large in surface area, the group overall displays shallow topography that resulted from the impact of agricultural activities in this area, probably in the last decade alone: bush trees were cut and burned, often in rows that create linear patterns of burnt material; limestone rocks, likely vestiges of masonry architecture, were moved off the mounds to the edge of the fields; materials are regularly broken in a 20-cm deep plow zone by the repeated north–south action of plowing, which is recently becoming mechanized on a larger scale; the mounds themselves were partly flattened, the eastern ones towards the east, and the western mound towards the plaza. The latter mound may have stood considerably higher, and was severely cut into for fill (according to a local informant) to raise the shallow area of the plaza at its base, which can get flooded with heavy rains. The observation of

these patterns suggests an urgent need to recover what information is still preserved for the interpretation of this large but relatively isolated E-Group.

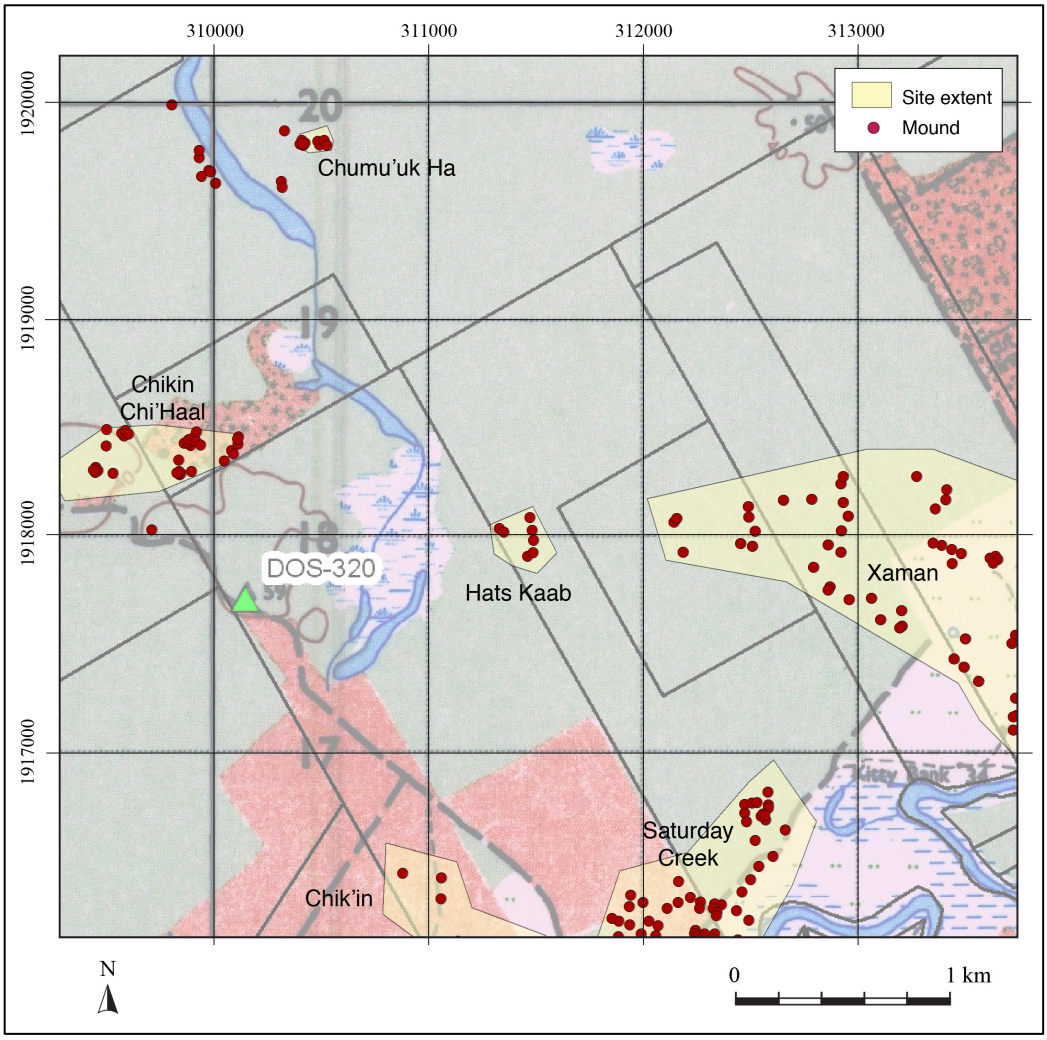

Figure 7.1 Hats Kaab and surrounding archaeological sites (map by M. Brouwer Burg).

Overview of the Research and Main Objectives

The two excavations were placed on the east mounds, which retained some limestone on the surface, indicating the chance to recover architecture, and had a substantial scatter of surface materials, including ceramics, obsidian, and ground stone. Operation 7 was located on what we interpret as the front of the central east mound (Structure 3), aligned E-W along its main axis. Operation 9 was located on the front of the northern east mound (Structure 2), somewhat south of what appears to be its main axis. The objectives of these two excavations, along with objectives for other research carried out at the site, are outlined below, and results are assessed in the final section of this report:

1. To salvage relevant information for the interpretation of this site as a Preclassic E-Group, before destruction from agricultural practices results in further loss of topography, dispersal of masonry materials, and breakage and dispersal of artifacts.
2. To excavate stratified deposits, in undisturbed contexts below the plow zone, associated with ceramics and other materials useful for chronological dating of construction and use phases, including radiocarbon samples.
3. To recover any extant architectural features, masonry or otherwise, that indicate the size and type of buildings and access to the group.
4. To test the association of the eastern mounds of this E-Group with possible ritual deposits (caches, burials, etc.) especially along the central axis, as occurs at E-Groups at other sites (Chase and Chase 1995; Laporte and Fialko 1995; Ricketson and Ricketson 1937).

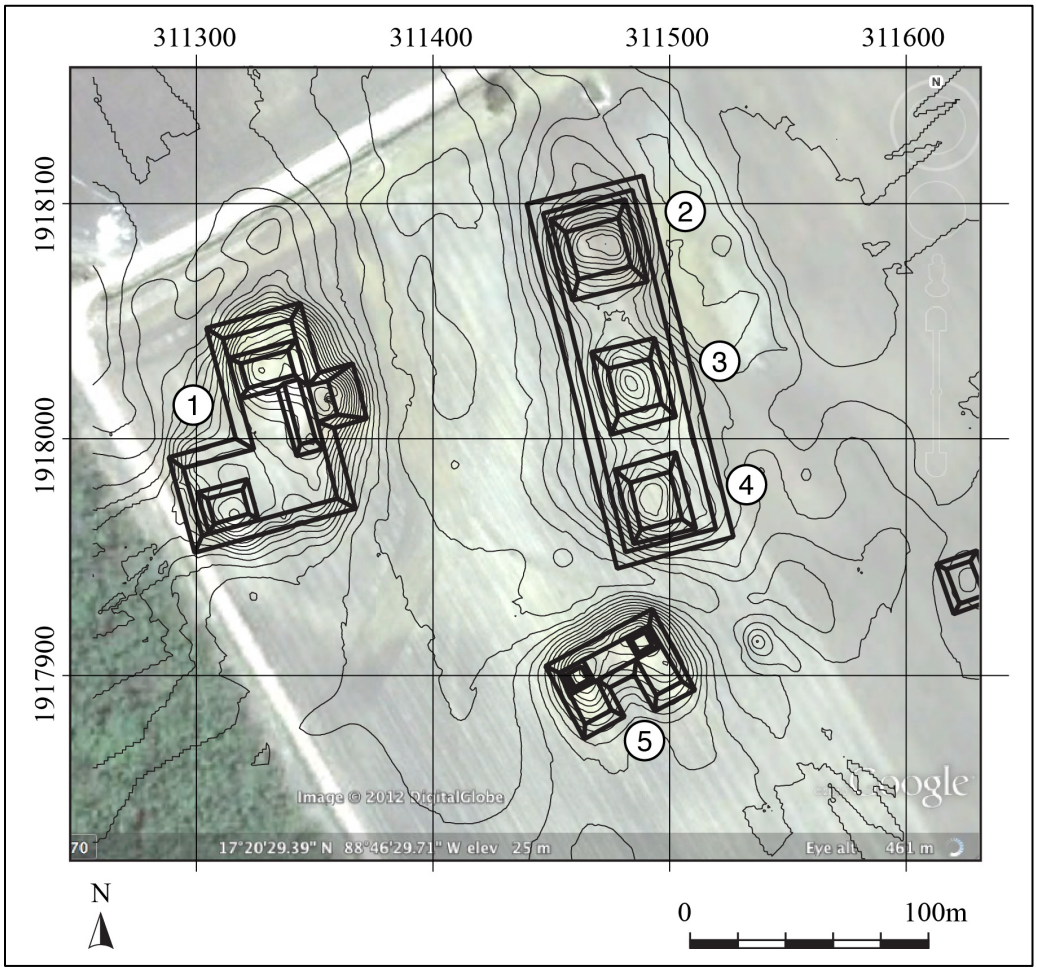

Figure 7.2 Satellite map of the Hats Kaab area with Projected Building Outlines (adapted from S. Murata by M. Brouwer Burg).

Operation 7

Operation 7 was excavated in January 2012, while the field encompassing all of Structures 1, 4, and 5 and most of Structures 2 and 3 was planted with sorghum, which grew around the excavations. Operation 7 was placed E–W along the central axis of the central east mound Structure 3, measuring a total of 3 m N–S x 12 m E–W, with a small 1 x 3 m extension at the northwest end (**Figures 7.3 and 7.4**). In general the excavation began at the western end of the unit and proceeded towards the east, that is, up the slope of the mound. The trench unit was divided into 2 x 3 m "squares," labeled with the letters A, B, C, D, and F in the order of expanding excavation. Square E, at the east end of Square D, was marked and labeled but was not in the end excavated. Square F was the extension along the north edge of Square A.

An arbitrary datum (Datum A) located at the northeast corner of Square C served as the "zero" point of intersection with the ground surface to calculate all positions and depths for Squares A, B, C, and F. To account for the eastward rising slope of the mound, a second arbitrary datum (Datum B) was placed on the northeast corner of Square D, and used for measurements in the latter square.

Buckets measuring 5 gallons in volume were used to remove all soil and materials from the unit, and counted to estimate the volume of excavated materials for each zone. Zones were separated at each change that had potential cultural meaning. Excavated materials were screened through ¼ inch mesh at either 50% or 25% frequency depending on the overall quantity of artifacts in the matrix, which in this location was very light – considerably lower than the expected quantities suggested by visible surface scatter.

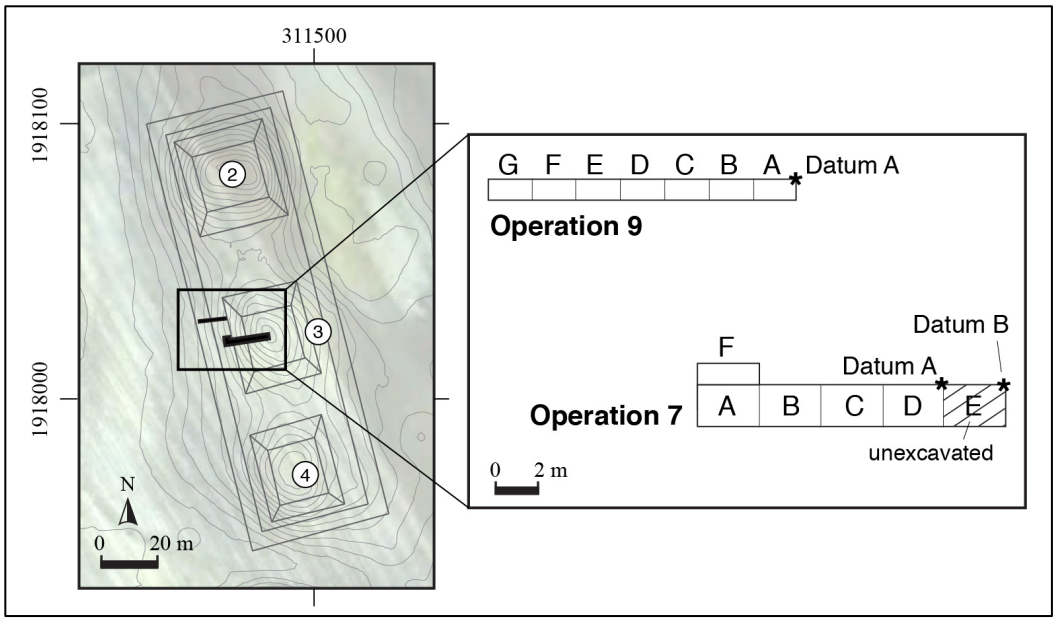

Figure 7.3 Location of Operations 7 and 9 trenches along the Eastern Platform (digitized by M. Brouwer Burg).

Figure 7.4 Opening shot and topsoil of Operation 7 (photo by M. Brouwer Burg).

Zone 1

Zone 1 was plow zone and overlaid all further zones. It encompassed five Squares (A, B, C, D and F)(**Figure 7.5**). Zone 1 averaged about 6 cm thick on the eastern end of the excavation unit, and 19.4 cm thick on the western end. In the middle of the excavation, it was about 25 cm thick. It extended from 14cm AD (above datum) in the NE corner of Square D to 8 cm AD, and from 89 cm BD in the NW corner of Square A to 108.4 cm BD (below datum). Soil texture was characterized by silty clay, with some limestone inclusions in Square D. Squares A and B were characterized by loose soil density, whereas Square C exhibited more compact soil. Soil color in Squares A, B, and F was 10 YR 3/3. In Square C, color was 10 YR 4/3. Few artifacts were collected (c. 354 total in 625.5 buckets of soil). Artifacts included animal bone, BCM, chipped stone tools, lithic debitage, groundstone, human bone, obsidian, and pottery sherds. The amount of obsidian was comparatively high (c. 47 pieces for the zone). Squares A and B were initially screened at 50% for the first 30 buckets and 25% afterwards. Squares C and D were screened at 25%. In Square A, Zone 1 was terminated when an eroded surface with sherd inclusions was encountered (Zone 5).

Zone 2

Zone 2 was found in Squares B, C, D. It was located directly underneath Zone 1 in these squares. Zone 2 was approximately 20-40 cm thick, extending from 88 cm BD at the top NW corner of Square B to 108 cm BD at the bottom (**Figure 7.5**). In Square D, the zone extended from 18cm above datum in the top NE corner to 20 cm below datum at the bottom. The texture of the soil in this zone was a uniform silty-clay, with very few inclusions and a compact density (**Figure 7.6**). The color of Zone 2 was 10 YR 4/4. A low number of artifacts were recovered

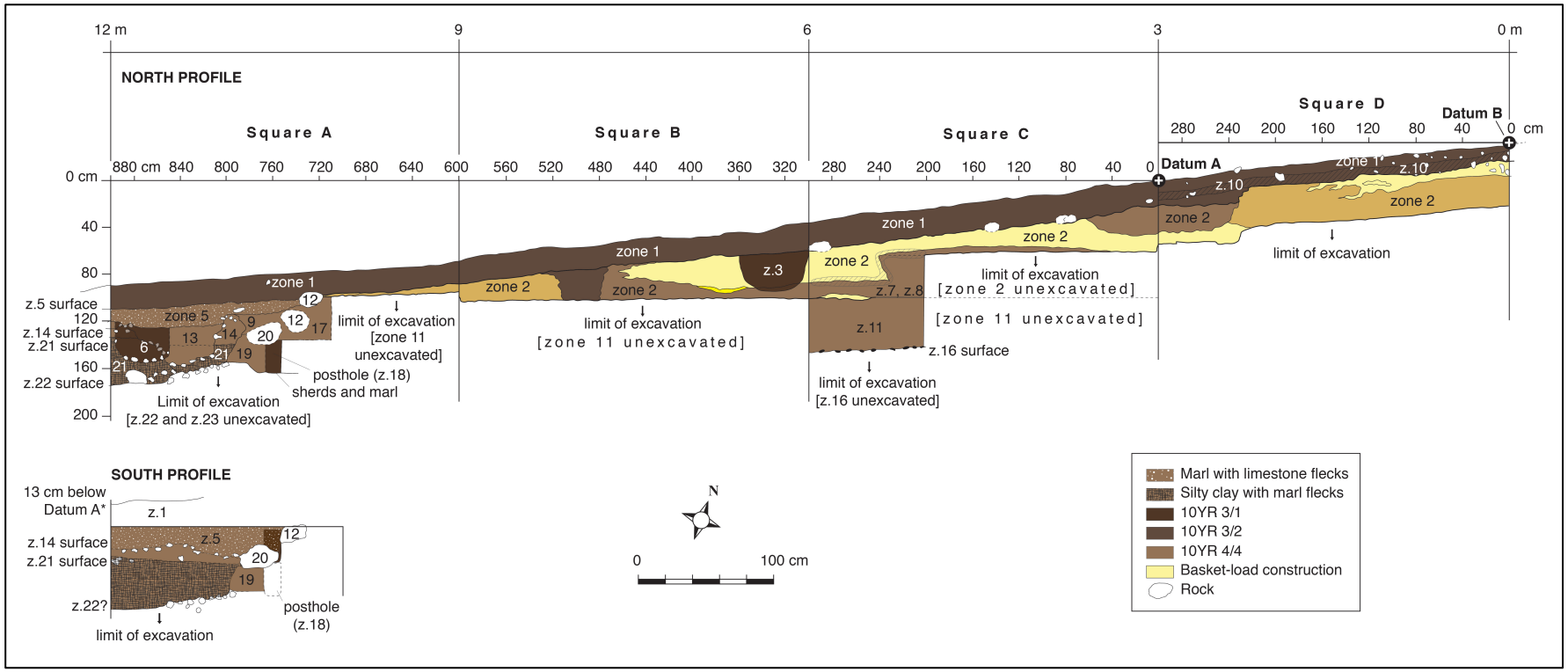

Figure 7.5 Operation 7 profile (drawing by A. Runggaldier; digitized by M. Brouwer Burg).

from this zone (129 total) from a total of 483 bucket loads screened at 25%. These artifacts included baked clay material, ceramic non-pottery, debitage, historical material, obsidian, and pottery sherds. In the eastern section of Square B, a small pit was found (Zone 3). In the western portion of Square C, a burned surface was found located 1.2 m west of the SE corner. The soil in this burned surface contained small burned clay bits, likely from the burning of the soil. In Square D, a yellow layer was found, but apart from some tiny gravel inclusions, was very similar in composition to Zone 2 and was not given a unique designation. Zone 2 was terminated before the base of the zone was found because patches of darker clay fill were encountered (Zone 11).

Figure 7.6 Zone 2 in progress with Zone 3 pit visible (photo by A. Runggaldier).

Zone 3

Zone 3 consisted of a small circular pit approximately 60.5 cm N-S and 53cm E-W. It was unearthed in the eastern section of Zone 2 in Square B (**Figures 7.5 and 7.6**). Zone 3 was identified at the transition between Zone 1 and 2 and is most likely the remains of a fire pit or root ball remaining from the previous bush cover (estimated by Tony Martinez as cleared around 2002). The pit was approximately 30 cm thick, extending from 69 cm BD at the top to 98 cm BD at the bottom. The texture of the soil in this zone was not recorded, but it did have inclusions of cahune nutshells and charcoal flecks. The color of Zone 3 was 10YR3/1. A low number of

artifacts were recovered from this zone (4) from a total of 3.5 bucket loads. The artifacts included two pieces of baked clay material, obsidian, and a pottery sherd. Zone 3 was terminated when the bottom of the pit was found.

Zone 4

Zone 4 was created for a darker pit found at the western edge of Zone 3. It is recorded as being similar to Zone 2 in Square B. In further excavation, it was decided to include Zone 4 into Zone 2 due to soil similarities.

Zone 5

Zone 5 was located directly underneath Zone 1 in the western half of Squares A and F. This zone was approximately 10-20 cm thick, extending from 106 cm at the top center of the zone, to 124 cm at the bottom center (**Figure 7.5**). The color of Zone 5 was 10YR4/4, with some limestone inclusions (5%). A low number of artifacts were recovered from this zone (95) from a total of 84.25 buckets. These artifact included baked clay material, chipped stone tools, debitage, groundstone, obsidian, and pottery sherds. The top of Zone 5 was a surface associated with the top two courses of stone found in the middle of Square A (**Figure 7.7**). The surface is recognizable from the evenly scattered and very eroded sherds. Zone 5 was terminated when a layer of marl and stone was found (Zone 6). Zone 5 capped several underlying features: two long pits (Zones 13 and 14), and a small pit (Zone 6).

Zone 6

Zone 6 was a circular pit feature located underneath Zone 5 in Square A (**Figure 7.5**). This pit measured 47 cm N-S and 42 cm E-W. The pit lay 1 m west of the wall stones/platform steps and could potentially lie on the central axis of the mound (see **Figure 7.7** for the top of the unexcavated pit, and **Figure 7.8**). The pit was approximately 30 cm deep, extending from 126 cm at the top center to 156 cm at the bottom center. The color of Zone 6 was a dark 10YR3/1. A low number of artifacts were recovered from this zone (6) from a total of 4 buckets. The artifacts included baked clay material, sherds, and obsidian. Zone 6 was terminated when limestone rubble was found at the base of the pit. Such rubble and brown, marl-flecked soil circumscribes the pit on all sides except to the east. The pit appeared to have been cut into two layers and is an intrusive (and thus later in age) feature into the two layers surrounding it.

Zone 7

Zone 7 was located at the bottom of Zone 2 in Square C. This zone was approximately 10-15 cm thick, extending from 71 cm BD at the top center to 84 cm BD at the bottom center (**Figure 7.5**). The texture of the soil in this zone was clayey, with a Munsell color of 2.5YR4/4. Some pockets of sandy clay were also found throughout. A few small sherds were found, but were too small to be collected. They were scattered evenly throughout the zone. A low number of artifacts were recovered from this zone (18) from a total of 7 buckets of soil. These artifacts

included baked clay material, sherds, C-14 sample, debitage, and obsidian (**Table 7.1**). The radiocarbon sample was taken at the transition between Zones 2 and 7. Zone 7 was terminated when it was determined that Zone 2 soil lay under it.

Figure 7.7 Zone 5 in Square A (also visible: Zones 6 and 12, Square B to the east of Zone 12; photo by A. Runggaldier).

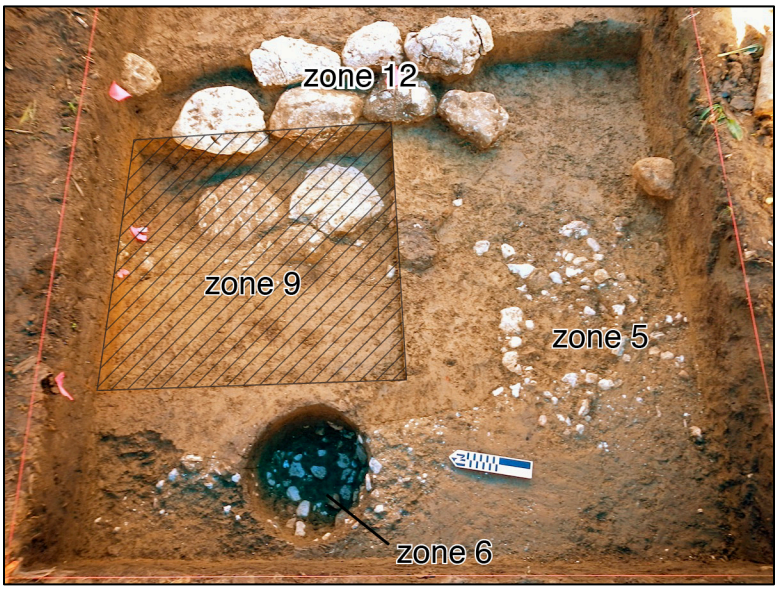

Figure 7.8 Plan view of Square A showing Zones 5, 6, 9, and 12 (photo by A. Runggaldier).

Zone 8

Zone 8 was located underneath Zone 7 in Square C. This zone was approximately 16 cm thick, extending from 84 cm at the top center of the layer to 100 cm at the bottom center (**Figure 7.5**). The texture of the soil in this zone was sandy-silt with some eroded pottery sherds mixed in. The color of Zone 8 was 10YR4/4, with sandy yellow patches (5YR5/6). The density of the deposit was semi-compact. A low number of artifacts were recovered from this zone (6 pottery sherds) from a total of 9 bucket loads.

Zone 9

Zone 9 was located underneath Zone 5 in Squares A and F. It consisted of a 1-x-1 m square excavated as an arbitrary section of the Zone 5 fill, directly west of the wall stones and east of the Zone 6 pit (**Figures 7.5 and 7.8**). This zone was later expanded beyond its 1-x-1 m dimensions and redefined to encompass the fill of the N-S cut to the east of the wall. This zone was approximately 16 cm thick. The texture of the soil in this zone was clayey, with some marl and gravel inclusions. The color of Zone 9 was 10YR3/2, with a compact density. A moderate number of artifacts were recovered from this zone (95) from a total of 19 bucket loads. These artifacts included baked clay material, a C-14 sample, debitage, freshwater/snail shell, and pottery sherds. This clay fill is likely the same as Zone 19 (see below).

Zone 10

Zone 10 was located in Square D. It had rock inclusions (c. 8-10 cm to 15 cm) and plow scars at its interface with Zone 2 (**Figure 7.9**). This zone was sandwiched between Zone 1 and 2 and was not present in any other squares (**Figure 7.5**). The plow scars measured 10 cm in thickness. The top center of the zone was at 80 cm below datum B, and the bottom center of the zone was at 88 cm below datum B. A low number of artifacts were recovered from 35 buckets. These artifacts included animal bone, d clay material, body sherds, debitage, and groundstone.

Zone 11

Zone 11 was located directly underneath Zone 2 in Square C. A total of 30.5 buckets were screened at 100%. A 1 m E-W x 50 cm N-S test pit was made from the bottom of Zone 2 (brown clay fill platform) (Figure 7.5). This pit extended from 100 cm below datum A at the top center point to 155 cm BD at the bottom center point. A thin yellow sandy lens was uncovered, below which the entire layer was a uniform dark brown clay (10YR3/2). A moderate number of artifacts were recovered (63), including baked clay material and sherds. Zone 11 was terminated when a uniform layer of sherds and charcoal bits (Zone 16) was encountered at c. 155 cm BD.

Zone 12

Zone 12 encompassed the wall stones in Square A along with Zone 20, which represents the westernmost, earlier stones (**Figures 7.7 and 7.8**). The Zone 12 stones were located further

to the east and represent the latest phase of construction (**Figure 7.5**). No artifacts were associated with this zone.

Figure 7.9 Soil striations from plowing in zone 10 (photo by A. Runggaldier).

Zone 13

This zone was located beneath Zone 5 and represents a N-S cut in the center of Squares A and F (**Figures 7.5 and 7.10**). The zone was approximately 32 cm thick. It extended from 135 cm BD at top center to 167 cm BD at bottom center. It represents a long cut to the west of the wall stones filled with very homogenous clay clearly distinguishable from the surrounding stones of Zone 5 into which Zone 13 was cut. A total of 15.5 buckets were screened at 100%, and a Munsell reading of 2.5Y4/4 was taken. The soil was very clayey, and a moderate number of artifacts were recovered (195), including animal bone, baked clay material, a c-14 sample, debitage, obsidian, and pottery sherds. This zone was originally thought to be a burial at the bottom of the wall stones, but with further excavation appeared to have been a patch on Zone 14, as a way to level out an uneven part of the surface, perhaps from high traffic.

Zone 14

This zone was found below Zone 5 and adjacent to Zones 9 and 13 in Squares A and F (**Figure 7.5**). It represents the surface and ballast into which the Zone 13 cut was made. It consisted of a marly, cobble fill. The cobbles ranged from 5-13 cm in size. The surface of this zone dips perhaps from heavy traffic up the central steps of the mound. The zone was

approximately 24 cm thick, extending from about 131.5 cm BD at top center to 144 cm BD at bottom center. A Munsell reading of 2.5Y4.4 was taken. About 11.5 buckets of soil were removed. A high number of artifacts were recovered (N=344), including animal bone, baked clay material, debitage, freshwater/snail shell, obsidian, and pottery sherds.

Zone 15

This zone was located in Square D, directly underneath Zone 1. The zone was originally distinguished from Zone 2, but upon further excavation was determined to be part of Zone 2 (a lens in basket-load construction fill) in the westernmost portion of Square D (**Figure 7.5**). It consisted of yellow soil that phased into brown in splotchy patches. Some small gravel was included in the soil. A Munsell reading of 2.5Y5/4 was taken, along with 8.5 buckets of soil. A low number of artifacts were recovered (N=18), including baked clay material and body sherds.

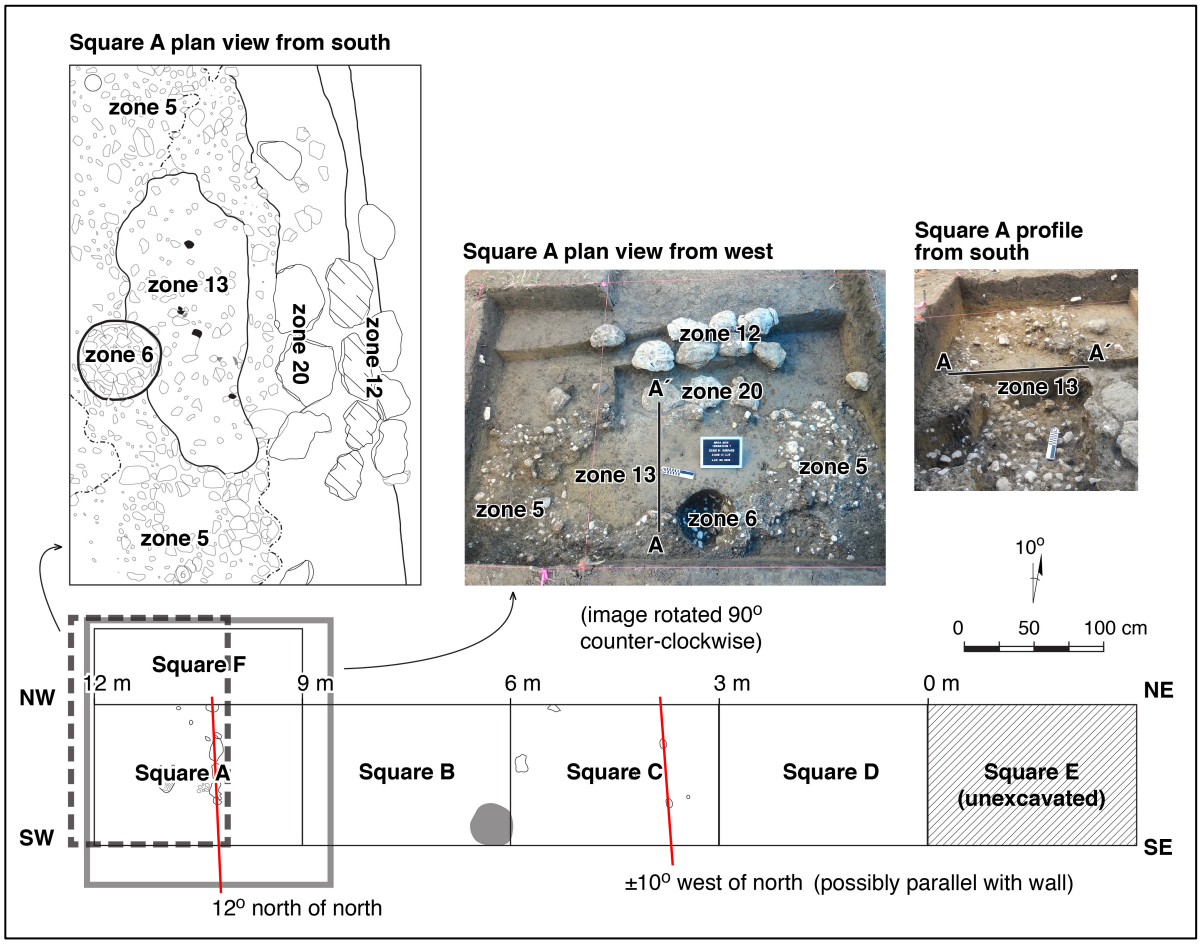

Figure 7.10 Plan and profile views of Operation 7, depicting plan view photos and sketch maps of Square A (photos by A. Runggaldier; digitization by A. Kaeding and M. Brouwer Burg; figure compilation by M. Brouwer Burg).

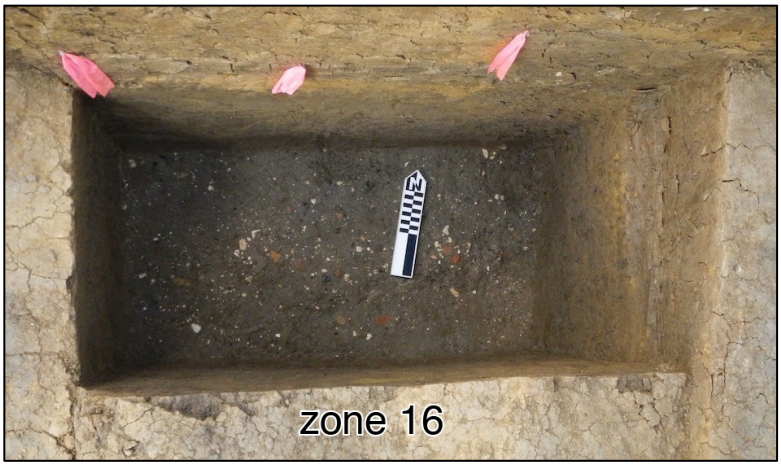

Figure 7.11 Sherd covered surface exposed below Zone 11 (photo by A. Runggaldier).

Zone 16

This zone was located at the bottom of the 1 m E-W x 50 cm N-S test pit in Square C (**Figure 7.5**). It was directly underneath Zone 11 and consisted of a surface covered in sherds with many charcoal flecks (**Figure 7.11**). The surface was located about 155 cm below datum in the center. A moderate number of artifacts were recovered (66), including baked clay material, body sherds, and a C-sample, which was analyzed by the University of Arizona Radiocarbon Lab.

Zone 17

This zone was found beneath the wall stones (Zones 12 and 20) in Square A (**Figure 7.5**). Upon further excavation, it appears that it may be the same as Zone 9. This zone consisted of clayey, dark brown soil such as that found in Zones 9 and 19, but almost no sherds were recovered (N=3). A posthole extension into this zone yielded a surface similar to the sherd-covered surface in Zone 16 (i.e., marl flecked with four sherds). However, this surface was designated Zone 18 because it lie nearly 20 cm lower than Zone 16 and thus did not provide a clear connection.

Zone 18

This zone represented a surface with sherds (in contrast to surrounding zones) at the bottom of a posthole dug into Zone 17 (**Figure 7.5**). It was not designated as Zone 16 (another sherd-covered surface in Square C) because it lay 20 cm lower in elevation, and while it is probably the same surface we felt that it would be more accurate to record the two separately at this stage. A total of six body sherds were recovered from this layer.

Zone 19

This zone was located beneath Zones 14 and 9 in Square A (**Figure 7.5**). It is assumed to be the same as Zone 9, and represents the clay fill into which the wall stones were set. A few sherds (N=6) were found in this zone.

Zone 20

Zone 20 encompassed the westernmost wall stones in Square A (**Figures 7.5 and 7.10**), which were assumed to represent an early phase of construction. No artifacts were associated with this zone.

Zone 21

This zone was located underneath Zones 6, 13, and 14 in Square A (**Figures 7.5 and 7.12**). It lay to the west of Zone 19. It consisted of a semi-compact, silty-clay soil with marl flecks and small stones that may represent a platform construction pre-dating the wall stones of Zones 12 and 20. Its Munsell reading was 2.5Y5/3. A moderate number of artifacts were recovered (N=96), including animal bone, C-14 date, debitage, and pottery sherds.

Zone 22

The Zone 22 surface, compact and level, flecked with marl, and devoid of stones, was found at the base of Zone 21 and may be a floor abutting a platform construction (Zone 21) (**Figures 7.5 and 7.12**). Since this zone marked the limit of excavation, nothing additional was recorded about the zone.

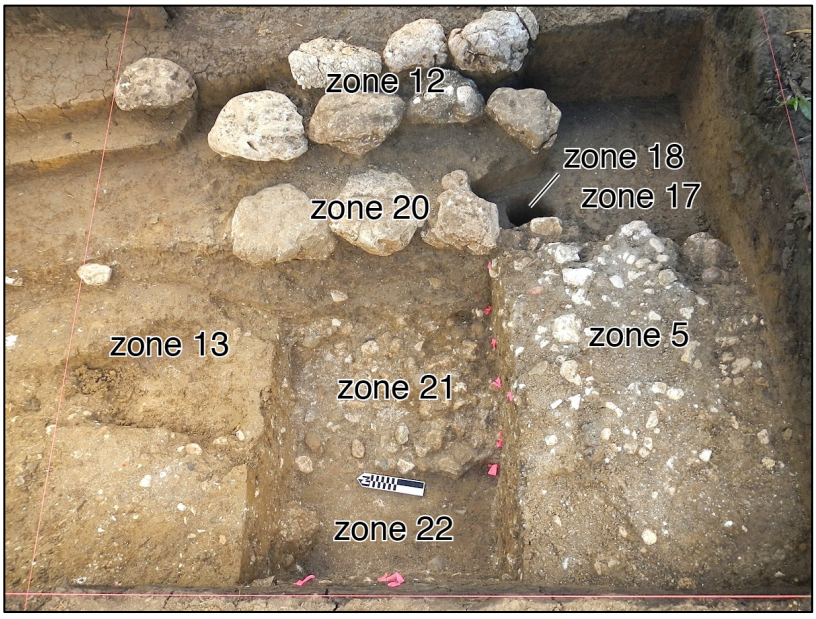

Figure 7.12 Plan view of Square A showing Zones 5, 12, 13, 17, 18, 20, 21, and 22 (photo by A. Runggaldier).

Operation 9

Operation 9 was excavated in summer 2012, when the field was not actively farmed and before the arrival of the rainy season, when planting would resume. Operation 9 was placed E–W just south of the central axis of the northeast mound Structure 2, north of Operation 7 along a line projected with a Total Station from the wall (Zone 12) uncovered in that excavation (**Figure 7.3**). The unit then extended westward from there, towards the base of the mound. The excavation resulted in a narrow "slit trench" that measured a total of 1 m N–S x 14 m E–W (**Figure 7.13**). The trench unit was divided into 1-x-2 m squares, labeled with the letters A, B, C, D, E, F and G in the order of expanding excavation, starting with Square A upslope, and proceeding westward towards the base of the mound. Square G, at the west end of the unit, was effectively off mound in the fairly level area that we expect to have been part of the plaza encompassed by Structures 1–5.

An arbitrary datum (Datum A) was placed at the mid-point (50 cm) between the northeast and southeast corners of the unit, halfway along the east edge of Square A. All positions in Squares A-G were measured from this datum.

Buckets measuring 5 gallons in volume were used to remove all soil and materials from the unit, and counted to estimate the volume of excavated materials for each zone. Zones were separated at each change that had potential cultural meaning. Excavated materials were screened through ¼ inch mesh at either 25% or 10% frequency depending on the overall quantity of artifacts in the matrix, which in this location was extremely light – considerably lower than the expected quantities suggested by visible surface scatter, and even lower than quantities recovered in Operation 7.

Zone 1

Zone 1 in this operation consisted of plow zone in a sorghum field before tilling and planting. It was underlain by Zone 2 across the entire trench, and extended over Squares A through G (**Figure 7.13**). In the easternmost square (A), the zone was approximately 27 cm thick and in the westernmost square (G), the zone was approximately 28 cm thick. The zone was relatively uniform in thickness. The zone extended from c. 28 cm BD at the top NE corner of Square A to c. 149 cm BD at the bottom NW corner of Square G. The texture of the soil in this zone was clayey with a semi-compact density, with the exception of Square F, which was characterized by silty-clay and very compact in density. Small (c. 5 cm) limestone inclusions were found in Squares A, B, and C (**Figure 7.14**). The color of Zone 1 was 10YR3/2. A low number of artifacts were recovered from this zone (c. 88) from a total of 327.5 bucket loads, screened between 10-25% on a ¼ inch screen. These artifacts included baked clay material, a chipped stone tool, debitage, a groundstone tool, obsidian, and pottery sherds. Excavation notes mention that the amount of obsidian is comparatively high (N=15). Zone 1 was terminated when Zone 2 was encountered, characterized by interspersed dark brown and yellow soil, and present in Squares A, D, and E.

Zone 2

Zone 2 underlies Zone 1 in all squares (A-G). At the easternmost square (A), the zone was approximately 27.3 cm thick and in the westernmost square (G), the zone was approximately 36.5 cm thick (**Figure 7.13**). The zone was somewhat thicker at the bottom of the mound than at the top. The zone extended from c. 61 cm BD at the top NE corner of Square A to c. 190 cm BD at the bottom NW corner of Square G. The texture/density of the soil in this zone was clayey and compact. The color of the soil was an olive brown (2.5Y4/4), with the exception of Square G, which had a Munsell reading of 10YR4/3. No inclusions were found in the soil. A low number of artifacts were recovered (N=216), with the highest concentration coming from Square G (N=91). These artifacts included baked clay material, a chipped stone tool, debitage a freshwater/snail shell, obsidian and pottery sherds. A minimum of 446.5 buckets were collected (no bucket count was entered for Square F), and screened between 10-25%. Zone 2 was terminated when Zone 3 was encountered, characterized by many more specks of limestone and gravel-sized limestone inclusions.

Zone 3

Zone 3 underlies Zone 2 in all squares (A-G). However, it was only excavated in Squares A, B, C, and D (**Figure 7.13**). In the easternmost square (A), the zone was excavated only in the western 50 cm of the unit, and measured approximately 13.5 cm thick, tapering dramatically to the east. The surface of Zone 3 was encountered 85 cm BD in the eastern section of the unit, although further excavation was not undertaken. While the zone was not excavated in the westernmost square (G), the zone was identified at 190 cm BD in the NW portion of the unit, and 162 cm BD in the eastern portion of the unit. The texture/density of the soil in this zone was clayey and semi-compact. The color of the soil was a light olive brown in Square A (2.5Y5/3) and 10YR5/4 in Square C. This zone was distinguished from Zone 2 above by the inclusions of small marly inclusions of limestone (**Figure 7.15**) and may represent the platform or terrace edge walls in line with the wall stones of Operation 7. A moderate number of artifacts were recovered (N=616), with Squares B, C, D, and G contributing a fair proportion. These artifacts included animal bone, baked clay material, a radiocarbon sample (see below for a discussion of the lab date), debitage, freshwater/snail shell, human bone, obsidian, and pottery sherds. A minimum of 75.5 buckets were collected (no bucket count was entered for Square D although a fair amount of soil was removed), and screened between 10-25%. In Squares A, B, C, and D, the zone was closed when Zone 9 was encountered, an architectural layer of fill characterized by clusters of large limestone chunks and marl (see below). Zone 3 was closed in Square G without further excavation due to limited time left in the field season, the heavy rains that filled the excavation with water and mud, and because a human burial was found and suspected to lie just below the surface in Zone 3 fill proper (**Figures 7.13 and 7.16**).

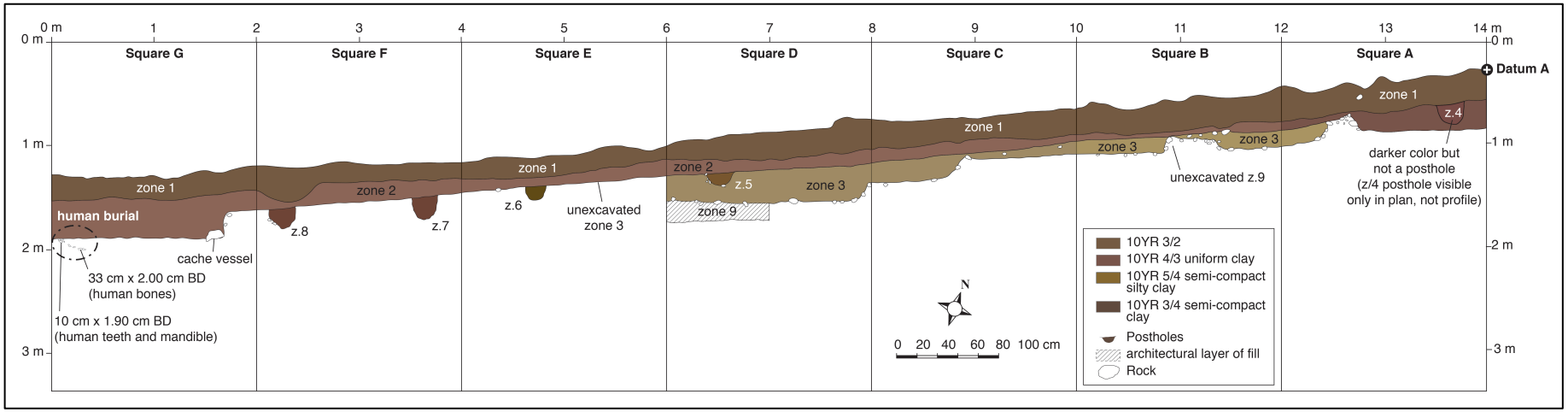

Figure 7.13 Operation 9 profile drawing (by A. Runggaldier; digitized by M. Brouwer Burg).

Figure 7.14 Top of Zone 2 in Square C (Squares A and B also visible; photo by A. Runggaldier).

Figure 7.15 Zone 3 in progress in Squares A and B (zone 4 also visible; photo by A. Runggaldier).

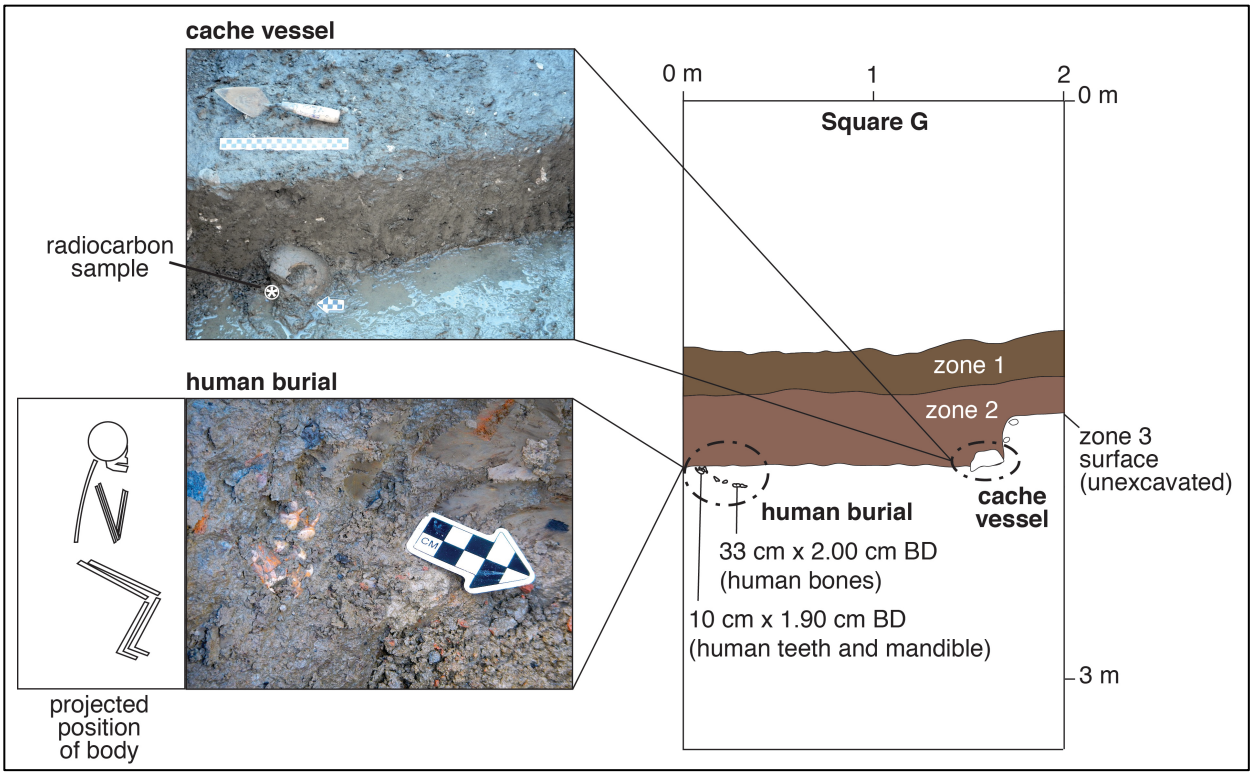

Figure 7.16 Inverted cache vessel and human burial in Square G (photos by A. Runggaldier; digitized by M. Brouwer Burg).

Zone 4

Zone 4 was uncovered in Square A, directly underneath Zone 1 and intrusive into Zone 2 (**Figures 7.13 and 7.15**). It was initially thought to represent a posthole because of its darker color than the surrounding soil, but was later determined to be some other type of pit feature (perhaps a fire pit). This feature was visible in the plan only and was located some 70 cm to the west of the east side of the pit on the northern wall. Zone 4 measured 14 cm in thickness, from 81 cm BD at the top to 95 cm BD at the bottom. The soil texture/density was clayey and semi-compact. The color was a yellowish dark brown (10YR3/4). No buckets are reported, nor are any artifacts.

Zone 5

Zone 5 was uncovered in Square D, directly underneath Zone 2, intruding into Zone 3 (similar to Zones 6, 7, and 8) (**Figure 7.13**). This zone was thought to represent a posthole, and measured 13 cm thick, from 113 cm BD at the top to 126 cm BD at the bottom. The soil texture/color was clayey and dark yellowish brown (10YR4/4). One bucket of soil was screened and yielded few artifacts (N=9), six animal or human bone fragments (analysis needed), two body sherds, and 1 piece of debitage.

Zone 6

Zone 6 was uncovered in Square E, directly underneath Zone 2, intruding into Zone 3 (similar to Zones 5, 7, and 8; **Figure 7.13**). The zone represents a posthole, and measured 19 cm thick, from 136 cm BD at the top to 155 cm BD at the bottom. The soil texture/density was clayey and loose. The color of the soil was black (7.5YR2.5/1). Half of a bucket of soil was removed and no artifacts were found.

Zone 7

Zone 7 was uncovered in Square F, directly underneath Zone 2, intruding into Zone 3 (similar to Zones 5, 6, and 8; **Figure 7.13**). It lay to the east of Zone 8. It represented a post hole with some ceramics found along the side wall, although these were to small and poorly preserved to recover. The zone measured 20.5 cm thick, from 145.5 cm BD at the top to 166 cm BD at the bottom. The soil texture/density was silty-clay and semi-compacted. The color was darker than the surrounding soil of Zone 3 (10YR4/2). One bucket of soil was removed, and three artifacts were recovered: two body sherds and one rim sherd. At the bottom of zone 7, small limestone pieces were found, similar in character to those found in Zone 3. This post hole was both wider and deeper than the Zone 6 post hole.

Zone 8

Zone 8 was uncovered in Square F, directly underneath Zone 2, intruding into Zone 3 (similar to Zones 5, 6, and 7; **Figure 7.13**). It lay to the west of zone 7. It represented a post hole, in line with those already discussed in Squares E and F (**Figure 7.17**). The zone measured 10.5 cm thick, from 159 cm BD at the top to 169.5 cm BD at the bottom. The soil texture/density was silty-clay and semi-compacted. The color was darker than the surrounding soil (10YR4/2). No artifacts were recovered, although half a bucket of soil was screened. At the bottom of Zone 8, four limestone cobbles were found placed in a circular formation.

Zone 9

Zone 9 was uncovered in Square D, underlying Zone 3. This zone extended from the midpoint of the unit to the western edge. It represents an architectural layer of fill. Its surface consisted of larger limestone cobbles (c. 15 cm in diameter). The surface of this zone was first identified in Squares A, B, and C in line with the wall stones in Operation 7. Excavation of this zone was only undertaken in Square D. The zone measured roughly 17 cm thick, from 157 cm BD at the top center to 174 cm BD at the bottom center. The soil/texture was rocky at the surface, but became dominated by looser soil fill toward the center and bottom of the zone. No color readings were taken. A moderate number of artifacts were recovered (N=178), including animal bone, baked clay material, debitage, freshwater shell, obsidian and pottery sherds. A total of 16.5 buckets of soil were removed.

Figure 7.17 Zones 8, 7, and 6 in Squares F and E, from the west, showing surface Zone 2/3 interface (photo by A. Runggaldier).

Systematic Surface Collection

In order to supplement the construction sequence information obtained through excavation, a systematic surface collection survey was undertaken, in part to augment the range of materials and ceramic types once it was determined that construction fills were poor in artifacts. The surface collection was therefore planned to produce more artifacts for analysis and interpretation purposes, and to reveal the extent of post-depositional disturbance cause by field clearing and plowing activities.

A 216 x 250 m grid was outlined using pin flags in the field (**Figure 7.18**). This grid covered the majority of the E-Group complex. Each of the 360 grid units measured 6 x 25 m, with 36 columns aligned roughly N-S and 10 rows running E-W. The total surface area covered was 54,000 m^2. A GPS point was taken just to the north of the northernmost eastern mound of the E-Group, and was used to georeference the grid.

During the surface collection phase, students, project staff, and workers walked down the first sorghum row in each column, scanning the ground surface for artifacts and ecofacts. Tyvec bags were labeled individually for each grid unit beforehand; while walking the column, the participant would collect all material in the grid unit bag. For example, the participant walking in column one would collect all visible artifacts on the surface in their Tyvec bag labeled "column 1, row 1." When the participant reached the end of the first row (demarcated by a pin

flag), they would close the first Tyvec bag and start collecting in the second bag ("column 1, row 2") for that column. Eight participants walked per pass. It took 4.5 passes to cover the gridded area. After the pass, the Tyvec bags and their contents were brought back to the lab, washed, and processed. Their contents were then tabulated and entered into a database for analysis and visual display. Tabulation of the collected artifacts was undertaken in Microsoft Excel.

Figure 7.18 Overview of Hats Kaab surface collection grid, no material depicted (map by M. Brouwer Burg).

In ArcGIS, a facsimile of the 216 x 250 m grid was constructed and overlaid on a topographic map of the Hats Kaab E-Group. The consolidated artifact data in Microsoft Excel was imported and linked to the georeferenced grid units through the relational database function. This facilitated investigation of distribution and concentration of artifact materials per grid unit. Below, we present the distribution of artifact types across the site, along with their quantity and weight.

Grid cells with no material tended to fall within the plaza as expected (**Figure 7.18**). However, it was also found that many grid cells falling partially or fully on mounds also yielded no material. This is likely a result of post-depositional processes or perhaps intentional

clearing/cleaning of the mound during use. More cells were found with no material in the western half of the grid, perhaps reflective of the direction in which plowing was undertaken. Further, mound 1 has the most grid cells with no material, which may be proportional to its size. Also interesting to note is that the plaza area just north of mound 5 yielded much material.

A large cluster of baked clay material was found clustering on the north side of mound 5 (**Figure 7.19**). A line of baked clay material can also be discerned trending NE-SW through the plaza toward mound 5. Rather than being representative of past human behavior, we believe this distribution is reflective of recent burning of cleared bush material. Such field clearing was observed during the May-June 2012 field season and involved piling brush material into linear piles and burning them (**Figure 7.20**). This burning hardens some of the clayey soil beneath the fire, leading to the inadvertent formation of material that looks very much like baked clay

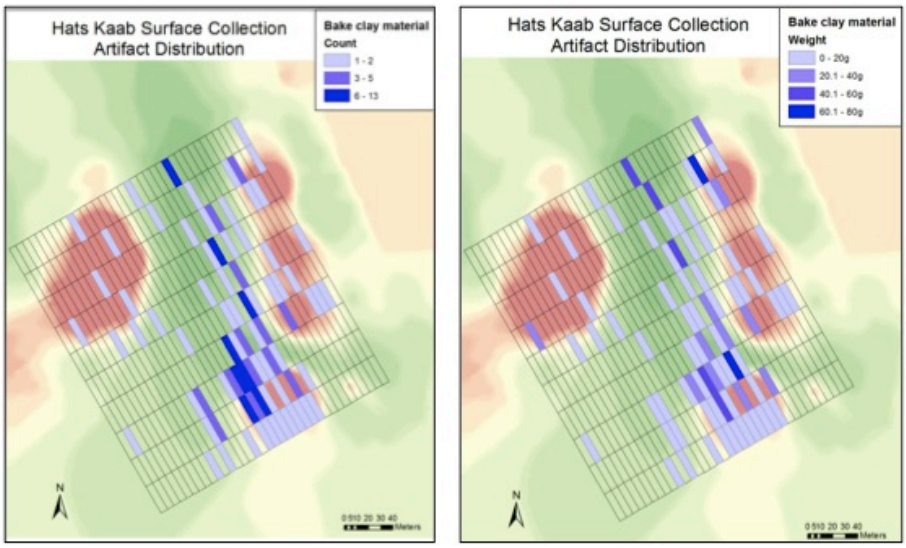

Figure 7.19 Distribution of baked clay material (map by M. Brouwer Burg).

Figure 7.20 Photo showing recent linear burning of brush pile (left) and resulting hardening clay (right; photos by A. Runggaldier).

material or daub. For this reason, we attribute the large amount of baked clay material found north of mound 5 as representative of a recent burning event.

Other artifact categories (e.g., ceramics, groundstone, chipped stone tools, debitage, obsidian, and shell) are located primarily on mound, or in close proximity. Ceramic distributions were found to correlate closely with mounds (**Figure 7.21**). Although we did not collect from the eastern side of mounds 2, 3, and 4, there appears to be clear movement or drag of artifacts toward the west, perhaps reflecting the direction of plowing activities. Chipped stone tools (N=15) were found mainly in the south of the grid unit, clustering around mound 5 and just south of mound 4 (**Figure 7.22**). Debitage was found evenly scattered over the mounds, fading fairly regularly into the plaza (**Figure 7.23**). This suggests that the majority of tool production was conducted on mound, or on the edge of the mound, rather than in the plaza. Groundstone was also found primarily on-mound and all mounds yielded had fairly large and heavy pieces (**Figure 7.24**). The largest piece of groundstone was found on mound 1. Some obsidian was recovered (N=19; although not nearly as much proportionally as was found in the excavation units on mound 3) and was associated only with the eastern and southern mound (that is, not mound 1; **Figure 7.25**). Small amounts of shell were recovered, both freshwater and land, and clustered mainly around (**Figures 7.26 and 7.27**).

Figure 7.21 Distribution of ceramics (map by M. Brouwer Burg).

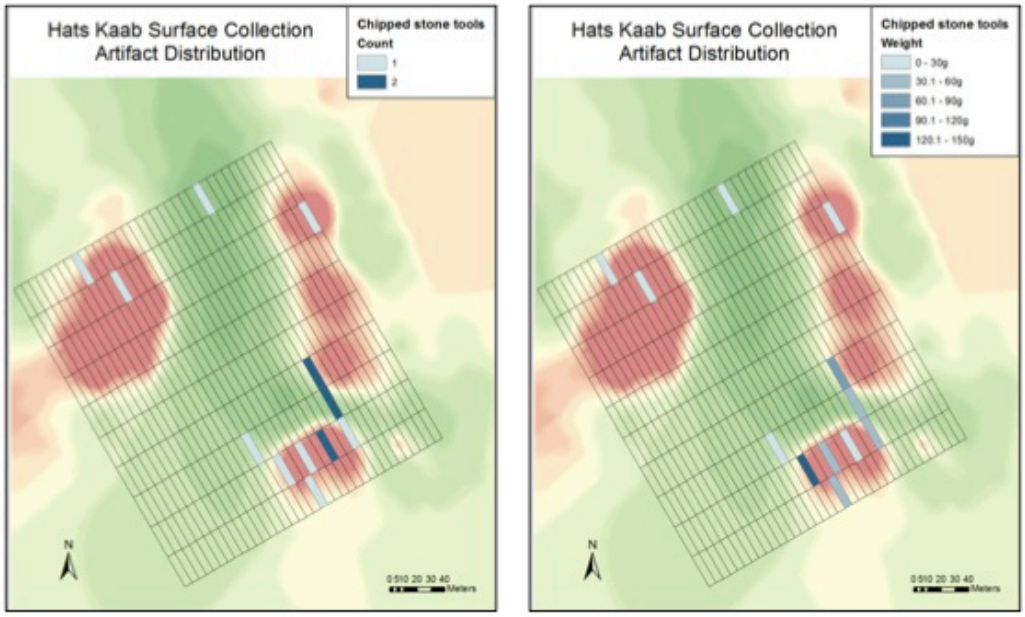

Figure 7.22 Distribution of chipped stone tools (map by M. Brouwer Burg).

Figure 7.23 Distribution of debitage (map by M. Brouwer Burg).

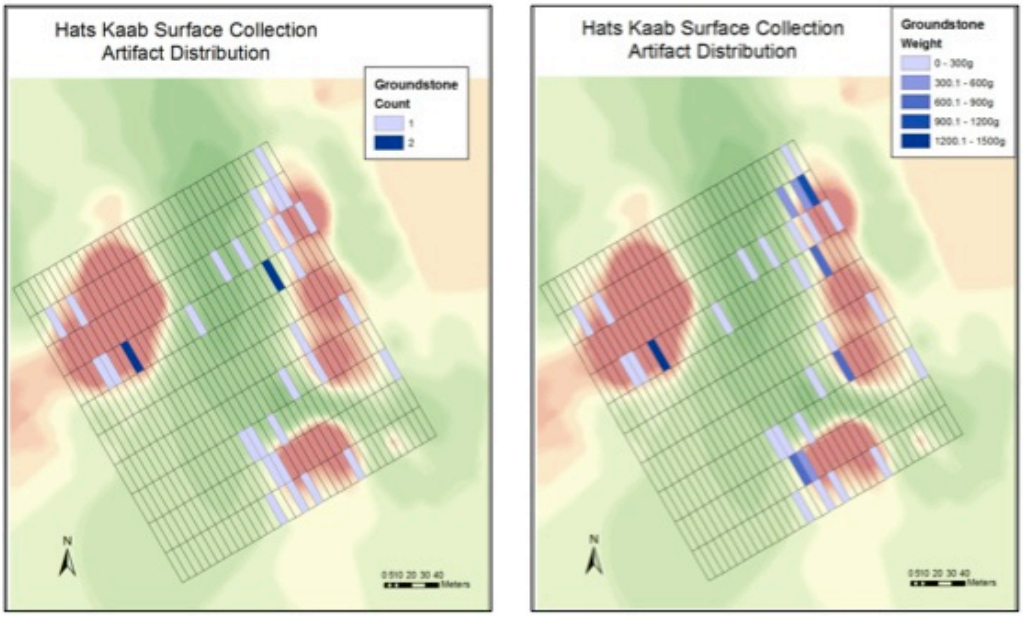

Figure 7.24 Distribution of groundstone (map by M. Brouwer Burg).

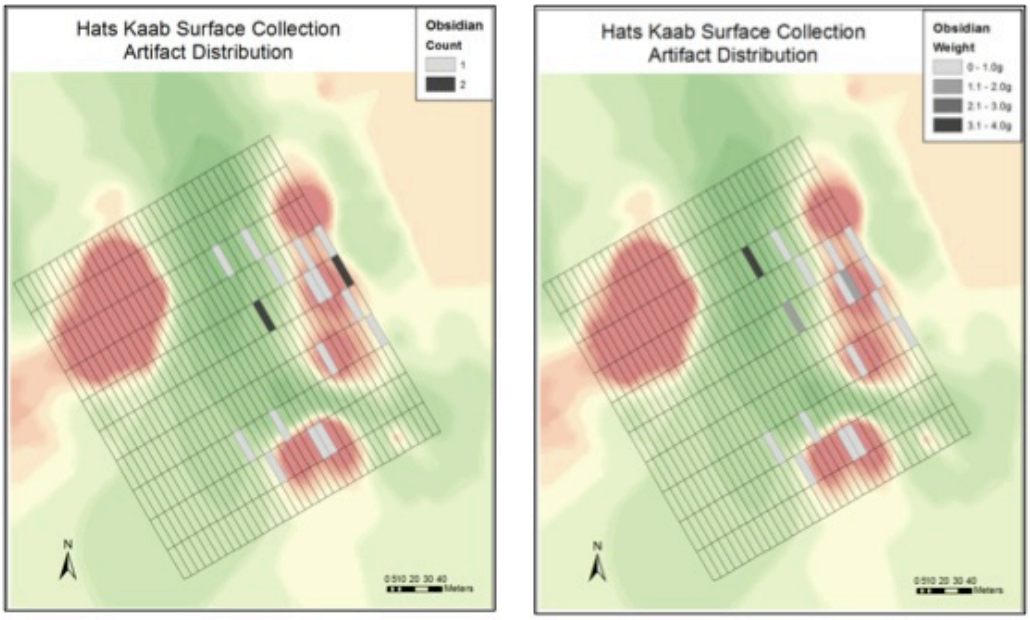

Figure 7.25 Distribution of obsidian (map by M. Brouwer Burg).

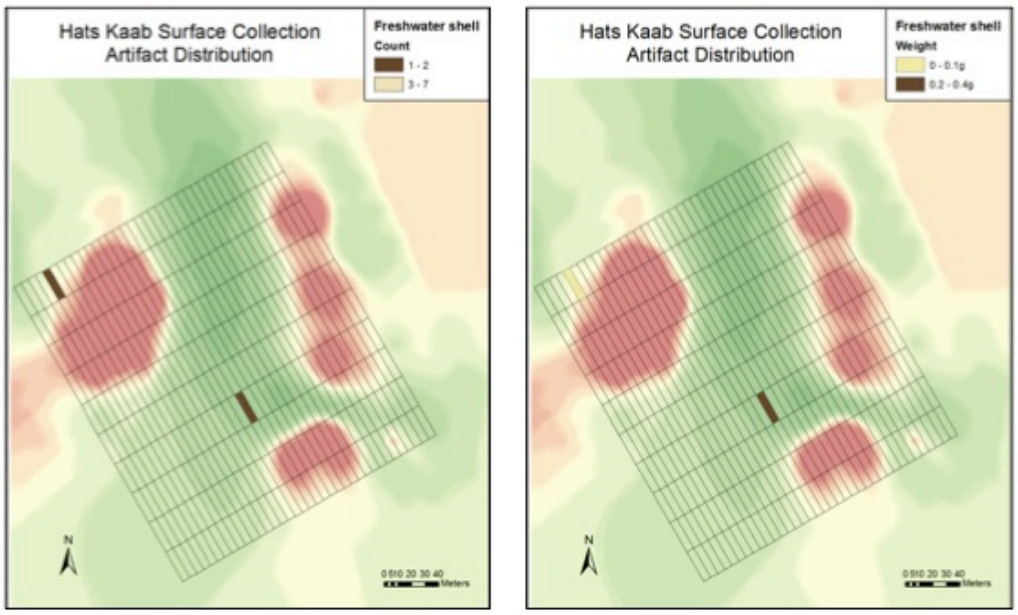

Figure 7.26 Distribution of freshwater shell (map by M. Brouwer Burg).

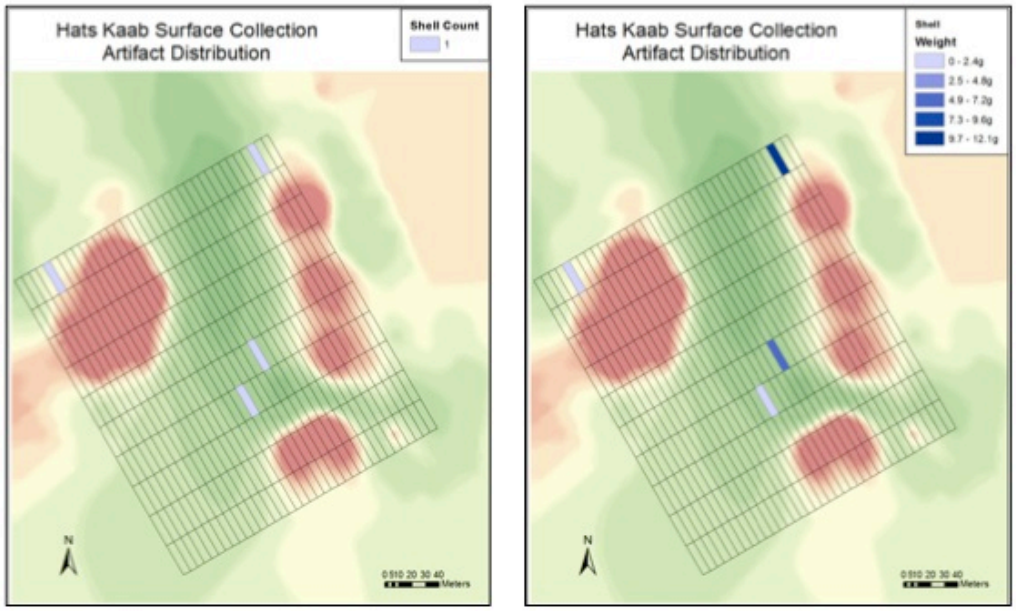

Figure 7.27 Distribution of land shell (map by M. Brouwer Burg).

Solar Alignment Observations

In June 2012 we also carried out observations on site at Hats Kaab to verify the alignment of the northeast mound with the observation of the sunrise directly behind the mound from the

western viewpoint of Structure 1. We choose the three days June 20, 21, and 22 to allow for clear observations in case of bad weather, as occurred in 2011.

At this latitude (Hats Kaab lies at a latitude/longitude of 17°20'29.35" N, 88°46'29.00" W) on a flat horizon the sun rises at the solstice at 24° north of true east. The angles of E-Group arrangements, however, vary with the position of the complex in its surrounding landscape so they are all slightly different, with angles clustering around similar values, but without exact replication. Past studies have shown that despite the shared appearance of building components, many E-Groups do not conform to a strict geometric template (loosely clustering around similar angle values), and most trace only the general path of celestial events (Aimers and Rice 2006; Cohodas 1980). It seems that E-Groups were not accurate astronomical observatories as much as they were ritual architectural complexes for the observation of known patterns in the sun's trajectory, with the orientation and scale of many E-Groups closely linked to the surrounding landscape, which likely provided a set of external guidelines for the planners of these monuments.

The lack of rigid prototypes for the alignments observable in existing E-Groups suggests that people likely did not build E-Groups to predict the date of the solstices or equinoxes, but rather they would gather to observe and celebrate those events at a large public space such as Hats Kaab. Therefore, E-Groups can be regarded more as community spaces for ritual and celebration tied to time and the marking of the year's seasons, including the appropriate times for planting and harvesting, and the rituals of community and families. This image (**Figure 7.28**) marks our witnessing of the sunrise on June 20th 2012, establishing that the sun clearly rises over the northeast mound on the summer solstice, and confirming that Hats Kaab most likely functioned as an E-Group, understood as an observation and gathering complex for solar-related rituals.

Figure 7.28 Observation of summer solstice at Hats Kaab (building numbers depicted; photo by A. Runggaldier).

Radiocarbon Samples

Three radiocarbon samples were collected from Hats Kaab during the 2012 field seasons. These samples were sent to the NSF-Arizon AMS Laboratory for age analysis. Two samples (AA100287, AA100291) came from Operation 7 and one sample (AA100288) came from Operation 9.

All three samples consisted of burned charcoal fragments. Sample 1 derived from square C, Zone 16. This surface represented a surface scattered with many sherds found at the bottom of Zone 11. We postulated that this surface represented the first phase of occupation of the site (see **Figure 7.31**). Sample 2 derived from Square A, Zone 22. This was also a surface that did not receive further excavation (similar to Zone 16), and was found at the bottom of Zone 21. This surface is likely part of a second phase of occupation, marking a phase of renovation at the bottom of the mound, along its central axis. The relationship between Zone 21 and 16 is not clear, as one can see from investigating the stratigraphic profile; however, the returned radiocarbon dates indicate that the two surfaces were likely contemporaneous (**Table 7.1**) ranging from B.C. 112 – A.D. 126 (2δ) for sample 1, and B.C. 39 – A.D. 127 (2δ) for sample 2. There is clear probable overlap in these dates (Figure 7.29). These layers were constructed during a later phase of Late Preclassic occupation at Hats Kaab.

Table 7.1 Radiocarbon Dates from Hats Kaab E-Group (NSF-Arizona AMS Laboratory).

Sample number	Sample derivation	d ^{13}C	F	^{14}C age B.P.	Calibrated date in calendar years	Calibrated age ranges (1 δ, 2δ)*
1. AA100287	Op. 7, Z. 22, Sq. A	-25.9	0.78060 +/- 0.0050	1,989 +/- 52	39 B.C. (+/- 52)	B.C. 44 – A.D. 66 B.C. 112 – A.D. 126
2. AA100291	Op. 7, Z. 16, Sq. C	-27.3	0.7845 +/- 0.0038	1,949 +/- 39	A.D. 1 (+/- 39)	A.D. 3 – A.D. 85 B.C. 39 – A.D. 127
3. AA100288	Op. 9, Z. 3, Sq. G	-27.0	0.7599 +/- 0.0039	2,206 +/- 41	256 B.C. (+/- 41)	B.C. 260 – 204 B.C. 384 – 178

*Run on Calib 6.0 Calibration Software.

Sample 3 (AA100288) derived from Operation 9, Zone 3, Square G. The zone represents a surface located at the bottom of Zone 2 that was not excavated in this square, although it was excavated in Squares D, C, B, and A. The radiocarbon sample was taken from directly beneath an inverted vessel found at the base of a platform cut, roughly 50 cm west of the eastern edge of the square (see **Figure 7.16** and **Figure 7.13** for the location in the Op. 9 profile). We hypothesized that this zone would correlate in age with the first or second phase of construction in Operation 7 (represented by the dates from radiocarbon samples 1 and 2); however, sample 3 is very clearly an older sample, representative of an even earlier occupation of Hats Kaab (**Table 7.1**), ranging in age from B.C. 384 – 178 (2δ). When the probability distribution is investigated, it is clear that this date comes from a completely separate, 200-year earlier phase of occupation, which places it squarely in the early Late Preclassic period (**Figure 7.30**). Also notable is that

just west of Square G in Operation 9, the fragmentary and poorly preserved remains of a human burial was found (see Operation 9, Zone 3).

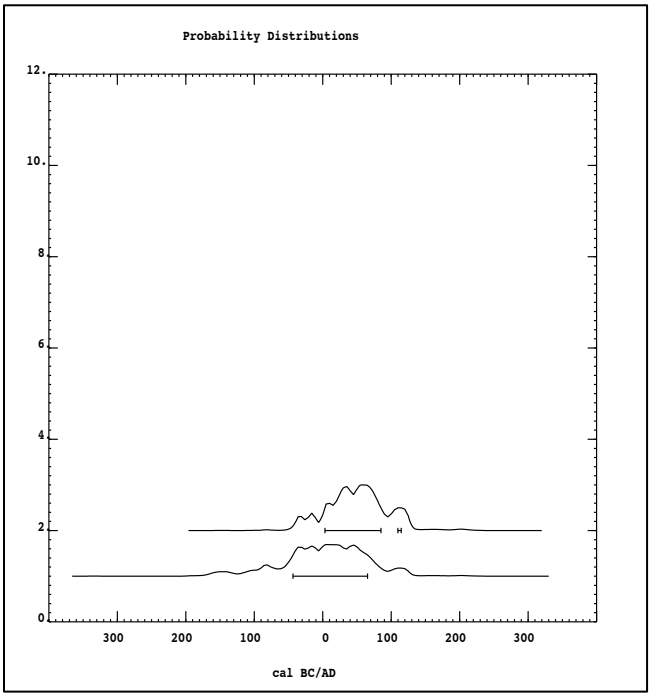

Figure 7.29 Probability Distribution for Radiocarbon Samples 1 and 2 (from Calib 6.0).

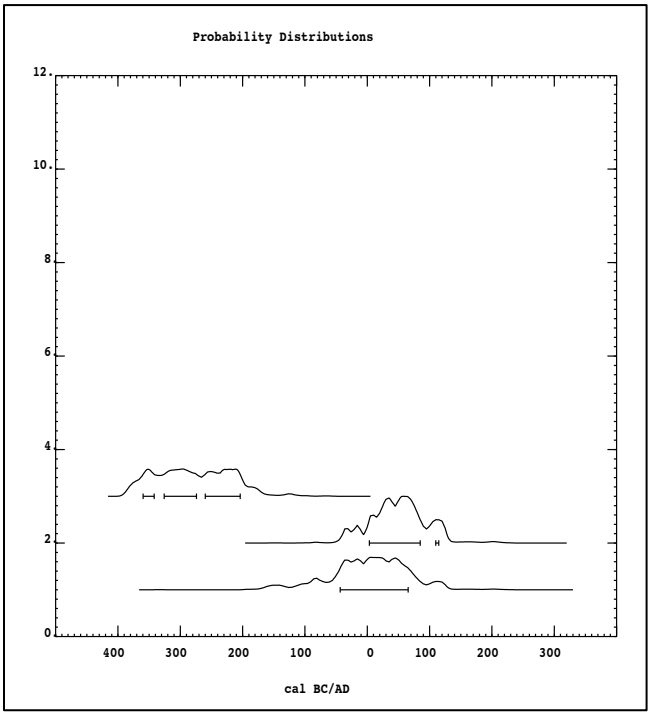

Figure 7.30 Probability Distribution for Radiocarbon Samples 1, 2, and 3 (from Calib 6.0).

Interpretations and Conclusions

While additional excavation will be needed to address unanswered questions, our primary objectives were met with the excavation of the two Operations 7 and 9, the surface collection, and the observation of the architectural group of Hats Kaab at the summer solstice. Given the taphonomic conditions of the site, we were able to recover substantial information that confirms Hats Kaab as a functioning E-Group and places its construction and use in the Preclassic period.

Both ceramics and carbon samples supplied chronological assessments that confirm the group's date, including samples from the systematic surface collection, which in general show relatively contained drag of materials. Preliminary laboratory analysis of the ceramics from both excavation and surface collection provides a dozen types of pottery from the Late Preclassic with a predominance of Terminal Preclassic examples (Runggaldier et al. 2012); these dates are confirmed by the two radiocarbon analyses from Operation 7. Operation 9 provided a date considerably earlier and possibly associated with ritual events focused on the eastern mounds (a burial and cache).

Masonry architecture was not preserved in any recoverable state, stones having been broken by plowing action, or carried away to be out of the path of tractors. Excavations confirmed that the bulk of construction relied mostly on earthen fills, probably given the abundance of mud and clay from nearby river deposits. It appears that building efforts were carried out with basket-load construction methods, resulting in lens deposits of different colors within the same phase.

Given the above considerations, excavations in Operation 7 determined an overall sequence encompassing three construction phases and two remodeling events of phase 2 (**Figure 7.31**). The earliest phase was identified at the limit of excavation (Zones 21 and 22, and 16 and 18) and was not further investigated (except for extracting a carbon sample from Zone 16). A subsequent phase included the wall stones and steps (Zone 12) of the edge of a platform or terrace leading up to the building of Structure 2, which presumably served as the access point to the structure, given their location along the central axis (**Figure 7.32**). The following two remodeling or repair phases seem to have affected only the area in front of these stones, where the surface was reinforced with small stones in addition to new clay layers. Between the two remodeling episodes a circular pit was excavated in line with what we interpret as the central axis, and while no distinctive artifacts were recovered from it, it may have contained a cache or offering of perishable materials. A third construction phase capped all these events, but its deposits are affected by the plow zone, and its associated architectural features have now been obliterated by agricultural activities.

Operation 9 recovered, in Squares A and B, vestiges of the same terrace or platform edge that was exposed in Operation 7 (Squares A and F), which form a badly damaged wall at the interface of plow zone and undisturbed deposits, aligned along the front of the eastern mounds. While very little was found in this excavation in the form of artifacts in the clay fill, several possible postholes were identified, roughly in a line perpendicular to the eastern mounds front. These may suggest the presence of perishable structures, or a system of sighting posts on a

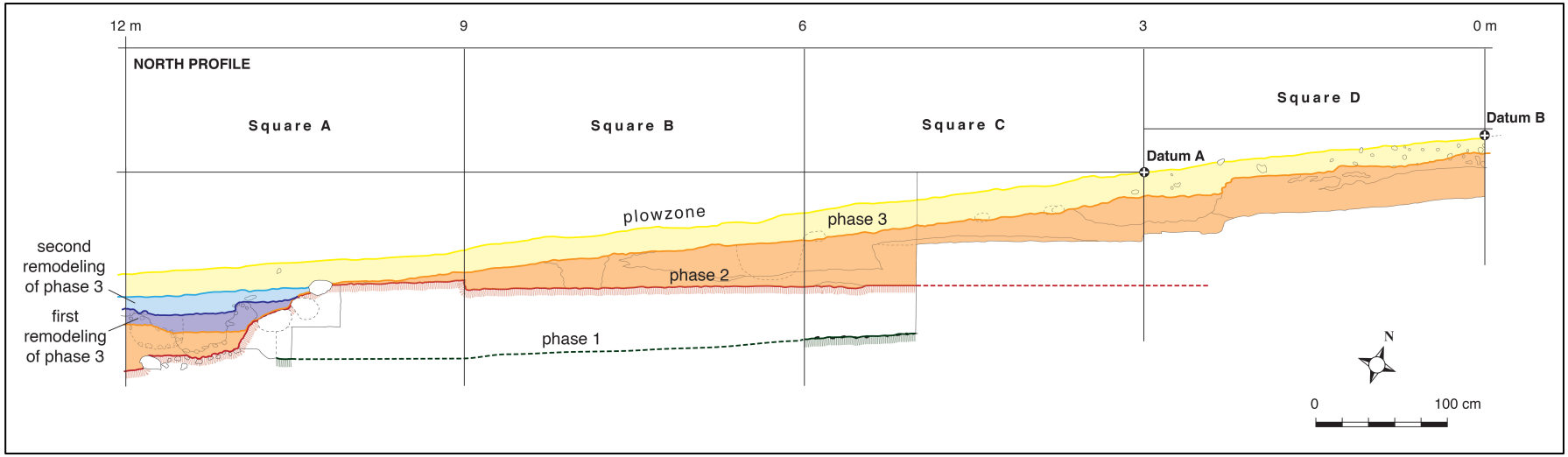

Figure 7.31 Occupation phases at Hats Kaab Structure 3 (drawing by A. Runggaldier; digitized by M. Brouwer Burg).

Figure 7.32 Closing shot of Operation 7 (photo by A. Runggaldier).

platform. In addition to these, an overturned vessel and the presence of articulated bones (facial and upper limbs) indicate the presence of a burial with a vessel, or a burial and a cache in a context that requires further investigation, given that operations were cut short by the heavy rains and waterlogging of the sediments from beneath the excavation surface. The presence of remains from ritual activities and interments warrants further investigation of a phenomenon that has been noted at several other sites with E-Groups along the eastern structures; in addition the radiocarbon assessment of a recovered sample indicates our earliest dates for the Hats Kaab group come from this context, and may indicate construction and use phases that long predate the earliest phase identified in Operation 7.

The upcoming field seasons of the BREA Project will focus of retrieving further information on this locus of ritual, more data on chronological assessments for construction including the western structure, and on further analysis of the ceramics and other material to understand the context of the Hats Kaab architectural group within the region, as well as in comparison with additional E-Groups in other regions.

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Chapter 8

Investigations of a Circular Structure at Ik'nal (Operation 13)

Eleanor Harrison-Buck

The site of Ik'nal was mapped with a Total Station during the summer of 2012 (**Figure 3.2**; see Murata and Kaeding, Chapter 3 for further discussion). The site overlooks the Belize River, situated only about 25-50 m north of the river's edge. Across the river are two modest-size settlement groups, Baakche and Nohochtunich, which are just slightly downriver from Ik'nal (see **Figure 1.2**). Additionally, the site of Married Woman Point is said to be located on the south side of the river, possibly in the vicinity of Ik'nal, and is supposed to be a sizeable site center with monumental architecture visible from the river, according to local accounts and reports from IA. Although we have yet to firmly locate the Married Woman Point site, it is possible that Baakche and Nohochtunich represent hinterland settlement of this site. Both sites were in bush, which hindered visibility. However, at Nohochtunich a sizeable pyramidal structure, roughly 4 m in height, was recorded by the survey team, along with large "megalith-style" stone construction that is visible from the river—features that align well with the descriptions of Married Woman's Point (see Kaeding, Murata, Buck, and Norris, Chapter 4). Local informants also tell us that more sites exist farther down river on both the north and south sides of the river, less than a kilometer from Ik'nal and further reconnaissance in this area is planned for the future.

Ik'nal consists of a single plaza group with one main elite residential structure (Structure 1) that is approximately 2.5 m in height. The length of this structure (running roughly east-west) measures approximately 25 m in length and roughly 15 m wide. This sizeable house mound occupies the southern side of the plaza at Ik'nal, which is open to the north. Two low, elongated platform structures line the eastern and the western sides of the plaza. The western platform (Structure 4) extends off of the northwest corner of Structure 1, while the eastern platform (Structure 3) extends off of the northern side of an all-stone circular structure (Structure 2) located in the southeastern corner of the plaza (**Figure 8.1**). Murata and Kaeding (Chapter 3) note that the orientation of the plaza group is difficult to ascertain and suggest that the main elite structure (Structure 1) may be oriented 21.5˚ west of north, aligning with the orientation of the western platform structure (Structure 4) extending to the northwest from the main structure (Figure 3.3). As an alternative layout, I suggest that Structure 1 may be oriented the same as Structure 3, nearly cardinal (perhaps 5-10˚ east of north) and this is reflected in my rectified map of the site presented in **Figure 8.1**.

The circular structure at Ik'nal was the focus of our investigations during the summer 2012 season. Operation 13, a large excavation unit measuring 15 m (east-west)-x-15 m (north-south), was laid out to encompass the entire structure and some of the floor surface of the

surrounding basal platform. The unit was divided up into twenty 3-x-3 m squares (A-Y) (**Figure 8.2**). However, only a little less than half of this unit was excavated, including Squares G, H, L, O, Q-T, and V-X. Squares A-F, I-K, M-N, P, U and Y were not excavated during the 2012 season, but may be the focus of future excavation. Our excavations during the 2012 season exposed a little over half of the interior room (Squares R and S) of the circular building (Structure 2-1st), which has a diameter measuring 4.5m and a narrow .75 m wide doorway that faces west toward Structure 1 and in the direction of the plaza area (**Figure 8.1**). Portions of the exterior walls of this building were exposed in Squares G, H, L, O, Q, T, and V-X (**Figure 8.2**). The circumference of this structure measures roughly 7.5 m in diameter, which includes a low plinth or bench that rings the exterior of this building (for further discussion see Harrison-Buck and Quinn, Chapter 9).

The circular building (Structure 2) appears to share a primary basal platform with Structure 1, elevating these two buildings from the plaza floor (**Figures 8.1-8.3**). Although the horizontal exposure was limited, a portion of this basal platform may have been revealed in Squares O and T, running roughly N-S (5-10˚ east of north). Murata and Kaeding (Chapter 3) suggest that the eastern platform (Structure 3) extending from the northern side of Structure 2 may be a later addition. Excavations in Operation 13 exposed (in Squares G and H) what may be portions of this north-south platform of Structure 3. It is oriented roughly cardinal (5-10˚ east of north) and from the northern edge of the primary basal platform, Structure 3 extends to the north approximately 12 m, based on a reading of the topography. Our excavations affirms that Structure 3 is a later addition, grafted on to the northern side of the primary basal platform, but it appears to continue south as a one-course high rectilinear platform, overlying a portion of the primary basal platform and covering an earlier phase of a circular building (Substructure 2). While Structure 3 seems to post-date Substructure 2, it appears to pre-date the construction of a second circular building (Structure 2-1st) that was constructed directly on top of the rectilinear one-course high platform, which appears to be part of Structure 3. Although further horizontal exposure would clarify this building sequence, at this stage of my investigations I interpret Structure 3 as an intermediate phase between Substructure 2 and the building of Structure 2-1st.

It is possible that Structure 3 represents a discrete phase of construction that covered over the earlier circular Substructure 2 and stood for a period of time as a rectilinear platform and that it was not until some time later that the Structure 2-1st circular building was constructed directly overtop. Alternatively, Structure 2-1st was built at the same time as Structure 3. Structure 2-1st barely fits over top of the Structure 3 rectilinear platform (see **Figures 8.1-8.3**). The Structure 3 platform serves to elevate Structure 2-1st about 15-20 cm above the primary basal platform, which is probably less than a meter above the plaza floor. The first phase of the circular building (Structure 2-1st B) contains a single interior room and narrow .75 m wide doorway that, during a final phase of construction (Structure 2-1st A), was blocked and in-filled, transforming the building into a solid round platform. Below I discuss the details of our excavations of this complex building, including our main objectives and methods of investigation, and conclude with some preliminary interpretations of the data collected.

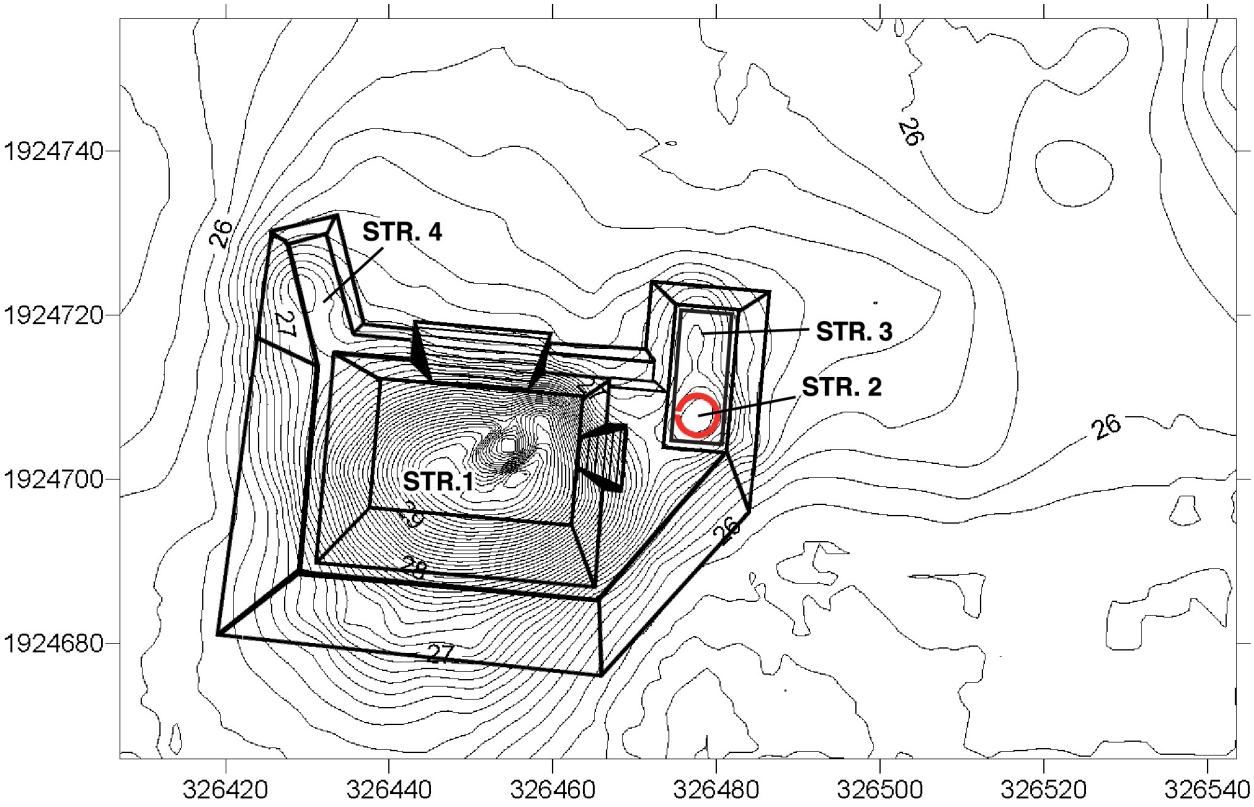

Figure 8.1 Rectified site map of Ik'nal showing location of circular structure (map prepared by S. Murata and A. Kaeding and adapted by E. Harrison-Buck).

Research Objectives

The surface of Structure 2 prior to excavation was notable for its density of stone compared to other architecture at the site (**Figure 8.4**). The presence of stone on the surface of the mound and the overall configuration of the site is similar to other ancient Maya settlements that contain examples of circular buildings, such as Hum Chaak, a site farther upstream on the southern side of the Belize River where another circular structure was investigated during the 2011 BREA field season (Harrison-Buck 2011; see also Harrison-Buck and Quinn, Chapter 9 for further discussion and architectural comparison). Therefore, our primary objective for the excavation at Ik'nal was to test whether the all-stone structure noted in the survey of the southeastern corner of the plaza group was a circular building similar to the one found at Hum Chaak and at other sites throughout the Maya Lowlands, such as the Sibun Valley to the south where I investigated three other examples of circular architecture as part of my dissertation research (Harrison-Buck 2007). These buildings show a distinctive layout and construction technique, which appears closely affiliated with the architectural styles found in northern

Yucatan (Harrison-Buck 2007, 2012). These buildings consist of low, freestanding walls that contain a single interior room with a narrow doorway, usually measuring between .75-1 m in width (**Figure 8.3**). This style of architecture is less common in the southern Maya Lowlands and appears to be introduced during the Terminal Classic period (ca. AD 780-900).

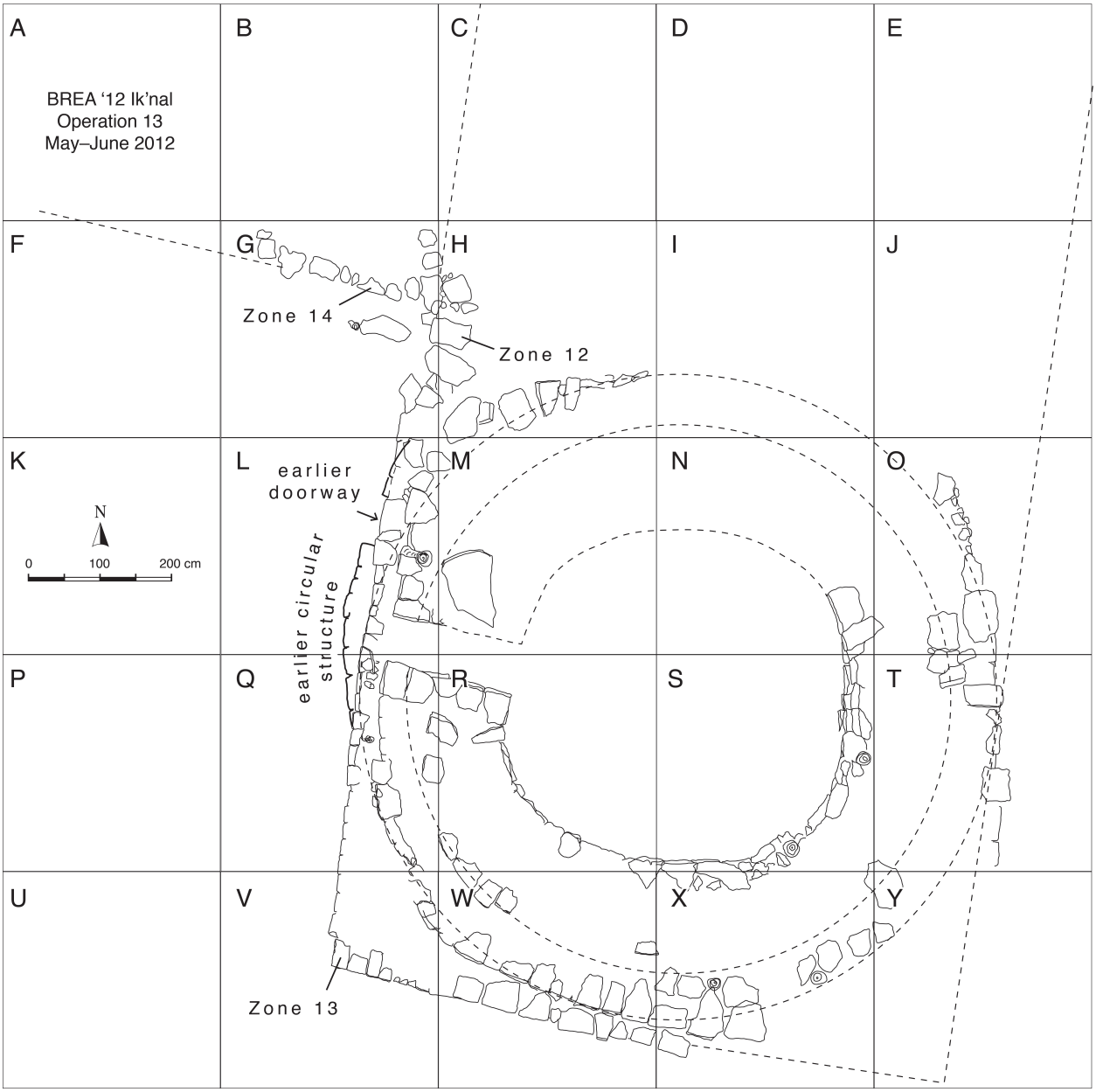

Figure 8.2 Ik'nal Planview of Operation 13 showing locations of Squares A-Y (drawing by E. Harrison-Buck; digitized by M. Brouwer Burg).

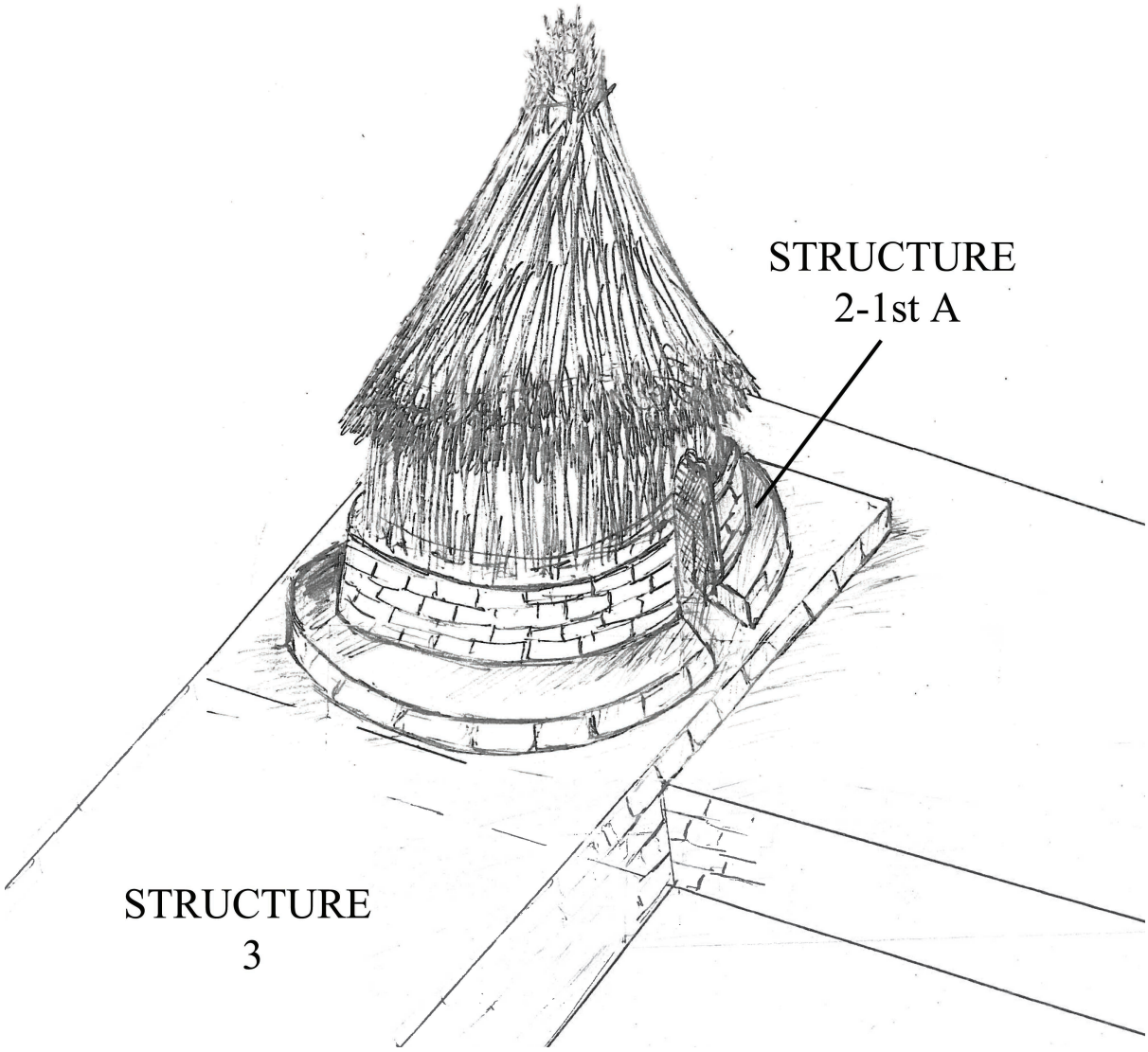

Figure 8.3 Reconstruction of Structures 2 and 3 at Ik'nal (drawing by E. Harrison-Buck).

Our excavations at Ik'nal were aimed at testing whether Structure 2 not only shared a similar form and construction technique to other circular structures, but also whether it shared a similar temporal chronology. Circular architecture from Hum Chaak and those in the Sibun Valley exhibit ceramic types of the Ik'hubil complex—a ceramic assemblage defined in the Sibun River valley just south of the Belize River valley (Harrison-Buck 2007). The Ik'hubil assemblage corresponds with other comparative collections in Belize that date to the Terminal Classic period. Based on the known distribution of the Ik'hubil Complex in the Sibun Valley and other sites in north-central Belize, such as San Jose and Lamanai, it was theorized that sites in the middle Belize Valley, like Hum Chaak and Ik'nal, would share the primary types of the Ik'hubil Complex (Harrison-Buck 2010). Therefore, the main objectives of our investigations at Ik'nal were to:

1. Define the architecture and any earlier phases of construction;
2. Collect diagnostic artifacts, including ceramics that could date the construction phases; and
3. Isolate artifacts and activity areas that might help us to better understand the function(s) of these special-purpose, non-residential buildings.

Figure 8.4 Operation 13 (circular structure) prior to excavation (photograph by S. Murata).

Research Methods

The site of Ik'nal had been recently cleared for planting, which made our initial clearing of the stone structure (Structure 2) fairly easy. Fortunately, the cultivation activity has involved non-mechanized clearing, planting and harvesting and, unlike other sites in the BREA study area, has not been heavily disturbed by repeated plowing and other destructive activities. During our excavation, the BREA survey team mapped the site with the Total Station and many of the elevations taken for the excavation were done with the Total Station (Murata and Kaeding, Chapter 3). Two temporary datum points (Datum A and B) also were placed toward the top of the stony mound and all measurements throughout our excavations were taken from these two points, which ultimately were logged with the Total Station. We also used the Total Station to map the final plan view of the structure (**Figures 8.2** and **8.5**). In most cases, 100% of all dirt

was screened through a ¼" mesh screen. Picks and shovels were used to remove the overburden and trowels were used to define architecture and *in situ* artifacts. Below I review the details of this excavation by zone, our smallest unit of excavation.

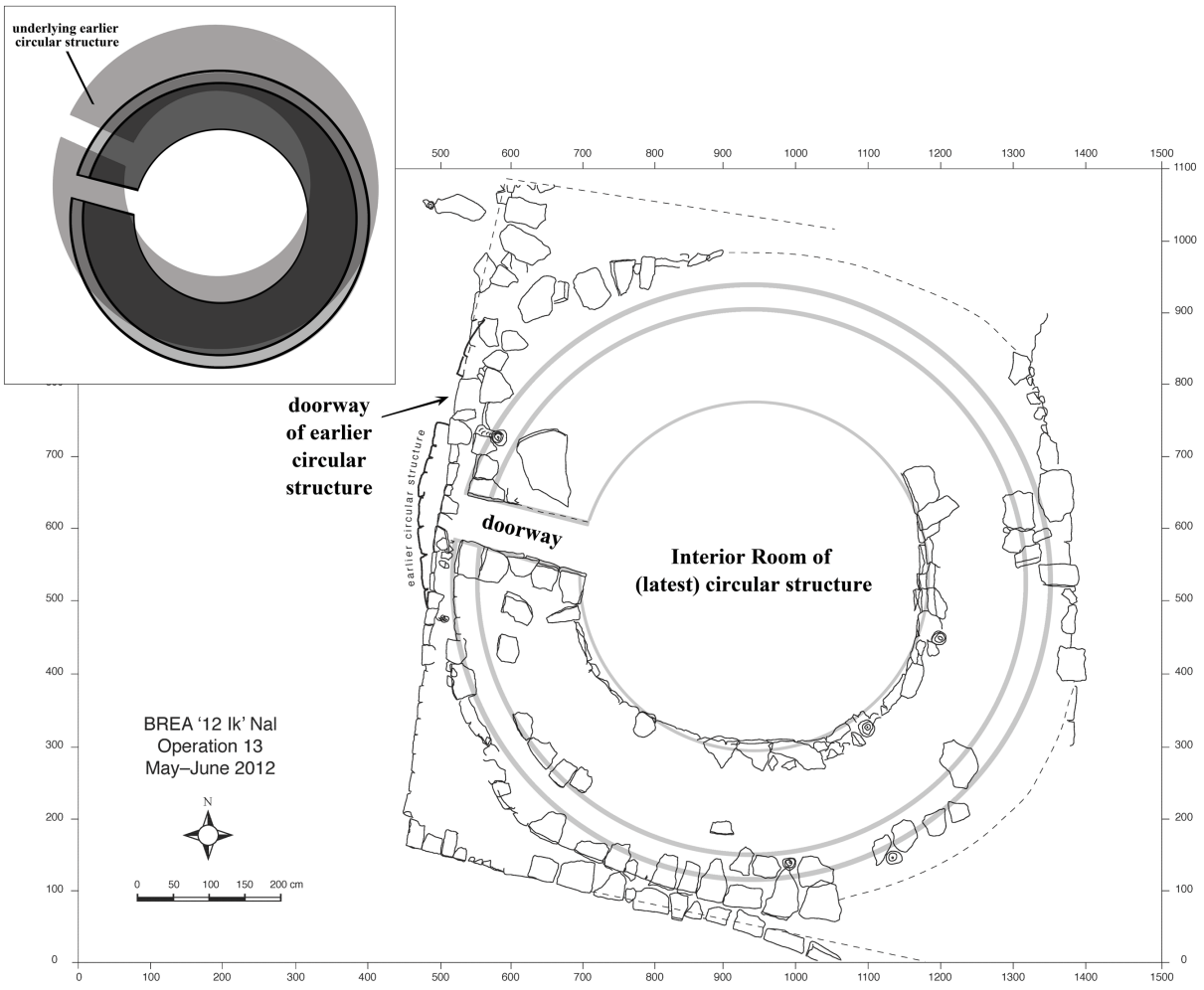

Figure 8.5 Final planview showing schematic of earlier circular building.

Excavation Results

Collapse Debris: Zone 1

Only a few small trees were growing on Structure 2 when we arrived at the site as most of the settlement area was under cultivation. The structure itself had very little topsoil and mostly consisted of exposed limestone rubble and cut stone blocks. Prior to excavation, there was an indication of intact walls that appeared circular in form. Opening shots of the unit were taken prior to excavation (**Figure 8.4**). On 5/21 we began excavating Squares Q, V, and W, focusing most of our attention on trying to define the exterior areas of the structure. We

continued north of Square Q and cleared down the topzone in Square L, which also is located on the western exterior side of the circular structure. This is also where we ultimately identified a large portion of the doorway of the circular building (discussed further below).

Zone 1 consists of a thin layer of topsoil that was stripped off of Squares G, H, L, O, Q-T, and V-X. The topzone in Operation 13 is a dark soil with roots that is deepest in the areas surrounding the exterior of the stone structure. In many areas on the structure large boulders and a high density of smaller cobbles protrude out from the surface (see **Figure 8.4**). At the base of Zone 1 we exposed a high density of cobbles that slope down off the structure and appear to be collapse. On mound, the stones were further defined as the topsoil was stripped away. Artifacts consist of broken ceramics and some lithic debris, found mostly wedged up against the exterior of the structure.

Several large limestone boulders were visible on the surface and were further exposed in Zone 1. One in Square Q may be a doorjamb as it is worked on three sides. If so, the stone has been ripped out and moved somewhat from its original location (we located the intact doorjamb primarily in Square L and also in Square Q – see Zone 5 below). Another large stone on top of the structure appears to be shaped and resembles a stela fragment perhaps dragged from its original location. However, this remains speculative. Initially, we thought maybe these large stones were blocking the doorway of the circular building, but they were not found in front of the door. Stone monuments were found associated with three circular structures in the Sibun Valley—Pechtun Ha, Oshon, and Obispo—and in the case of the latter the monument was found dragged in front of the circular building and appeared to block the doorway during the final phase of construction when the building was transformed into a solid circular platform (Harrison-Buck 2012).

In Square H, Zone 1 covers a long, low platform (Structure 3) that abuts the northern side of the circular structure. The Structure 3 platform appears to be cardinally oriented (5-10˚ east of north) and extends roughly 12 m to the north (see **Figure 3.3**). The western side of the platform was exposed along the eastern side of Square G. The platform contains at least one course of large, roughly cut retaining stones visible in the eastern sidewall of Square G. This line of stone appears to connect with a rectilinear platform that underlies the latest circular structure (discussed below).

Squares T and O are located on the eastern side of the circular structure. There is clearly a natural slope downward to the east and the Zone 1 topsoil in this area is substantially deeper than on the south and west sides of the structure. The dark black matrix and stone was loose. At the base of Zone 1 in Squares O and T we encountered a high density of collapsed stone. On the surface several large stones were visible and appeared in alignment. At the base of Zone 1 the top of a north-south line of large, roughly cut limestone boulders was exposed. This wall may be the remains of the eastern side of Structure 3, although it seems substantially lower in elevation than the eastern wall of Structure 3 identified in Squares G, L, V-X. My thinking is that this is the vestiges of the eastern side of the primary basal platform that during an intermediate phase (prior to the construction of Structure 2-1st) merged with Structure 3, the elongated rectilinear

platform that continues to the north 12 meters. The eastern wall of what I am calling the primary basal platform is oriented roughly cardinal (5-10˚ east of north) like Structure 3, and bisects Squares O and T. There appears to have been significant tree disturbance on the eastern side of the circular structure and while the eastern wall was relatively intact, the outer wall of the circular building (Structure 2-1st) was poorly preserved and proved difficult to define in our excavations.

The top surface of the Structure 3 platform was exposed at the base of Zone 1 in Squares V-X. Here, a portion of the southern edge of the circular structure (Structure 2-1st) was exposed in Squares V-X. A relatively high density of fish bone and other artifacts were found in these squares, wedged up against the circular exterior walls, which is mixed with collapse debris. Collapse debris sloping off of the circular structure was removed as Zone 2.

Collapse Debris: Zone 2

Zone 2 is the collapse debris surrounding the exterior of the final phase of the circular structure (Structure 2-1st). Zone 2 consists of mostly small size cobbles and some larger boulders, some of which are cut stone and likely fall from the superstructure walls. The collapse debris lying on an 80 cm deep plinth or low bench that rings the perimeter of the circular superstructure was removed separately as Zone 3. Likewise, we removed the collapse material on the surface over top of the circular room separately as Zone 6 (see further below).

Zone 2 in Square G contains a lighter density of tumble than other squares that surround the exterior of the Structure 2-1st circular structure. The dark black matrix that characterizes the top zone continues in Zone 2 somewhat deeper than in other squares at the level where more tumble was encountered (Munsell reading black). A lighter density of artifacts was recovered in this area, but notable remains include a marine conch shell, two associated obsidian blades, a perforated ceramic bead or spindle whorl, and a metate fragment. To the north of these finds, remnants of a wall running roughly east-west was detected at the base of Zone 2 in Square G, which may represent the northern facing of the primary basal platform that supports both the circular structure and Structure 1 visible in the topographic map of the site (see **Figures 8.1 and 3.3)**. Another wall running roughly north-south was exposed at the base of Zone 2 in Square G, which appears to be where Structure 3 merges with the northern side of Structure 2-1st and runs underneath this structure as a one-course high rectilinear platform. The Structure 3 northern platform extension is roughly cardinal, measuring about 5-10° east of north (see **Figures 8.2** and **8.3**).

In Squares L and Q, Zone 2 consists of collapse debris sloping off the west side of the Structure 2-1st circular structure. The doorjambs of a narrow .75 m wide doorway of the circular structure were identified while removing the collapse of Zone 2 in Square L. At the base of Zone 2 in Squares L and Q, between the doorjambs and just outside of the door and right around the exterior of the circular structure we encountered a compact matrix filled with tiny river pebbles, marl, and pebble size limestones mixed with larger limestone cobbles that comprise a fairly even, packed surface. This is the surface of a rectilinear platform that appears to be part of

Structure 3 on which the Structure 2-1st circular structure sits (**Figure 8.3**). A medium density of artifacts was recovered in the tumble debris. Artifact density spiked toward the base of Zone 2 as we encountered the surface of the rectilinear platform on the west and south sides of the circular structure. Artifacts included a large quantity of serving vessels and red-necked jars, as well as a few fish bone and other animal remains. These artifacts clustered mostly around the exterior of the circular plinth or low bench encircling the exterior of Structure 2-1st. The exterior walls of the plinth/bench and the superstructure were best preserved along the western edge of the circular building where a narrow doorway was also exposed, as noted above. The top surface of this rectilinear platform was identified right around the exterior of the circular structure walls. In Squares L and Q, we detected a number of large boulder size limestones that were resting on top of the rectilinear platform. They did not appear to have any meaningful alignment or purpose. The boulders were drawn and removed as part of the Zone 2 collapse debris.

The Structure 3 rectilinear platform was exposed at the base of Zone 2 on the west and south sides of Operation 13 in Squares G, L, and Q, and along the south side of the circular structure in Squares V, W, and X (**Figure 8.2**). The exterior wall of the circular structure sits on this rectilinear platform. The Structure 3 rectilinear platform underlying the circular structure consists of a nicely preserved one-course high platform. The western side of the platform wall runs through Squares G, L, Q, and V at an orientation of roughly 5-10° east of north. In Square V, the platform corners in a west-southwest direction through Squares V, W and X, with the southern edge of this platform is oriented about 112° east of north (see **Figure 8.2**). By the bottom of Zone 2, the exterior wall of the circular stone plinth/bench of Structure 2-1st was defined, which appears to be a low, two-course high wall resting on the Structure 3 rectilinear platform surface.

Like Squares L and Q, Zone 2 collapse debris was removed in Squares V, W, and X. The bulk of the collapse in these squares was around the southern exterior edge of the circular structure and surface of the Structure 3 rectilinear platform. A high density of smashed serving vessels was found along this outer wall of the circular building, perched on the surface of the Structure 3 rectilinear platform. These clusters of ceramics did not appear to be whole pots, but rather, partially reconstructable vessels. Two clusters of Daylight Orange: Darknight ceramics were exposed and one cluster was defined *in situ*. This was photographed, drawn, and removed as part of Zone 2. Many of these clusters of artifacts, which also included groundstone fragments and a couple fragments of marine shell, were point plotted with the Total Station. The top course of the exterior of the circular structure was partially exposed at the base of Zone 1 and further defined in Zone 2.

Unfortunately, time did not allow for the excavation of Square Y where we would anticipate finding the southwestern corner of the Structure 3 rectilinear platform. However, we did find another N-S wall running through Squares O and T (noted above in Zone 1) that appears to share a similar orientation of 5-10° east of north and suggests it may be part of Structure 3 or, alternatively, it is part of the primary basal platform. The wall of large, roughly cut stone bisects Squares O and T and runs roughly north-south through both of these 3-x-3 m squares. In Square

O the edge of the wall is about 175cm from the west side of the square. In Square T the wall is about 185cm from the west side of the square. The difference reflects the orientation of the wall, which is about 7° east of north.

Collapse Debris on the Building: Zone 3

Zone 3 is the tumble lying overtop of the exterior walls of the circular structure that comprise the superstructure of Structure 2-1st and a plinth or low bench that surrounds the exterior of the building. A thin layer of collapse debris was removed from the top of the bench and superstructure walls (Squares Q, V, and W) and a top layer of debris deposited in the doorway area (Square L). The tumble primarily rests on the bench and consists of a high density of small limestone cobbles and a light density of artifacts. At the base of zone 1 is the poorly preserved surface of the superstructure walls, measuring roughly 1.3 m thick, which steps down to the plinth or step of the circular structure that measures roughly .80 m deep and rings the exterior of the building (except at the doorway). The outer wall of the bench is 2 courses high and steps up to the circular superstructure walls that are preserved (in the doorway) to a maximum height of four-five courses. It is possible that the plinth served as a step that was constructed after the room of the building was in-filled and transformed into a solid platform. However, a step up another 3 courses is considerably high for a step up to the platform and it seems more likely that the .80 m deep plinth may have served as a bench for sitting (or placing offerings) around the exterior of the building.

Zone 3 in Square L comprises a layer of collapse debris that was excavated in between the doorjambs of the circular structure. At the base of zone 3 the two doorjambs were partially exposed and a fill of limestone cobbles and boulders was found wedged in the doorway, which was excavated separately as Zone 6 (see below). Artifact density is quite high for a relatively shallow zone. Zone 3 is collapse that is on and just in front of the doorway and is similar to other Zone 2 collapse with a high density of cobble size stones and several larger limestone blocks collapsing from the western side of the circular structure.

In the southeast corner of Square L and northeast corner of Square Q a .75 m wide doorway was defined as part of Structure 2-1st (**Figure 8.6**). Below the Zone 3 thin layer of collapse, the fill inside the doorway was removed separately as Zones 6 and 9. These zones resembled the fill inside the room of Structure 2-1st that was removed as Zones 6, 7, 8, and 9. The large doorjambs seem to have been purposefully ripped out but do not appear to have been used to block the entrance and retain the fill. This was the case in the examples of circular architecture at Hum Chaak and also those from the Sibun Valley.

Collapse Debris Outside of the Building: Zone 4

Directly below Zone 2 collapse was Zone 4, which appears to be more collapse debris surrounding the outer edge of the Structure 3 rectilinear platform. Zone 4 bottoms out on a floor surface and construction fill layer defined as Zone 5. The matrix of Zone 4 is mostly small stones measuring 2-10 cm, but there are clusters of somewhat larger limestone cobbles that look

like collapse mixed in. Therefore, this zone is defined as tumble although it is possible it represents a fill layer that covered the rectilinear platform during a final construction phase of the later circular structure.

Figure 8.6 Doorway of Structure 2-1st A (photo by E. Harrison-Buck).

Zone 4 in Square G is a narrow trench exposing the rectilinear platform and the top of an earlier circular structure (Substructure 2) running underneath the rectilinear platform. A relatively high density of artifacts, including what appears to be a whole conch shell (hit by the pick so fragmentary now) and several pieces of obsidian were found (unwashed for future residue analysis). The soil in Square G has a light density of stone and is darker and less compact than Zone 4 in Squares L, Q, and V.

Zone 4 in Square L represents the matrix surrounding the exterior of the rectilinear platform. A high density of artifacts was found mixed in with the Zone 4 matrix. Cleaning the bottom of Zone 4/surface of Zone 5 a fragment of a hollow figurine was found, which is a bird head with horns and protruding beak, suggestive of a horned owl (**Figure 8.7**). Zone 4 consists of a packed marl mixed with mostly small pebble and cobble size stones. The presence of a few larger (20 cm) stones suggests this zone may represent collapse debris surrounding the edge of the rectilinear platform, rather than the construction fill of a later floor. Zone 4 in Square V appears to represent more collapse debris surrounding the edge of the rectilinear platform. As

noted above, there is an outside chance that this is a fill layer that was built up over top of the Zone 5 floor/fill, covering up the rectilinear platform on which the latest circular building (Structure 2-1st) sits.

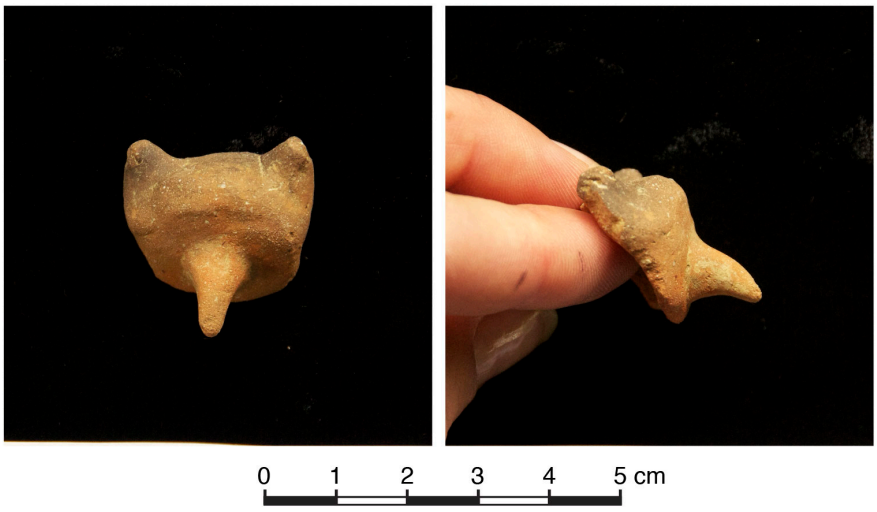

Figure 8.7 Figurine found in Operation 13 (photos by M. Brouwer Burg)

Floor/Fill Outside of the Building: Zone 5

Zone 5 lies directly below Zone 4. The one-course high rectilinear platform sits directly on the Zone 5 floor and fill, which covers over an earlier circular structure (Substructure 2), partially exposed at the base of Zone 5 (see further below). Zone 5 consists of a poorly preserved floor surface and underlying fill. This relatively level, compact surface was encountered at the bottom of Zone 4 and was defined at the base of the one course high rectilinear platform. The Zone 5 floor and fill was excavated in Squares L and Q in a narrow north-south trench directly west of the rectilinear platform. Due to time constraints, only this small section of Zone 5 was excavated. On the north side of Square L, the Zone 5 floor merges with what appears to be the remains of a partially intact flagstone floor. The Zone 5 floor probably represents a re-surfacing of the primary basal platform, connecting with the eastern side of Structure 1. Based on the topography (**Figure 8.1**), the basal platform supports both Structures 1 and 2 and serves to elevate them probably a meter (or less) above the plaza floor.

At the bottom of Zone 5, the western edge of an earlier circular structure (Substructure 2) was exposed in Squares L and Q. The earlier circular structure is directly beneath the one course high retaining wall of the rectilinear platform and can be seen in the northern part of Square Q. About 110 cm to the south of the north side of Square Q, Substructure 2 curves underneath the rectilinear platform and is eclipsed by this later phase of construction. In Squares L and Q, only a very small section of Substructure 2 was exposed, including a narrow doorway measuring .75 m wide, exactly the same width as the doorway of the later circular building (Structure 2-1st).

The doorway and wall of Substructure 2 is visible throughout Square L where a second course of stones on the earlier circular structure may exist, which may be the remains of a plinth or step similar to the Structure 2-1st (**Figure 8.8**). This needs further clarification because this second course appears to cover a portion of the rectilinear platform. The earlier circular structure clearly predates the rectilinear platform so this second course, preserved as a line of four stones, is confusing as it covers faced stones of the rectilinear platform. It may be that when the rectilinear platform was constructed all but the first course of stone on the earlier circular structure were removed and in this case four were put back to serve as a step up onto the northwest side of rectilinear platform. Further exposure in the future might clarify this sequence and the layout.

Floor/Fill Associated with Earlier Circular Structure: Zone 11

A posthole (Zone 11) was dug meter deep into the floor/fill underlying Zone 5, which is associated with the earlier circular building (Substructure 2). Zone 11 likely represents the primary basal platform on which the earliest circular structure (Substructure 2) and Structure 1 sit. Several ceramic sherds were recovered from this compact earthen fill, but none were diagnostic, unfortunately. However, several sherds recovered from inside the doorway of the earlier circular structure (removed as Zone 5) are thin-walled ceramics almost entirely oxidized black. Notably, they do not resemble the ceramics from the Terminal Classic period found associated with the later circular structure and it may be that they date to an earlier time period (Late Classic?). Further investigation is needed to clarify the chronology of the earliest phase of circular architecture. The ceramics associated with the rectilinear platform constructed over top of the earlier circular structure appear to date primarily to the Terminal Classic period.

Fill Inside the Room of the Building: Zone 6

Zone 6 represents the upper portion of fill inside the interior room of the circular building, which was in-filled at some point prior to abandonment as part of a final construction phase (Structure 2-1st A). The fill consists of boulder-size limestone, as well as smaller cobble- and pebble-size limestone mixed with a marl-filled-silty clay soil. The infilling of the rooms of circular architecture appears to be a pattern found in numerous other examples of circular structures in the Maya Lowlands (Harrison-Buck 2012). Zone 6 is the top portion of the fill inside the room of the circular structure encompassing all of Squares S and R and the northern edge of Square X, as well as the fill found inside the doorway in Squares L and Q, which was taken out as interior room fill because it appeared to be the same fill material and could be differentiated from the overlying collapse debris (Zones 1, 2, and 3). Zone 6 is a mix of dark topsoil and lighter tan construction fill. A high density of artifacts, including diagnostic sherds and one fragment of a conch shell (point plotted in one corner of Square R) were found right at the interface between Zones 6 and 7 where a consistently lighter fill matrix occurs. This fill includes a mix of Terminal Classic ceramics and Early Postclassic types, such as Zakpah Orange-Red, Rio Juan Unslipped, and More Force Unslipped. A distinctive Postclassic anthropomorphic censer was found smashed and scattered throughout the fill of the interior room

in Zones 6-9 of Squares S and R, but the bulk of the censer was found in Zone 6 Square R (**Figure 8.9**). This mix of ceramics suggests that while the early phases of the circular structure date firmly to the Terminal Classic period, the final infilling event of Structure 2-1st A dates to the Early Postclassic period (ca. 900/950-1050/1100).

Figure 8.8 Doorway of earlier circular building (Substructure 2) (photos by E. Harrison-Buck and D. Buck)

Figure 8.9 Anthropomorphic censer associated with fill inside the room of Structure 2-1st (photo by E. Harrison-Buck)

Fill Inside the Room of the Building: Zone 7

Zone 7 is restricted to Squares R and S (and a small portion along the northern side of Square X, which was removed as part of Square S). Zone 7 comprises the construction fill inside the room of the latest circular building that marks an infilling event associated with the building's final phase (Structure 2-1st A). Zone 7 appears is lighter tan color with more marl and limestone than the Zone 6 fill above it. The fill is loose with both large and small boulder and cobble size limestone with little to no river stone. A high density of nicely preserved sherds was recovered from the zone. As noted above, Zone 7 contained a mix of Terminal Classic and Early Postclassic ceramic material.

Fill Inside the Room of the Building: Zone 8

Zone 8 lies directly below Zone 7 and is restricted to Squares R and S (and a small portion along the northern side of Square X, which was removed as part of Square S). Zone 8 comprises more of the construction fill inside the room of the latest circular building that marks an infilling event associated with the building's final phase (Structure 2-1st A). Zone 8 is similar to the matrix of Zone 7, light tan in color mixed with marl and limestone cobbles and boulders. Upon excavating Zone 8 in Squares R and S, about half of the interior of the room was exposed. In addition to a high density of nicely preserved ceramic sherds, a relatively high density of turtle carapace and several pieces of unidentified bone was recovered from Zone 8 in both Squares R and S. Also, toward the base of Zone 8 a cache of pomacea was found along the west edge of Square S and extended into square R. The presence of bone that may be human was found dispersed toward the interface of Zones 8 and 9, mainly along the central axis of the interior

room of the circular building. Zone 8 contained a mix of Terminal Classic and Early Postclassic ceramic material.

Floor Surface Inside the Building: Zone 9

Zone 9 is a thin layer (5-10 cm deep) of packed terminal debris associated with the floor surface of the interior of the circular building (Structure 2-1st B). This surface was difficult to define and the thin layer of packed material may be all that remains. It was not a well preserved, flat plaster floor, but a cobble-filled matrix that also serves as the surface of the (Structure 3) rectilinear platform, which lies directly underneath Structure 2-1st B (a portion of which was excavated as Zone 10 – see below). Zone 9 was excavated in Squares R and S (and a small portion of Square X, which was removed as part of Square S). In addition, Zone 9 was removed from in between the doorjambs in Squares L and Q (**Figure 8.2**). Despite the small area, Zone 9 in Squares L and Q revealed a relatively high density of artifacts. In this thin layer, a high density of sherds were found lying flat, suggesting this 5-10 cm layer represents the remains of a packed surface of the rectilinear platform that also served as the interior room floor of Structure 2-1st B. At the interface of Squares L and Q, a large boulder of limestone rested on the floor surface right on the western edge of the rectilinear platform and just at the opening of the doorway. A human (?) long bone was found lying on the Zone 9 surface directly beneath the boulder, suggesting that the stone may have been purposefully placed in this location in front of the door perhaps when the room was in-filled. The bone and some sherds around it were defined, drawn, photographed and removed as part of Zone 9.

Inside the room of Structure 2-1st B, we exposed the final course of stones of the superstructure interior wall and encountered a poorly preserved floor surface covering a large cobble and boulder fill. Zone 9 floor/fill (ballast?) was poorly preserved floor and difficult to define, but in the best preserved spots it measures roughly 5-10cm thick. It is packed with small and large cobble and boulder size limestone. Little to no river cobbles or pebbles were found in either the interior fill or the floor/platform construction. The Zone 9 floor surface in Squares R and S was inconsistent and uneven. Initially thought to be a flagstone floor, these flat-lying stones did not extend across the entire area of the room. Some areas are filled with large, flat-lying stones, while other areas of this floor surface range from a marly consistency to more of a compact surface consisting of smaller packed pebbles and cobble size limestone. It is possible that the floor surface was partially destroyed when the room was in-filled during the Early Postclassic. This was found to be the case at the site of Oshon, where a flagstone floor inside a Terminal Classic circular structure was partially dismantled and burned prior to the infilling of the room (Harrison-Buck 2007).

A range of artifact material was recovered from Zone 9 inside the room of the circular structure at Ik'nal, including diagnostic pottery sherds, debitage, several C-14 samples, animal bone, and what appears to be fragments of human bone. Some of the artifacts probably represent material associated with the infilling of the room (Structure 2-1st B), while other material, particularly the flat-lying sherds likely represent terminal debris associated with the final use of

the floor surface of Structure 2-1st A. It is also possible that some of the material recovered in the excavation of Zone 9 in Squares R and S was associated with the interior fill of the rectilinear platform (zone 10) that lies directly beneath the later circular structure. As the floor surface was uneven and poorly preserved, it made delineating the intervace between these three contexts difficult to define.

Compared to Squares L and Q (and the fill layers above in Zones 6-8), the artifact density in Zone 9 for Squares R and S was relatively light. Most of the ceramic material found in this Zone dates to the Terminal Classic period. However, at least one censer fragment was found in Zone 9 Square R, which may be part of the smashed Postclassic censer fragments found scattered throughout the fill in Zones 6-8. A partially intact Daylight Orange: Darknight vessel was found associated with the floor surface of Zone 9 in the northeast corner of Square S, suggesting that the final use of Structure 2-1st B (prior to the infilling of the room) dates to the Terminal Classic period (ca. AD 780-900). At the base of Zone 9 in Square S, the eastern edge of the square is disturbed by a tree and the eastern half of the later circular structure and accompanying rectilinear platform slump downward.

Fill of Surface Inside the Building: Zone 10

Zone 10 lies directly beneath Zone 9 and is the construction fill of the rectilinear platform that the circular building (Structure 2-1st) sits on. A portion of the platform fill was removed beneath the Zone 9 floor inside the room of the circular structure in Squares R and S. Only a light density of artifacts were recovered, but appears to date to the Late-to-Terminal Classic period.

Wall Modifications?: Zone 12

Zone 12 designates what appear to be several later walls that appear to be grafted on to the north-south rectilinear platform (Structure 3), extending to the north in Squares L, G, and H. Tree disturbance hinders a clear picture of the latest architectural phase in Square X, but a southern wall may have been grafted onto this part of the circular structure as well. These walls appear to be later modifications to Structure 2-1st A. Alternatively, they could be part of the latest phase of Structure 2-1st B when the room was infilled and the building was transformed into a circular platform. Unfortunately, little can be said, as they are not well preserved.

Retaining Wall of the Rectilinear Platform: Zone 13

Zones 13 was unexcavated. It designates the retaining wall of the rectilinear structure that covers over the earlier circular building (Substructure 2) and is directly underlying the later circular building (Structure 2-1st). The platform may be part of Structure 3, which extends to the north about 12 meters and appears to be oriented roughly 5-10° east of north. Zone 10 is the surface of this platform and Zone 13 is the wall that retains the platform. Zones 10 and 13 are part of the same construction event and were partially exposed in Squares G, L, Q, V, W, and X of Operation 13. It is possible that north-south wall in Squares O and T are part of this same

platform or, alternatively, represent the original primary basal platform onto which the Structure 3 platform was built onto at a later point, post-dating the use of Substructure 2. The best preserved portion of Zone 13 was found in the western side of Operation 13. It was defined, drawn, and photographed (**Figures 8.2** and **8.4**).

Zone 14

Zone 14 was not excavated. It is a poorly preserved retaining wall that runs roughly east-west and bisects Square G and appears to be the remains of the primary basal platform that supports both Structure 1 and Structure 2 (see **Figures 8.2** and **8.3**).

Zone 15

Zone 15 was not excavated. Zone 15 represents the free-standing wall of the circular superstructure of Structure 2-1st A. At its highest point, the wall stands about 4-5 courses tall (**Figure 8.10**). Given the quantity of daub recovered from the excavation, the circular stub wall of the latest phase of the building likely supported perishable walls and a pointed thatch roof, resembling other Terminal Classic examples found elsewhere in the Maya Lowlands (see Harrison-Buck and Quinn, Chapter 9). This free-standing wall is faced on two sides and sandwiches a loose cobble fill. The facing wall on the exterior consisted of nicely cut stone masonry, but the facing wall on the interior consisted of more roughly hewn facing stones (the latter visible in **Figure 8.10**). A similar construction style was found in the examples of circular architecture at Hum Chaak and in the Sibun Valley (Harrison-Buck 2007).

Figure 8.10 Closing shots of Operation 13 showing interior room of Str. 2-1st A (left) and west side of unit (looking south) with rectilinear platform and underlying earlier circular building (right) (photos by E. Harrison-Buck and D. Buck).

Architecture and Site Comparisons

The circular structure found at Ik'nal resembles other examples found in the Maya Lowlands, including the nearby site of Hum Chaak, which is located just upstream from Ik'nal on the south side of the Belize River (**Figure 1.2**). A circular structure found at Hum Chaak was the focus of excavations in the summer of 2011 (Harrison-Buck 2011). The design and layout of the circular structure at Hum Chaak is strikingly similar to the one investigated at Ik'nal during the summer 2012 season (see Harrison-Buck and Quinn, Chapter 9 for further discussion and architectural comparisons). However, there are a few subtle differences that exist. For instance, the structure at Hum Chaak lacks a plinth or bench construction and while the exterior size of both buildings measure roughly 8 m in diameter, the interior room size of the circular building at Hum Chaak is bigger (diameter = 5.5 m) than the one at Ik'nal (diameter = 4.5 m).

The overall size of Hum Chaak, with a site core oriented 20° east of north (rather than 5-10° east of north), is considerably larger than Ik'nal. Hum Chaak consists of two conjoining plaza groups (see **Figure 9.1**). The largest plaza group at Hum Chaak is elevated and contains three mounds with the southwestern side of the plaza open, similar in some ways to the configuration of Ik'nal. However, unlike Ik'nal, this elevated plaza group contains two sizeable mounds, not just one. The main elite residence at Hum Chaak is roughly equivalent to the size of Structure 1 at Ik'nal and it is located in the middle of the site, straddling the two plaza areas. Yet, it does not share a basal platform like the circular building and Structure 1 at Ik'nal. At Hum Chaak, the circular structure is located in the lower plaza area in the far northeastern corner of the site (see **Figure 9.1**). There is a low, elongated platform that extends off the southeastern edge of the circular structure that is oriented 20° east of north like the rest of the site. Despite the differences in site size and layout, this configuration is similar to the northern platform extension that was attached to the north side of the circular structure at Ik'nal. The position of the circular structures at both sites may have more to do with the orientation and location of the river. Both circular structures are located closest to the riverside and may mark the entrance to these sites, where a gap between structures would have allowed access into the plaza spaces.

Preliminary Analysis of Associated Artifacts

Preliminary analysis of the ceramics from Ik'nal suggests they are similar to the ceramic assemblage recovered from the circular building excavated at Hum Chaak (Harrison-Buck 2011). This shared ceramic assemblage contains types that resemble the so-called Ik'hubil Complex that dates to the Terminal Classic period, which I defined as part of my dissertation research in the Sibun Valley, located just to the south of the Belize Valley (Harrison-Buck 2007, 2012). In the Sibun Valley, the Ik'hubil assemblage was found associated with three circular structures. The presence of this ceramic assemblage at Ik'nal and Hum Chaak suggest that these two buildings are coeval with one another and those in the Sibun Valley, which date to the ninth century

Terminal Classic period (Harrison-Buck and McAnany 2013). Within the so-called "Ik'hubil Sphere" that appears to be present at sites across a broad area of north-central Belize (Harrison-Buck 2007, 2010), the primarily (highest frequency) types include: Sibun Red Neck jars, Roaring Creek Red and Dolphin Head Red serving vessels, and Kik Group types, such as Indian Creek Polychrome bowls and Fat Polychrome basins (see Harrison-Buck 2010 for further comparisons between the Sibun and Belize Valleys). In my most recent analysis of the ceramics from the circular structures at Hum Chaak and Ik'nal, I have found that Daylight Orange: Darknight serving vessels and Achote Black squat bowls also are quite common in the assemblage, perhaps more so than in the Sibun Valley assemblages. What is also notable is that Early Postclassic diagnostics are associated with the final phase of the circular structure at Ik'nal, which involved the infilling of the room (Structure 2-1st B). An Early Postclassic component associated with circular structures also recorded at sites in the Sibun Valley (Harrison-Buck 2007). This Early Postclassic component also appears to be present at Hum Chaak.

Other notable artifacts in the Ik'nal assemblage found associated with the circular structure include an abundance of obsidian (see Garland and Brouwer Burg, Chapter 11). Most of the obsidian ranges from black to gray in color, presumably from the El Chayel and Ixtepeque sources in Highland Guatemala. However, there was one notable piece of olive green obsidian that was found in Square T of Operation 13. This visually distinctive olive green obsidian is characteristic of the Pachuca obsidian source from the highlands of central Mexico. It is rarely found at sites in Belize, but a relatively high density of Pachuca obsidian was found associated with a circular structure at the site of San Juan on the northern tip of Ambergris Caye, Belize (Guderjan et al. 1989).

Along side the high density of obsidian (N=37 blade fragments), there were a large number of turtle shell fragments recovered in Operation 13, around the exterior of the circular structure and, particularly, inside the room of the building. The highest concentration of turtle shell was found inside the room of the building (Squares R and S) at the level of the interior room floor (Zones 7 and 8). Of the 45 fragments that were solidly identified as turtle shell, 25 of these pieces came from inside the room of the building, some of which comprised a partially reconstructable turtle carapace. The remaining turtle shell was found mostly found along the western side of the exterior of the structure in Zones 1 and 2 of Squares G, L, Q, and V (N=12). The distribution patterns suggest that in places farther away from the door of the building, the quantity and fragment size of the turtle shell appear to diminish. For instance, of the 12 fragments found on the western exterior of the structure, seven were found in Squares G, L, and Q (the squares closest to the door). The other five fragments were found in Square V and three of them were very tiny pieces. No turtle shell was found in Squares H, W, X, and O located along the northern, southern, and eastern sides of the exterior of the circular building. The one exception to this pattern is in Square T where eight pieces of turtle shell (along with the one Pachuca green obsidian blade) were recovered in the collapse debris.

There appears to be a similar pattern for the obsidian in that the highest concentrations (N=32) appear to be in or just outside of the building doorway of Structure 2-1st. Farther from

the doorway, the density of obsidian diminished, but the material (N=54) was fairly evenly distributed (N~10) in Squares H, Q, V, W, and T. Similar to the turtle distribution pattern, little to no obsidian was found in Squares G, X, and O (N=3). One marked difference in the distribution pattern is that very little obsidian (N=7) was found inside the room of the circular building whereas this context yielded the highest quantities of turtle shell.

Preliminary Interpretations and Concluding Thoughts

The presence of both turtle shell and obsidian in high densities may point to bloodletting activities taking place in or just outside of the circular structures. Elsewhere, Karl Taube (1988:189-193) suggests that turtle carapaces served as the locus of blood offerings during from Classic through Postclassic times. Perforators range from stingray spines to obsidian blades, but the latter are a more common bloodletting implement found in the archaeological record. Taube (1988:Fig. 7, 192-193) presents a number of Postclassic representations that explicitly show figures perforating their penis with bloodletting implements while standing on human-size turtles and he also points to some Classic period analogs found among the Palenque-style incensarios (see Rands et al. 1979:Figs. 3-5). He concludes, "[t]he imagery suggests that the participants situated themselves over the turtles so as to let blood directly upon the carapace" (Taube 1988:193). I suggest that in some cases, the actual turtle shells may have served as the receptacles for blood and this may be the case at Ik'nal. As male-male activities, bloodletting was conducted to honor important bundles of time, namely k'atun endings (roughly 20-year periods of time) and some argue that these period endings (often symbolized by turtle imagery) served to time events, such as warfare (Rice 2012; Taube 1988, 2004). The introduction of circular structures in places like the eastern Belize Valley were perhaps built and modified to honor important period-ending celebrations, like the k'atun, and may have served as a locus of bloodletting and warfare preparation. It is worth noting that the introduction of these buildings during the ninth century Terminal Classic period coincides with a time of increasing warfare in the Southern Maya Lowlands and the political decline of many Classic Maya centers.

Here, I have presented some preliminary data that suggests bloodletting activities, perhaps corresponding with important period ending dates in the calendar, was an important activity taking place in and around the circular structure at Ik'nal and possibly Hum Chaak. Additionally, evidence of censer wares deposited around the vicinity of circular structures in Postclassic times suggest these buildings continued to function as important special-purpose buildings in the local memory for a lengthy period of time. Our analysis of the associated artifacts of the circular structure at Ik'nal is still ongoing. Future investigations will continue to investigate more examples of this architectural form and its associated artifact assemblages. I will continue to compare the examples I have found in the Belize Valley with others from the Sibun Valley and elsewhere in the Maya Lowlands in an effort to better understand their range of function and significance across the Maya Lowlands from Terminal Classic through Postclassic times.

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Chapter 9

An Architectural Comparison of Circular Structures from the Belize and Sibun Valleys

Eleanor Harrison-Buck and Sara Quinn

In this chapter, we examine a pattern of circular shrine buildings, a distinctive architectural form found at three sites in the eastern Belize Valley (Ik'nal, Kak'nal, and Hum Chaak) and at three sites in the Sibun Valley (Pechtun Ha, Oshon, and Obispo), which is the river valley located immediately to the south of the Belize River valley. The three buildings from the Sibun are compared with two examples that have been excavated at the sites of Hum Chaak and Ik'nal in the BREA study area. The circular shrine at Ik'nal was the focus of excavation during the summer 2012 season (see **Harrison-Buck, Chapter 8**). The shrine at Hum Chaak was excavated during the summer of 2011 (Harrison-Buck 2011). As part of this study, we present the results of an analysis of daub carried out by Sara Quinn. This baked clay material has impressions and appears to have been used in the construction of pole and thatch buildings. The findings support the assertion that the superstructures of the circular buildings were primarily constructed of perishable materials. By plotting the concentration and distribution of daub found at Hum Chaak and Ik'nal, our aim was to better understand the construction of the building's superstructure and any shared patterns found in the Sibun and Belize Valley sites. A closer examination of baked clay pieces with clear stick impressions revealed the average size of the wood most commonly used in the construction of these perishable buildings, which were mounted on low, freestanding circular stonewalls. While there is some marked differences in the design of the substructures between the sites in the Sibun and eastern Belize valleys, we find there are sharp similarities in the layout and construction of the circular superstructures at these sites, as well as similar artifact assemblages, including the presence of marine shell and cave formations. Below we discuss these findings.

Architectural Styles of Circular Shrines

The circular architecture documented at sites in Belize are found at modest-sized settlements and appear well integrated into the sites plans, which often consist of one or more enclosed plaza groups with a main elite residence. At both Hum Chaak and Ik'nal, the circular shrines both had elongated platform structures extending off the "back side" of the circular structures with the doorways of the buildings facing the interior plaza spaces

(**Figures 9.1**). Circular shrine architecture is notably different from other structures in the Maya Lowlands, which tend to be rectangular in shape. Three discrete building types have been categorized elsewhere by Harrison-Buck (2012), based on her investigations of the circular buildings in the Sibun Valley. Type 1 structures consist of a simple circular platform with a cobble surface but not a formally plastered floor. It sometimes has an overhanging cornice and may or may not have a staircase leading to the top. Building Type 2 (**Figure 9.2a**) consists of a superstructure with low walls and a single doorway, measuring between 1-1.5m, leading into a small interior room with dimensions ranging from five to 12m in diameter. Encircling the base of the exterior walls is a plinth that bears resemblance to a low step (Harrison-Buck 2012:72). Circular shrines were constructed in a time associated with the "collapse" of the Classic Maya during the Terminal Classic period (A.D. 780-900). During this time, many Classic Maya centers were abandoned in the southern Maya Lowlands as the political and economic power of the urban royal Maya fell apart

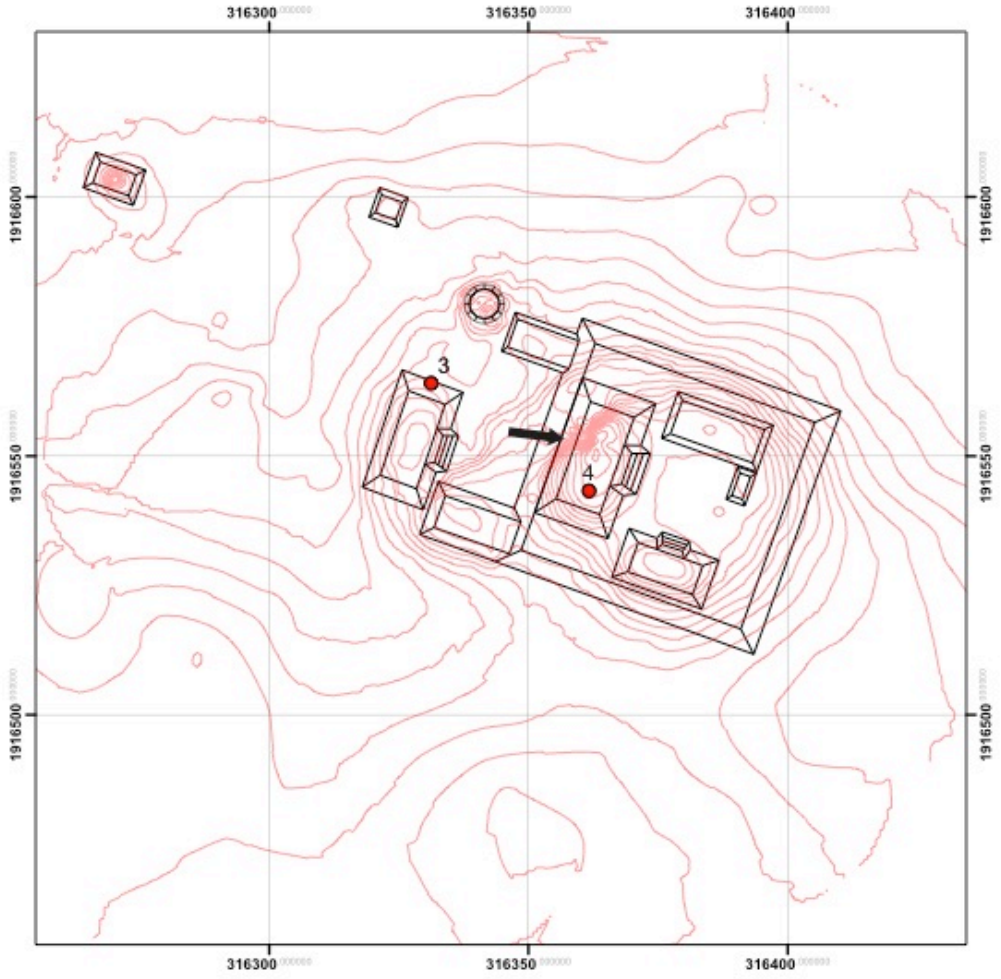
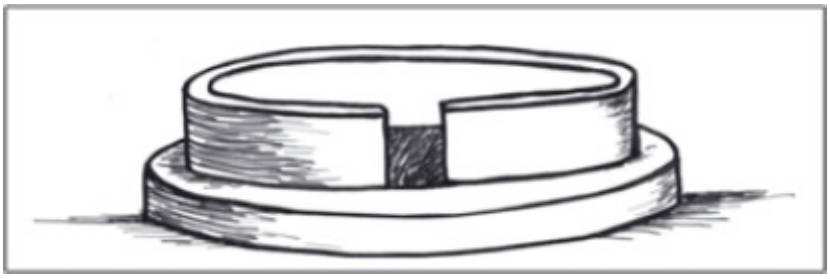
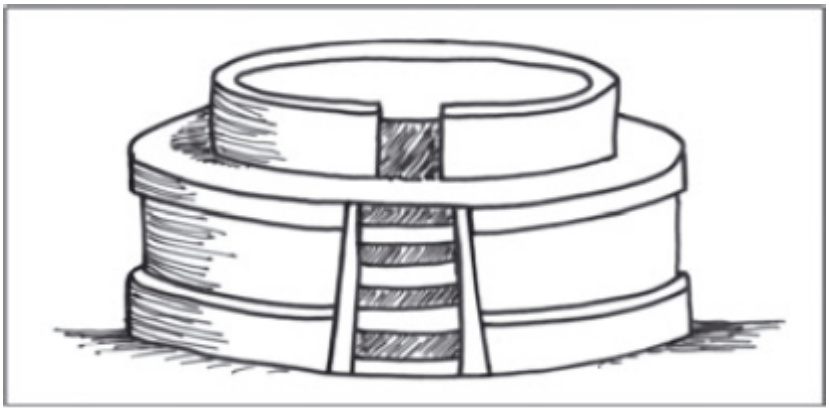


Figure 9.1. Site map of Hum Chaak (map prepared by S. Murata).

(McKillop 2006:97). Yet, the sites in Belize with circular shrines seem to survive somewhat longer and are not abandoned until the early tenth century (Harrison-Buck 2007). By the end of the Terminal Classic period, the interior rooms of these structures are "in-filled with large, loose cobble and boulder fill and transformed into a solid, round basal platform" which made up the final construction phase, referred to as Type 3 (Harrison-Buck 2012). In some instances, the stone seems to be reused from other parts of the site in order to build another circular superstructure of low stub walls on top of the in-filled circular platforms (**Figure 9.2b**).



a.



b.

Figure 9.2 (a) Type 1 and (b) Type 2 circular structures (*after* Harrison-Buck 2012:Figs. 5-6).

Neither Hum Chaak or Ik'nal yielded evidence of an earlier Type 1 simple circular platform. Excavations at Ik'nal did reveal an earlier circular structure, but this appears to be a mirror of the subsequent phase of the building, which is a Type 2 building, with a 75 cm wide doorway (**Figure 8.4**). The size of the circumference of the Type 2 buildings at both Hum Chaak and Ik'nal are relatively similar to one another, both measuring around 8 m in diameter. This size also aligns with the average size of the exterior diameters of other Type 2 buildings found in the Sibun Valley and elsewhere in the Maya Lowlands (see Harrison-Buck 2007:Table 3.1). There are a few differences between the Hum Chaak and Ik'nal structures. The interior

room of the Hum Chaak Type 2 structure measures 5.5 m in diameter and is slightly larger than the interior room of the Type 2 building at Ik'nal, which measures 4.5 m in diameter (compare **Figure 8.2** with Harrison-Buck 2011:Fig. 14.2). The difference in size is accounted for by the lack of a low plinth or step construction around the exterior of the Hum Chaak circular structure, which accounts for 1.60 m of the diameter on the Type 2 structure at Ik'nal. In addition, the freestanding low walls of the circular structure at Hum Chaak are about a meter in width whereas the walls of the structure at Ik'nal measure about 1.3 m thick. A similar degree of variability was noted in the wall thickness of the three circular buildings that were partially excavated at the sites of Pechtun Ha, Oshon, and Obispo in the Sibun Valley, where the size of the freestanding walls ranged from .90-1.25 m in width (see Harrison-Buck 2007:Table 3.1). Likewise, the width of the doorways of the Type 2 buildings ranged from 1m to .75m for Hum Chaak and Ik'nal, respectively. Similar variability was noted in the doorways of the Type 2 circular buildings in the Sibun Valley, where the width ranged from .7-1 m (Harrison-Buck 2007:Table 3.1).

The presence of a plinth or step found on the circular structure at Ik'nal is a common architectural feature of other Terminal Classic circular buildings throughout the Maya Lowlands, including the three examples from the Sibun Valley and other examples found at Nohmul, Uxmal, and Chichen Itza in the two early phases of the Caracol. Its absence on the circular structure at Hum Chaak is unusual. Another notable difference was that both the Type 2 circular structures at Ik'nal and Hum Chaak showed signs of rectangular substtructures, rather than a circular substructure, which is more commonly found elsewhere (Harrison-Buck 2007). These substructures may be part of the long platforms that extend off the back side of the buildings to create a somewhat enclosed plaza space (see **Figures 8.1 and 12.1**). Aside from these differences, the overall design, layout, and construction style of the circular structures at Hum Chaak and Ik'Nal are both very similar to one another and other examples from the Maya Lowlands.

While Type 3 architecture was difficult to define, particularly at Hum Chaak due to a large looters pit, the rooms of buildings were infilled with large, elongated limestone blocks and loose fill that was strikingly similar to the Type 3 structures found in the Sibun Valley (Harrison-Buck 2011:14.5). Like the structures in the Sibun Valley, the large doorjambs seemed to have been purposefully removed and used to block the entrance in order to retain the interior fill of the room (Harrison-Buck 2011:108). At Ik'nal, a smashed and scattered censer with an appliqued deity head (possibly God K) was found under and mixed within the debris that blocked the doorway of the circular structure, suggesting the possibility that the dismantling of the door jambs and the infilling event took place during the Postclassic, rather than Terminal Classic times (Harrison-Buck, Chapter 8). Further analysis of the ceramics found in the fill of the interior rooms may shed further light on the timing of the final phase of construction. It is worth noting that Early Postclassic censers and other ceramic material also was found associated with the circular shrines in the SIbun Valley (Harrison-Buck 2007). Therefore, we can say for certain that these sites were visited, if not occupied, through Terminal Classic and Early Postclassic times (ca. AD 780-1200).

In all cases, building material consisted of limestone cobble and boulders, as seen in the tumble debris and standing architecture, as well as daub. In closer examination of the daub found at Hum Chaak and Ik'nal, one is provided clues in relation to the original structure of the circular shrines. Multiple pieces have preserved impressions of sticks that were aligned side-by-side and held together by a thin rope-like material about 0.4cm thick. The average stick diameter at Hum Chaak being 1.55 cm, with the exception of a huge post impression that measures 5.8 cm. Ik'nal has far fewer samples of daub. The average diameter of these specimsns is 1.05 cm. Two pieces of daub at this site were notable for having a corner with two flat edges, which may indicate that the perishable structures at this site was more polygon in shape, rather than round. More samples are needed in order to confirm this hypothesis. A high density of daub also was found associated with the circular structures in the Sibun Valley. The bulk of this material was found on or around the exterior of the free-standing, circular low stub walls (Lopez 2004). In sum, the presence of daub provides firm evidence that the low stone circular walls supported a perishable structure, presumably capped with a pointed thatch roof. This is a more common roof type in central Mexico, rather than in the Maya Lowlands (Harrison-Buck 2012:70).

Harrison-Buck (2012:68) suggests that the "Sibun Maya shifted their political, religious, and economic focus away from the Petén heartland and developed some degree of interaction with Chichén Itzá." It is possible that the famous circular Caracol building at Chichén Itzá served as a template for other circular shrine buildings found across a broad area of the Maya Lowlands (see Harrison-Buck 2012:Figure 1). A recent re-examination of the ceramics from the Caracol building at Chichén Itzá provides a more refined chronology and suggests that the initial two construction phases of this building are associated with the Late Classic Yabnal-Motul Ceramic Complex (Perez Heredia 2012:392-393). This revised ceramic chronology lends support to the notion that the earliest phases of the Caracol are at least coeval (ca. AD 830) if not slightly earlier than the contexts from the Sibun and eastern Belize Valley.

Circular Shrines and the Local Landscape

The placement of most Maya sites correlate with the presence of certain natural resources found in the local landscape, such as water sources (McKillop 2006:181). This is the case for sites with circular shrines in Belize, which are all located proximate to rivers or other bodies of water (Harrison-Buck 2012:68). Although the Maya had a firm understanding of astronomical events, as can be observed in the Preclassic/Early Classic period E-group structure at Hats Kaab (Runggalider and Brouwer Burg, Chapter 7), there is no set orientation of circular shrines that align with celestial movements, such as the rising or setting sun. However, they do appear to be strategically placed, often positioned on high

promontories, perhaps in order to catch the strong winds at the onset of the rainy season (Harrison-Buck 2012:74).

These buildings not only appear well integrated into the site layout, but also connected with the "natural" landscape, including water and caves. Natural and artificially built features (i.e., pyramids as mountain-cave complexes) in the landscape were viewed not as symbolically separate, but as holding equal ritualistic importance as locations where humans and deities interact (Harrison-Buck 2012:66). In the Sibun Valley, the karst hills to the south of the river contain numerous caves that contain evidence of ancient Maya visitation and, like most of the caves in the upper Belize Valley, were primarily used during Terminal Classic times (Peterson 2005). Caves were viewed as points of entry to the underworld, Xibalba, and believed to house supernatural beings, such as the earth lord and the storm deity *chaak*. Cave rituals tied to these supernatural phenomena connect caves with rain and agricultural fertility. In the Sibun Valley, cave formations were found placed around the doorways of the circular shrines and, in some cases, worked into cut doorjamb stones, suggesting a purposeful selection and incorporation of cave speleothems (Peterson et al. 2005). Additionally, the presence of conch shell, most with their tips cut to function as trumpets, were found around the exteriors of the circular buildings in the Sibun Valley, as well as at Ik'nal and Hum Chaak. Circular buildings often are interpreted as "wind shrines" associated with the plumed serpent, Quetzalcoatl, and the conch shell is a key insignia of this god who also is associated with wind, water, and caves (Taube 2001). Harrison-Buck (2012) suggests that the cave formations and marine shell associated with circular shrines did not serve as merely symbols of this god, but were meant to embody the physical and audible presence of Quetzalcoatl—the generator of clouds, rain, and the annual cycles of agricultural fertility.

Although not circular in shape, a late period shrine at the coastal site of Punta Islote in the northeastern part of Yucatán contained marine shell as decorative architectural elements that served as musical instruments, which sounded when the wind blew (Schavelson 1985). It is possible that the shell on the circular shrines at the Belize sites functioned in a similar manner as architectural adornments and would sound in a trumpet-like fashion when the wind blew (Harrison-Buck 2012:72). While the circular shrines at Hum Chaak and Ik'nal did not reveal densities of marine shell that were as high as the Sibun contexts, our excavations of each circular structure revealed one or more whole conch shells with the apices cut, indicating their function as trumpets (see **Harrison-Buck, Chapter 8**). Likewise, some speleothems were found associated with the circular structures at both sites, also pointing to a connection between the shrines and caves as places of origin, creation, and agricultural fertility (Harrison-Buck 2012:73).

Conclusions

The shared patterns of marine shell and cave formations found at circular shrines in both the Sibun and Belize Valleys lend support to the notion that these were more than just "symbols" of sacred geography, but were seen as living entities and an expression of an animate landscape (Harrison-Buck 2012). The strategic placement near bodies of water and caves suggests an affiliation with these natural resources and features, for not only ritual but also practical purposes. Caves were seen as sources of rain and water and the rivers were the "highways" that facilitated canoe travel and socio-economic interaction between sites. The shared architectural style and layout of circular architecture between sites in the Sibun and Belize Valleys and across a broad area of the Maya lowlands as far north as Chichén Itzá reflects both local and long-distance interaction networks with some degree of direct communications. The evidence of northern influence in the southern lowlands suggests that sites with shrine buildings may have been involved in a growing circum-peninsular trade network that developed during the Terminal Classic period and may have been administered and controlled by Itza merchants stemming from Chichén Itzá and possibly the Gulf Lowlands (Harrison-Buck and McAnany 2013). These groups may have brought with them not only trade goods, but also the worship of plumed serpent wind god at the end of the Classic Period.

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Chapter 10

Excavations in Plaza A at Kaax Tsaabil (Operations 14 and 16)

Satoru Murata, Eleanor Harrison-Buck, Adam Kaeding, Astrid Runggaldier, Ana Maria Diaz Rocha, and Samantha Woods

Kaax Tsaabil is an extensive site comprising monumental architecture that has been carved into and built atop several limestone hills (see also Chapter 2). The area we call Kaax Tsaabil North is a series of structures related to one of the tallest of these hills, rising c. 15 m above the surrounding area. There are several low structures placed at the highest point of the hill, but most notably, the southwestern slope of the hill was intensively modified to create a series of terraced platforms, each one apparently serving as discrete plaza/plazuela groups. Of all the terraces and plazas that were built at Kaax Tsaabil, Plaza A stands out as being the most formally laid out, with structures constructed on all four sides of the plaza (**Figure 10.1**).

Plaza A is almost perfectly cardinally oriented, with the northern and eastern structures (Structures 5 and 6) displaying sets of staircases leading down to the plaza floor. The southern structure (Structure 7) juts out to the south, and there are two, very low structures that line the western edge of the plaza (Structure 8 and 9), with a "saddle" in between. This low saddle marks a corridor between Structures 8 and 9 and was the location of Operation 16 (**Figure 10.2**). Operation 14, a 2 x 14 m trench, was placed roughly on the center line of Structure 5, encompassing a small portion of the structure's summit and front (southern) side where excavations exposed a staircase running down into the plaza area. We noted on the surface of Structure 5 a single line of stones running roughly east-west, which appeared to demarcate the southern edge of this northern platform (**Figure 10.2**). No sign of any superstructure walls were detected on the surface or in our excavations on top of this sizeable platform, which was built up into the natural hillside. On the surface, several lines of stone were visible on the lower parts of the slope of the mound, indicating a frontal staircase leading down to the plaza, which may flank the entire southern side of Structure 5. It should be noted, due to a slight confusion in the site layout, Operation 14 was placed around 10˚ off-axis, which resulted in the upper squares being off-set to the east from true center axis.

Our overal goal of the excavations of Operations 14 and 16 were to elucidate the building styles, construction sequences, and possible functions of the structures within this prominent plaza group at Kaax Tsaabil. In Operation 14, specific aim of this excavation unit was fourfold:

1. To find the plaza floor and reveal any underlying construction in the southernmost squares (Squares F and G);
2. To expose the frontal staircase and the construction sequence thereof;
3. To find remnants of the superstructure, if present, on the summit of the platform;
4. To reveal any deposits associated with Structure 5 that might shed light on the

chronology of the site's occupation.

For Operation 16, our aim was to expose the two walls of Structures 8 and 9 and define their orientation and a narrow corridor that runs between them. We also were looking for midden or terminal deposits that are frequently found in corridor spaces at Maya site, which would help us to better understand the final occupation of the elite center at Kaax Tsaabil.

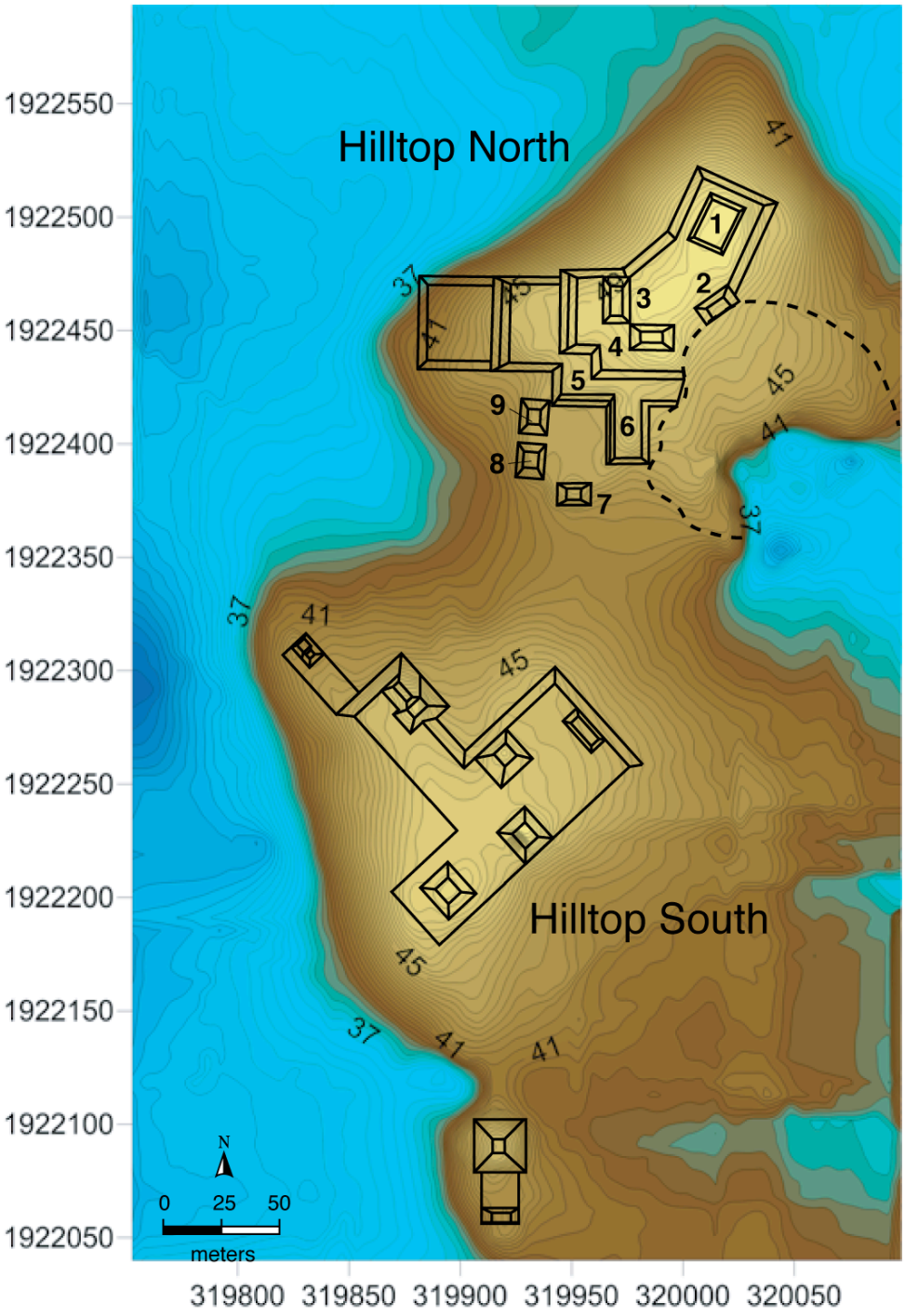

Figure 10.1 Site map of Kaax Tsaabil with Plaza A in Hilltop North (prepared by S. Murata and M. Brouwer Burg).

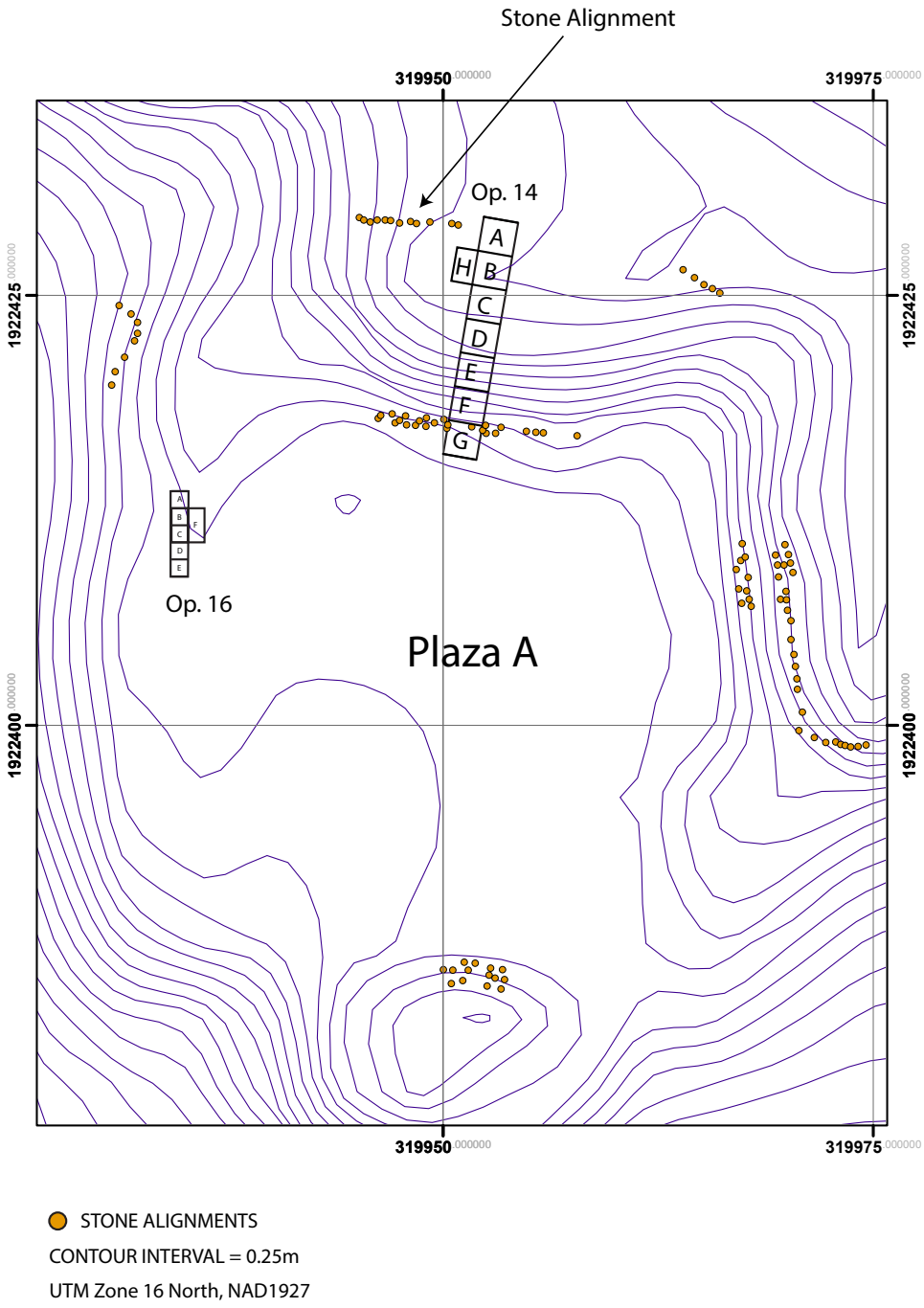

Figure 10.2 Close-up of Plaza A showing location of Operations 14 and 16 (prepared by S. Murata).

In this chapter, we summarize the findings from our excavations of Operation 14 and 16. We devote the most time to discussing the construction sequence revealed at the base of the stairs in Squares F and G, as well as a special deposit and overlying burial that was found on top of Structure 5 in Squares B and H of Operation 14. Since the excavation at the base of the stairs and that on top of the structure were, for all intents and purposes, different units, they are described below in discrete sections, with the exception of Zone 1. Following this discussion, we provide an overview of Operation 16, located on the western side of this same plaza, in the corridor between Structures 8 and 9.

Operation 14: Plaza Floor and the Staircase of Structure 5

Here, we describe the excavation zones in the lower squares (Squares E through G), with a special focus on Squares F and G where we encountered the plaza floor and its interface with the frontal staircase.

Zone 1

Zone 1 is the only zone that was shared across all squares in the operation, including both the lower (plaza/stair) and upper summit of the mound. Zone 1 is the topsoil that covers Structure 5 and the plaza floor. Topsoil development seems to be minimal in Squares E and F, with many of the stones of the southern staircase exposed, while thicker in Squares A - C and G toward the top of the mound where less stone collapse was encountered at the base of Zone 1. On the top of the mound, Zone 1 measured between 5-10 cm in thickness and at the bottom of this zone in Squares A, B, C, and D we encountered a pebbley surface (Zone 6) that may be the remains of a platform floor of Structure 5. Below we detail the excavations of Zone 1 across the unit.

The topsoil zone in Square A was 5 to 10 cm thick with many inclusions of fresh water snail shell and roots, a low density of artifacts but some large sherds and an obsidian blade. Zone 1 was removed in the area to the south of the stone alignment. We terminated this zone when we reached a pebbly level. The topsoil also was removed from the area to the north of the east-west line of stones, but here we came down to a level with white speckled inclusions that was slightly more clayey than other areas of Zone 1. Here, we defined a series of limestones that seem to be resting on another surface that is lower than that on which the stones in the southern part of the square lie. Most interestingly, the line of boulders in the southern part of Square A are clearly associated with the stone alignment visible on the ground surface (see **Figure 10.2**), but the east-west line of stones exposed in the excavation were off-set from the rest of the stone alignment by about 30 cm to the south, but *only* in this square. Limited horizontal exposure and poor preservation of the wall(s) make it difficult to say with certainty if this outset wall is the remnants of the southern-facing staircase (exposed in Squares E-G and discussed below – see **Figure 10.3**) or represents the remains of a superstructure that once stood on the summit of Structure 5 or, simply marks the interface with the terrace to the north that leads to the uppermost hilltop plaza (see Figure 10.1). The second scenario—a superstructure wall—seems less plausible because no parallel southern wall was detected on the surface of the mound or in excavations of Squares C or D where it would be expected if it existed

In Square B, only one large cobble of c. 30 cm in length was found next to the eastern wall of Square B and around 1.5 m away from the northern edge of the excavation unit. Zone 1 came down to a pebbled surface around 5 - 10 cm below the ground surface. As noted above, this pebbely surface is similar to the surface encountered at the southern end of Square A and may be the remains of the platform floor. Zone 1was terminated at this point. The surface was mostly made up of pebbles 3 - 5 cm in size, though some of the stones were cobbles around 15 - 20 cm in size, suggestive of a ballast-style floor construction.

Zone 1 in Square C was a little thicker than that of Squares A and B, measuring around 15 - 20 cm in depth. At the bottom of the zone we encountered the same pebbly

surface that was found in Squares A and B. As noted above, no parallel line of stones corresponding to that found to the north was present in Square C or in Squares D further to the south. Here, we removed about 5-10 cm of topsoil and encountered the same pebble-cobble surface, at which point we terminated the zone. Thus, it appears that the line of stones in Square A is neither the front nor back wall of a superstructure. The pebbly surface seems to continue unabated for another 70 cm or so south from Square C into Square D, at which point the mound slopes down (**Figure 10.3**). The southern half of Square D dipped down following the slope of the mound; however, the pebbly surface below traces this slope. No retaining stones or remnants of stairs were found in this square.

Zone 1 in Squares E and F consisted mostly of loose gravel/sand rather than the silty-clay found in the other squares. It was brought down to collapse in Square E, composed of only a few cm of the topsoil. The collapse consisted of small cobble-sized stones. One intact stone step—most likely a tread—was found in the SE quadrant of the square. Besides the above, there were six large stones and a large number of smaller stones in the north quadrant, all following a similar slope as seen in squares D and F (**Figure 10.3**). Zone 1 Square F was more or less the same as that in Square E, with the depth of the topsoil being slightly deeper. Artifact density was very light in both Squares E and F, consiting almost entirely of small pottery sherds.

Zone 1 in Square G consisted of loose burnt organic material, limestone pebbles, some collapse (cobble sized stones), and many roots. The bottom riser stones were found in the northern portion of the square, facing south into the plaza. The risers of the basal step that rested on the plaza floor were approximately 40 cm high and 90 cm wide.

Zone 2

Zone 2 is collapse comprising loose gravel/sand, with small-to-medium sized limestone pebble inclusions. The dimensions of the zone are 2 m E-W x 1.20 m N-S in Square G only with a depth of around 10 - 15 cm. The north end of the zone is 80 cm from the north wall of square G. The artifact density was light with some pottery sherds and lithics. It should be noted that what was collected as Zone 2 Square E in the field actually corresponds to Zone 11, collapse debris from the staircase (discussed further below).

Zone 3

Zone 3 appears to be ballast of the final construction phase of the plaza floor (now eroded) featuring pebble inclusions larger than those in Zone 2. The zone abuts, and therefore is associated with the bottom riser stones of the staircase. Artifact density was extremely low for the zone (N = 3), in a depth of around 15 cm. At the bottom of Zone 3, we encountered a plaster floor that was eroded on the east side of the operation but fairly well-preserved on the west side.

Zone 4

Zone 4 is an earlier plaster floor, which was better preserved than the Zone 3 floor, but relatively thin, measuring around 2 cm in thickness. This floor runs underneath the bottom riser of the staircase, suggesting that it is associated with an earlier construction phase. A portion of of the floor (approx. 86 cm running E-W) was left intact as a sample.

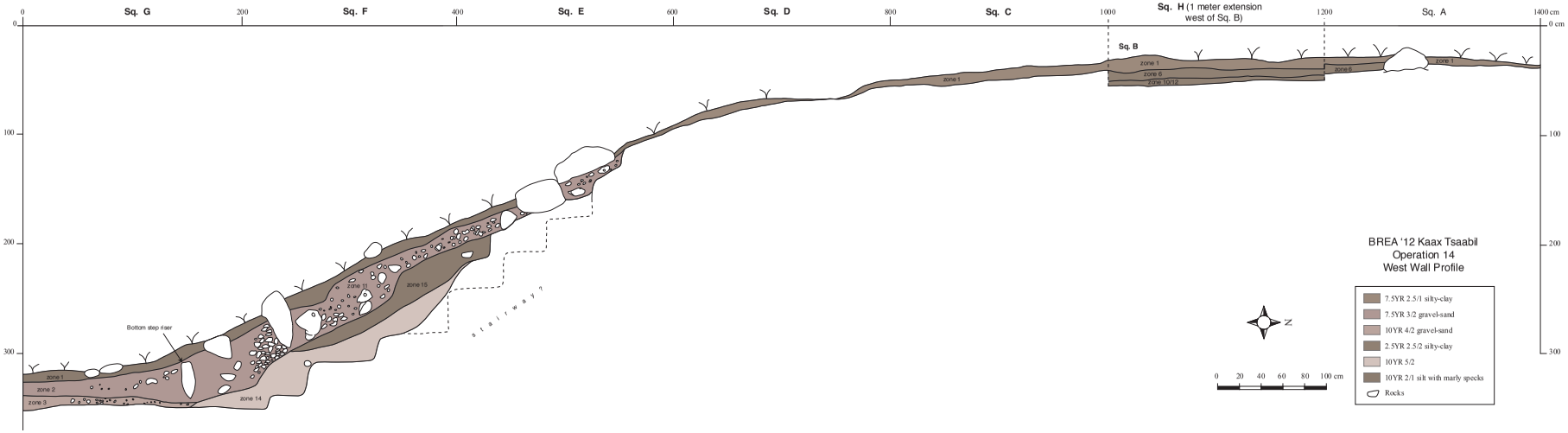

Figure 10.3 West Profile of Operation 14 (digitized by M. Brouwer Burg).

Zone 5

Zone 5 is the ballast of the Zone 4 plaster floor. The top of the zone consisted of pebbles and cobbles, and at around 12 cm down (c. 125 cm below datum), we hit groundwater, which continuously refilled the pit with water as we emptied it.

Zones 7 and 9

Directly underlying the Zone 5 floor ballast is a layer of construction fill comprising cobbles and large boulders that we began removing as Zone 7 in Square G. The water inundation continued to be a problem and buckets of water had to be removed during the course of excavation. In order to see if there weare any more cultural strata below this water table, we excavated a posthole (Zone 9) another 50 cm roughly in the middle of Square G. The first 20 cm was a light brownish gray (Munsell value: 10YR 6/2) soil/sediment, and the next 30 cm was a black (Munsell value: 10YR 2/1) soil/sediment, both appearing to be natural strata with extremely low artifact density. We reached the culturally sterile bedrock at 171 cm below datum, at which point excavation was halted (**Figure 10.4**).

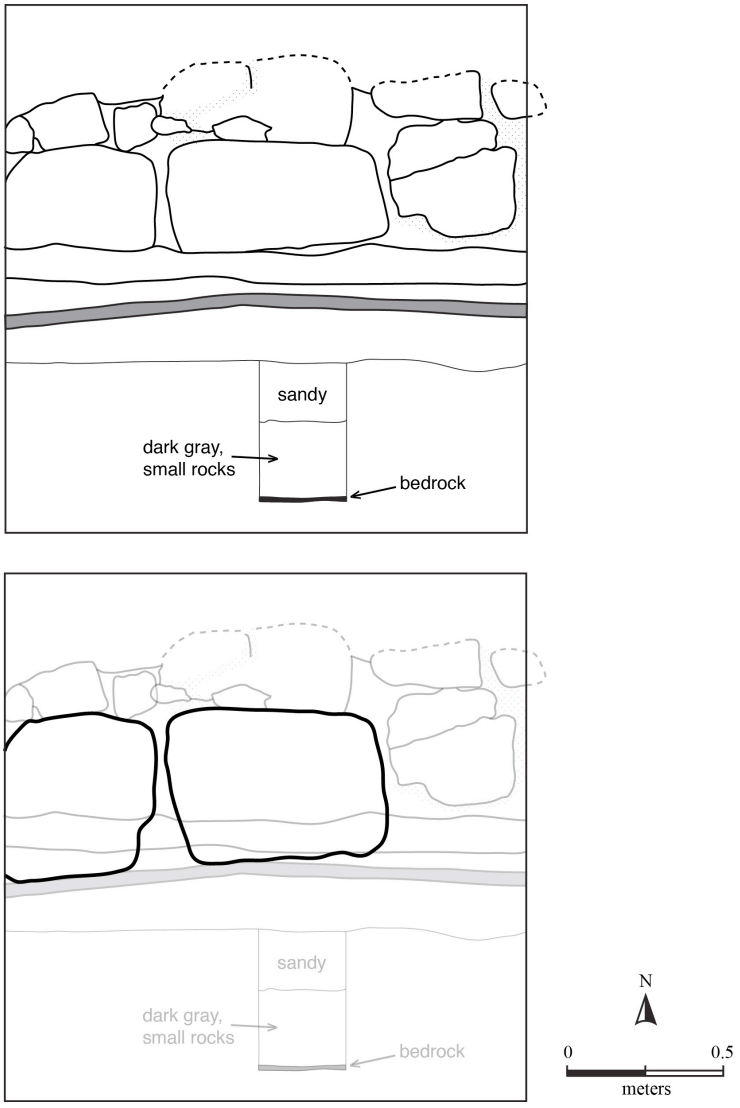

Figure 10.4 Profile of Square G in Op. 14 showing stair risers and posthole excavation (digitized by M. Brouwer Burg).

Zone 11

Zone 11 is the collapse of the staircase and the loose dark fill underneath found in Squares E, F, and G (note that in Square E, it was incorrectly excavated as Zone 2). The collapse was removed, after which the underlying fill was excavated until a texture change was noticed after around 30 cm in Square F, which was designated Zone 14. Square G came down to Zone 14 after around 50 - 60 cm. Artifact density was very light at less than 1 artifact per 12 L of earth in Square F.

Zone 14

Zone 14 was excavated in in Squares F and G and distinguished from the overlying Zone 11 by its lighter and denser soil/sediment, with a grayish brown color. Because our excavation was conducted from the bottom up, it was discovered earlier and designated a smaller zone number than Zone 15, which, in the upper part of the excavation, clearly overlies Zone 14. After around 15 cm of excavation, we encountered what appeared to be a plastered surface or soft limestone. This new stratum seemed to form several steps, thus, suggesting that it represents the stairs of an earlier building. This substructure is perhaps associated with the earlier plaza floor surface of Zone 4 identified in Square G. Unfortunately, no facing stones were found in association with the earlier staircase, which may indicate that all of them were purposefully removed at the time of reconstruction. Artifact density was extremely light again, at less than one artifact per bucket in Square F.

Zone 15

Zone 15 was also collapse debris that overlies Zone 14 and is distinguished from this zone (which lies below it) by its darker color (Munsell value: 10YR 2/1). The presence of fewer inclusions in Zone 15 distinguishes it from Zone 11, which overlies Zone 15. The marley inclusions in Zone 15 originally led us to believe that some sections of this zone constituted steps of the earlier substructure, but it was later determined that the entirety of the zone was slopewash (**Figure 10.3**). Artifact density was quite light, but with greater variety of artifacts than previous zones, including potsherds, rims, animal bone, and terrestrial gastropods. The zone was terminated after reaching a stratum with a different matrix, identified as Zone 14 (discussed above), which was found earlier in the lower part of the square.

Operation 14: Elite Structure and Associated Special Deposits

Here, we describe the excavation units in the upper squares (Squares A through D and the Square H extension on the summit of the mound). Special attention is give to Squares B and H where we encountered an articulated burial and a cache deposit of pottery (and one stone tool) that partially overlay the skeleton and appeared to be related.

Zone 1

Zone 1 is described above.

Zone 6

Zone 6 is a 10 – 20 cm thick pebble/cobble matrix that appears to be the remains of a floor surface found just below Zone 1 in Squares B through D, and the southern edge of Square A (south of the east-west wall visible on the surface and described above). Zone 6 is underlain by a stratum of larger, cobble-sized stones, Zone 10, which is likely represents the ballast of the floor. There was a dramatic increase in artifact density, with many large potsherds found mixed in with the pebbles as well as at the interface between the pebbles and the underlying cobble surface. Notably, in Square B, we found relatively large cobbles and boulders dispersed around the unit without creating any discernible lines indicative of a wall. Three boulders were found clustered near the center of the east wall of Square B, between and around which a concentration of pottery was deposited. A similar cluster of large cobbles/small boulders existed near the center of the western wall of Square B, although artifact density around it was not as high.

In retrospect, these two clusters of large boulders may have been associated with two special deposits—a cache (**Figure 10.5**) and a burial (**Figure 10.6**)—which are discussed below (see Zones 13 and 16, respectively). Based on the cross-section drawing of Square H (**Figure 10.6b**), the cache deposit and the burial pit likely cut into the Zone 6/10 floor and may not have been capped but demarcated by the boulders, noted above. Part of why these deposits were not fully recognized until Zone 12 is because the fill surrounding the cache and the burial resembled the fill of the floor and ballast and there was no obvious color or texture difference defining a discrete pit feature until we encountered the Zone 12 earthen layer that was devoid of limestone inclusions. The Zone 13 cache partially overlays the burial deposit, which was deposited first. The Zone 13 cache pit and the Zone 16 burial pit both appear to have intruded into Zones 6, 10, and 12. These zones (10, 12, 13, and 16) are described below.

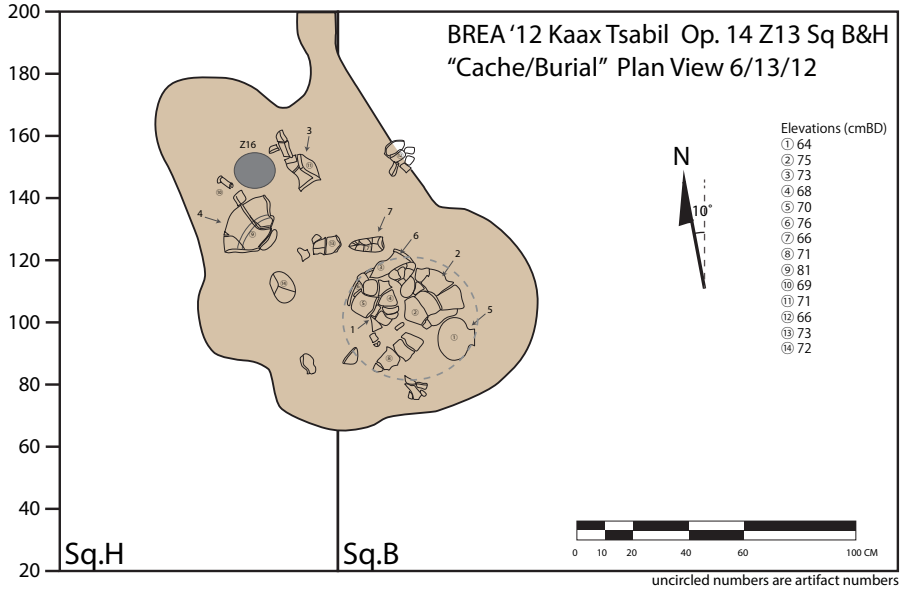

Figure 10.5 Planview of Zone 13 "cache" deposit (digitized by M. Brouwer Burg; modified by S. Murata).

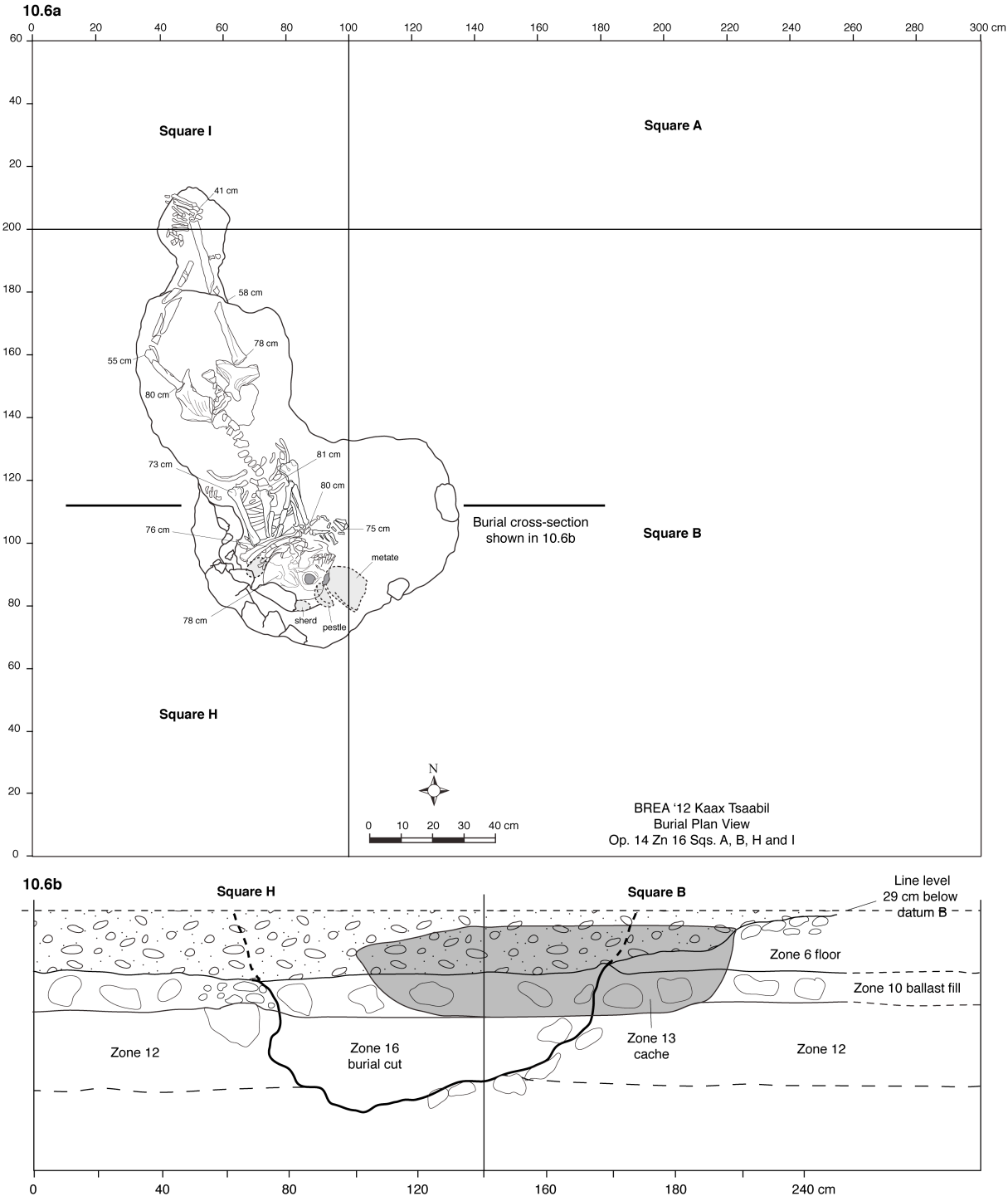

Figure 10.6 a) Planview of Zone 16 burial and b) Profile of Squares H and B (digitized by M. Brouwer Burg).

Zone 10

Zone 10 is a cobble fill around 8 - 10 cm thick that underlies the Zone 6 floor surface found in Squares A, B and H, but only excavated in Squares B and H. If Zone 6 was the eroded remains of a plaster floor, this zone would be its ballast. Artifact density was light to medium comprising an assemblage of artifacts similar to those from Zone 6. The large cobbles and boulders first noted in Zone 6 that comprise Zone 10 end at the bottom of this zone, after the removal of which, a flat earthen stratum (Zone 12) was revealed.

Zone 12

Zone 12 is a flat, semi-compact earthen layer that may be associated with an earlier phase of construction or represents the core fill of the Structure 5 platform. We did not expose the entirity of this layer and its total depth is unknown. Vertical excavations were limited due to the discovery of two special deposits, a cache of pottery vessels (Zone 13) and a rather informal burial of a single articulated individual (Zone 16), which was partially covered over by the smashed deposit of ceramics. Two C14 samples were retrieved from Zone 12, one from the screen and one from the northwest corner of Square B at the interface of Zone 10 and Zone 12, c. 42.5 cm below datum. The latter should be a good candidate for radiocarbon dating, as it is from a relatively sealed context (below ballast) and associated with the Zone 13 special cache deposit. Analysis of the artifacts for Zone 12 has yet to be understaken, but it should be noted that 192 L of soil/sediment were excavated from Square B before it became clear that Zone 13 was an intrusive layer, concentrated near the western edge of the square (and extending into Square H). Thus, many of the artifacts in this zone may, contextually, belong with those of Zone 13. There were several relatively large pieces of pottery scattered across the top of the Zone 12 earthern layer that are associated with the Zone 13 cache deposit, seemingly broken *in situ*, suggesting that they were scattered prior to covering it with (or as part of) the Zone 10 ballast. Alternatively, the cache may have been an intrusive deposit placed in the Zone 6/10 floor, which was previously cut into by the Zone 16 burial and neither were ever formally capped by the Zone 6/10 floor, but simply marked by the large cluster of boulders.

Zone 13

Zone 13 was first recognized shortly after the removal of the large cobbles found in Zones 6 and 10 near the western edge of Square B and the subsequent levelling and cleaning of the top of Zone 12. At this point, the sidewall of a complete vessel (artifact 5; see Figure 10.5) was exposed. The vessel was but one component of what turned out to be a cache of artifacts scattered across the instrusive feature in an area roughly 1 m x 1 m, including at least six different vessels and one complete bifacial stone tool (**Figure 10.5**). Preliminary analysis suggests these vessels likely date to the Terminal Classic period (ca. AD 800-900). Since this important cache deposit clearly extended to the west outside of Square B, we decided to expand the excavation unit another 1 m to the west, and called it Square H. Square H was taken down to Zone 13, following the stratigraphy elucidated in Square B, after which the intrusive feature was almost fully outlined. We found a few fragments of what appeared to be human bone in Square H of this zone alongside pottery.

Our assumption was that this deposit was either a cache or grave goods associated

with a burial lying underneath. Thus, following full exposure, photography, drawing, recording of elevation data, and the careful removal of the artifact scatter, excavation continued below the area of highest artifact density (see the dashed circle in **Figure 10.5**) in search of any human remains. Surprisingly, nothing was revealed, and after c. 20 cm of further excavation, we reached what appeared to be another cobble layer, perhaps from an earlier construction phase. In order to bring closure, we decided to excavate the entire intrusive feature down to this level, at which point we came across a human mandible farther to the west and determined it was a burial feature, but seemingly a separate deposit from the cache. Subsequently, the burial was removed separately as Zone 16, discussed below.

Zone 16

Zone 16 was a burial. The single interred individual was in an articulated, extended, supine position (**Figure 10.6a**). The pit comprising the body was roughly 1.6 m in length, and the width was at its maximum around 80 cm. Construction core/ballast was present in the southwestern end of the pit, suggesting that the pit was dug into Zone 6/10 floor. Elevation data shows that the cache of pottery encountered in Zone 13 was placed just above the level of the interred body (i.e, around 70 cm below datum) and slightly offset east of the body, suggesting that these two deposits should be viewed as possibly discrete activities. Typically, associated grave goods are placed directly overtop or in close association with the body, but this is not the case here. Only a few broken artifacts were directly associated with the body, including a large fragment of a metate that may represent fill rather than any purposeful grave good. Overlaying the planview drawings of Zones 13 and 16 shows that the bulk of the ceramics from Zone 13 were positioned to the east of body, with the exception of a dish (artifact 4), which appears to have been placed roughly over the abdomen but were separated by about 20 cm or more of fill (**Figure 10.7**). The deposit of ceramics, which we are tenatively calling a cache, contained a series of inverted vessels suggestive of a termination event, which evidently came after the burial of the skeleton. Although it is possible that the cache and the burial are part of an extended termination event, at this point it remains unclear how far apart in time these events took place.

A large (~20 cm) metate fragment and a pestle were placed immediately in front of the face of the interment. The incisors of the individual had been filed into a T (*ik*) shape, suggestive of high-status. A full osteological analysis is required to determine the individual's age and sex. The head of the deceased pointed roughly due south, and faced east. The arms were raised up near and to either side of the skull. Perhaps most interestingly, though the individual was extended and supine, it did not lie on a flat surface. Rather the skull, torso, and pelvis were largely on the same level, but the legs extended upward bending again at a roughly 40 degree angle at the knees. At the very simplest level of analysis, this suggests that this individual was interred in a pit that was essentially too small. Admittedly, the "cut" of the burial pit was not all together clear and the position of the burial leaves open the possibility that there was no formal burial pit, but rather, this represents an individual who died on the surface of a stepped platform and that perhaps his or her legs are propped up on a step that lies underneath. Further excavation of is needed to clarify the wider context of the Zone 16 "burial" and the overlying Zone 13 "termination cache." Additional speculation from this point should also appropriately await a more complete analysis of the human

remains and associated artifacts, but it seems fair to consider that this seemingly elite individual, in a clearly elite context on top of Structure 5, was not interred in a particularly prestigous fashion as one would expect of a revered ancestor.

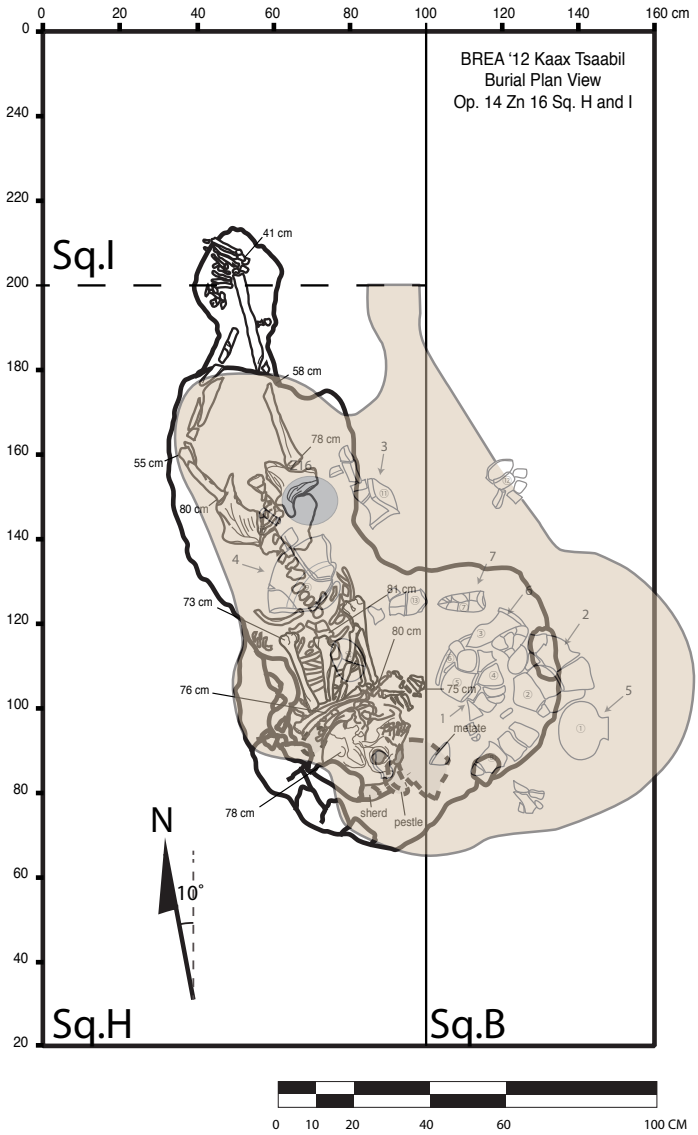

Figure 10.7 Planview of Zone 13 superimposed over Zone 16 burial (digitized by M. Brouwer Burg).

Given project time constraints, we were restricted to the full investigation and careful removal of this burial feature alone. As a result, we have not yet had an opportunity to examine the wider context of the burial in reference to the surrounding area at the top of the mound. Expanded excavation is planned in the future and could potentially reveal more burial deposits or other related features particularly to the west towards the central axis of the building.

Operation 16: Investigations of a Corridor between Structures 8 and 9

Operation 16 was an excavation unit located in a corridor between two low platform buildings (Structures 8 and 9), which line the western side of Plaza A at Kaax Tsaabil just to the west of Operation 14 (see **Figures 10.1 and 10.2**). The excavation unit was oriented cardinally and positioned in such a way so as to expose the north and south walls of Structures 8 and 9, respectively (**Figure 10.2**). Excavations revealed both walls, which form a narrow ~1.5 m wide corridor between the two buildings, and demonstrated that the orientation of these two buildings are not exactly cardinal, but are both oriented roughly 30˚ east of north (**Figure 10.8**). Despite the building orientation, Operation 16 was laid out cardinally and consists of a relatively small unit comprising a series of 1 x 1 m squares (A-E) and an extension of a 1 m E-W x 2 m N-S unit (Square F) that extended off the east side of Squares B and C. While Zone 1 was excavated in Squares A-C and F, due to limited time, only squares B, C, and F were excavated beyond this depth and no excavation was carried out in Squares D and E. Below we describe the zones (1-5) of excavation in Operation 16.

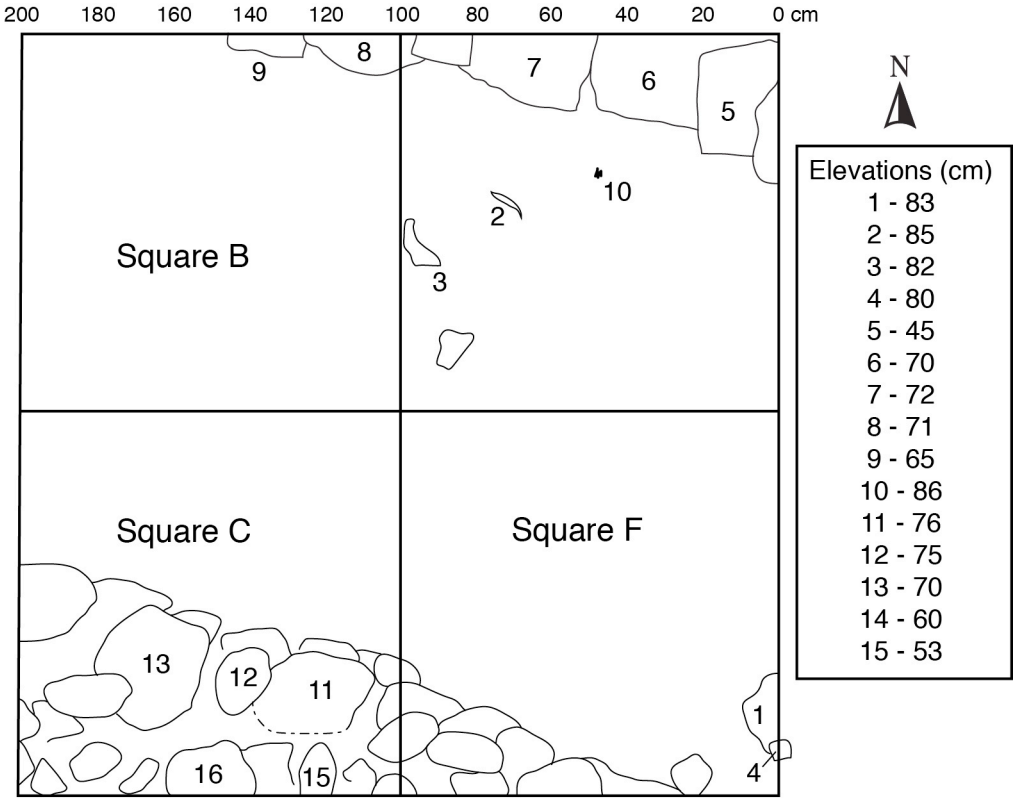

Figure 10.8 Planview of Operation 16 showing walls of Structures 8 and 9 (digitized by M. Brouwer Burg).

Zone 1

Zone 1 was excavated in Squares A-C and F and comprised a thin (~10 cm deep) topsoil that covered the mounds. The matrix consists of small stones and many medium to large sized stones with large pottery rims on this surface context, particularly in Square A,

which may be because this square is technically on mound and is overlying the southern end of Structure 9 (see **Figures 10.1** and **10.2**)

Zone 2

Zone 2 is the collapse debris inside the corridor and we removed roughly 20 cm of the collapse debris in Squares B, C, and F. At the base of Zone 2 in Square B we had defined five medium sized stones in a roughly east-west linear arrangement that we thought might be a wall formation, but they turned out to be collapse debris falling from the southern wall of Structure 9. We continued to excavate Zone 2 collapse in Square C to see if we could find evidence of another (parallel) wall of the corridor. At the base of this zone the northern wall of Structure 8 was firmly identified and partially defined in Square C. As we excavated the Zone 2 collapse in Square F, we were able to define a portion of this same northern wall of Structure 8 extending to the east, although it quickly runs at an angle outside of Square F, this due to the building orientation, which is not cardinal (see **Figure 10.8**). Zone 2 in Square F contained a similar density of collapsed limestone from the walls of Structures 8 and 9.

Zone 3

We continued to excavate the collapse debris inside the corridor as Zone 3, which consisted of large limestone cobbles and boulders. In Squares B and F, we still had no sign of the southern wall of Structure 9, even at the base of Zone 3. This wall had evidently collapsed more than the northern wall of Structure 8. However, we did find a dense array of artifacts in Zone 3 of Square B. Artifacts recovered include human bone, animal bone, chipped tool fragments, debitage, fresh water/snail shell, marine shell, and pottery. In Zone 3 of Squares C and F, we continued to clear down the collapse debris and further defined the northern wall of Structure 8.

Although at the base of Zone 3 in Square F, we still were unable to define an intact wall in the northern half of the square (where we anticipated the northern edge of Structure 9 to be), we did recover a high density of artifact debris in what we have been calling "collapse." Several diagnostic sherds were noted and mapped on the planview (**Figure 10.8**), including an unusual incised flange of a ceramic pot that looks like it could date to the Terminal Classic-Early Postclassic transition (ca. AD 800-950). Other interesting deposits of artifacts in Zone 3 were found in the southeast corner of Square F, also noted on the planview map (**Figure 10.8**). Here, a concentration of smashed ceramics, possibly representing a whole vessel that once stood upright, was found in pieces. There was associated human bone located where the inside of the vessel would have been, suggesting this interment may have been located inside the vessel. The vessel does not appear to be resting on a floor surface and it is clearly floating in what has been interpreted as collapse. Its location suggests that these materials were not part of a formal burial or at least not in their primary context. It is possible the vessel and its contents fell from somewhere else as the buildings collapsed. Alternatively, it is possible the debris inside the corridor was a purposeful in-filling event, similar to termination activity documented at other Maya sites, such as Hershey in the Sibun Valley, located just to the south of the Belize Valley (Harrison-Buck et al. 2007). It remains debatable whether the deposit was placed on top of existing debris in the corridor and

smashed purposefully at the time of deposition or fell there as a result of "natural" wall collapse.

Zone 4

Zone 4 consists of collapse debris, which was only removed in Squares B and C. Due to time constraints, Square F was not further excavated. Excavations of the Zone 4 collapse cleared both squares down to the level of about 120 cm below Datum A. Our excavations in Square B finally revealed the remains of an intact wall representing the southern end of Structure 9 that runs exactly parallel with the northern wall of Structure 8, which form a corridor between the two platforms that measures roughly 1.5 m wide (**Figures 10.8 and 10.9**). At the base of Zone 4, no floor was clearly visible and the wall stones appear to continue down. Unfortunately, time did not allow us to continue to excavate down to the floor and only a posthole was dug any further in Square B (see Zone 5).

Zone 5

Zone 5 was a posthole excavated in the center of Sq. B extending roughly 25 cm in depth to determine if a floor was present further below Zone 4. The posthole yielded a high density of artifact material suggestive of a midden or terminal debris possibly overlying a floor inside the corridor. However, at the base of the zone no floor was readily apparent. Due to time constraints, excavations of Operation 16 ceased at this point but hopefully investigations will continue in this area of Kaax Tsaabil in future seasons and clarify the nature of the debris inside the corridor between Structures 8 and 9.

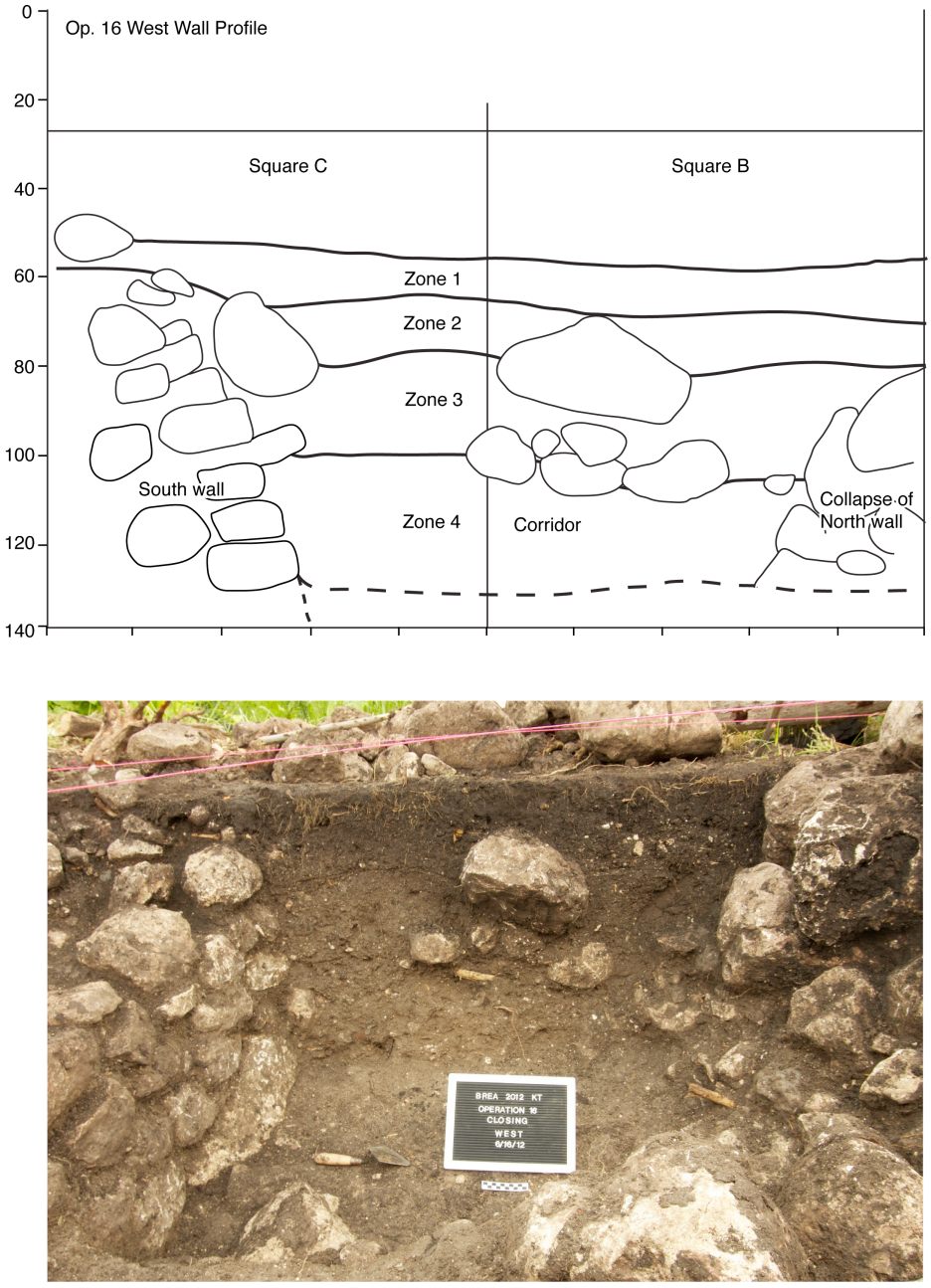

Figure 10.9 Profile of West Wall of Operation 16, Squares B and C (digitized by M. Brouwer Burg; photo by E. Harrison-Buck).

Conclusions

In keeping with the goals expressed at the beginning of this report, we were able to elucidate some components of the construction sequence of this locale, and the occupation history of the site of Kaax Tsaabil. In Operation 14, a plastered plaza floor (Zone 4) was identified in Square G, and there was evidence of another, less well defined, surface above it (Zone 3). Not far below the second surface was the water table, likely within the natural stratigraphy of the hillside. The staircase of the final construction phase was clearly defined, at least for the bottom step, with its large riser facing stones. What may be the deteriorated

remnants of a staircase associated with the penultimate construction phase of Structure 5 also was found in Operation 14, although its facing stones seem to have been purposefully removed prior to the final construction phase that rebuilt the staircase. Although ours excavations were limited in terms of vertical exposure due to time and the watertable, our investigations indicate just two phases of construction and suggest that the occupational sequence at this locale was relatively short, although further evidence is needed to thoroughly assess the overall chronology.

We were not able to clearly identify architectural remains of the superstructure at the top of the stairs. The fact that the burial in Square H was almost precisely on the primary axis at the highest point on the structure, and also that the east-west stone alignment originally identified on the surface to the north of the burial was not replicated on the south side (i.e., enclosing the burial) may suggest that the superstructure, if it indeed existed, was of a highly perishable nature and, therefore, may not represent a main elite household. Further excavation may reveal that east-west line of stones represents the start of another staircase leading up to the uppermost plaza of the northern hilltop. If so, Structure 5 and 6 may have served as intermediate terraces and their staircases may have faciliated the movement of elite between Plaza A and the uppermost plaza. In the mean time, the cache deposit and human remains in Zones 13 and 16 suggest that the inhabitants (whereever they lived) were of high status. As noted above, preliminary study of the ceramics from the cache deposit suggests a Terminal Classic date. Further excavation of the burial context and osteological study of the human remains may also reveal more about the deceased, its relationship (if any) to the cache deposit, and the circumstances surrounding his or her death.

There seems to be little reason to believe that the occupational sequence at Op. 14 extends very deep. If excavation should be reinitiated at this locale, a fruitful avenue may be to instead focus on a broader horizontal exposure on top of the stairs—i.e., extending along the transverse axis from Squares B and H. The midsection of the frontal staircase showed little promise either in terms of well-preserved final construction phase architecture or in terms of a well-preserved substructure. A lateral trench abutting the bottom riser stones—i.e., extending east and west from Square G—to the corners with the eastern and western range structures may provide additional architectural and artifactual data to complement our 2012 findings.

Hopefully, future investigations will continue to clarify this area of Kaax Tsaabil. The two excavations have provided more questions than answers concerning the site's occupation and final hours just prior to its abandonment. Further investigations may help to clarify the nature of the dense artifact debris found in Operation 16 inside the corridor, associated with its final occupation. Does this represent a midden deposit or is it perhaps the remains of a termination deposit inside the corridor, which elsewhere are linked to conquest-related events? How does this terminal deposit relate at all with the two enigmatic deposits found on the summit of Structure 5, which may point to a violent termination of the site that was accompanied by the sacrifice of an elite individual who was never given a proper burial. Future investigations will hopefully shed some further light on these provocative finds from the summer 2012 season at Kaax Tsaabil.

References Cited

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2007 Empowered and Disempowered: Terminal Classic Maya Burial and Termination Rituals in the Sibun Valley, Belize. In *New Perspectives on Human Sacrifice and Ritual Body Treatments in Ancient Maya Society*, edited by V. Tiesler and A. Cucina, pp. 74-101. Springer Science + Business Media, New York.

Section III

Analytical Investigations

Chapter 11

An Analysis of Obsidian from Sites in the Middle Belize Valley

Kathryn Garland and Marieka Brouwer Burg

Obsidian has been found in several of the BREA excavations conducted during the 2011 and 2012 seasons. As an exotic luxury good, obsidian was highly valued by the Maya and was traded widely throughout the lowlands from sources in the volcanic mountains of Ixtepeque and El Chayal, situated far to the south in the Guatemalan highlands. The movement and transportation of this resource into the middle Belize valley would have been required a long and arduous trip. The wealth of obsidian recovered in the BREA project area suggests that there were established trade routes already in Preclassic times, which provided regular supplies of obsidian to settlements in the middle Belize Valley. Large quantities of obsidian in various stages of production have been found at the sites of Ik'nal, Otley's Flat, and Ma'xan.

Obsidian blades, with their incredibly fine and sharp edges, were used by the Maya in bloodletting rituals and other types of auto sacrifice. Maya ideologies entailed elements of balance and reciprocity, and bloodletting was viewed as a way to pay homage and reciprocate goodwill to the deities. The use of obsidian (versus other types of crypto-crystalline stone) in bloodletting activities was crucial, as the incisions made by the fine blade edges were so clean that they would usually heal quickly and without infection. As a testament to this particular function of obsidian blades, traces of blood can often be found on blade edges when scanned with high power microscopes. Obsidian was also used for more mundane purposes, such as in knifes and other cutting implements.

Methods of Obsidian Analysis

Obsidian is a sharp, volcanic glass that the Maya used for practical cutting uses, as well as for self-sacrifice in ritual activity. Obsidian can be sourced to the specific volcanic eruption from which it was created, through a process known as X-Ray Fluorescence (XRF) Spectrometry Analysis (Shackley 2011: 7). The color and patterns of the glass will vary depending on the conditions of its geologic emplacement (i.e., the conditions of the volcanic eruption). Obsidian can be black, gray, or green, such as the unique Pachuca obsidian, which comes from only one source in Mexico (Ponomarekno 2004). Green obsidian can be identified macroscopically, with the naked eye, while the black and gray varieties must be chemically sourced in order to determine location of derivation. In Belize, the vast majority of obsidian comes from the Ixtepeque and El Chayal volcanos in the Guatemalan highlands, although a few examples of Mexican-derived obsidian (known as Ucarero) have also been found.

Obsidian is found at archaeological sites in a wide variety of forms: usable and expended cores, chipped tools, macroblades, microblades, bladelets, and debitage. Blade fragments (or bladelets) are most commonly found the Maya Lowlands. Blades are generally twice as long as they are wide and produced on prismatic blade cores that, when prepared in advance, can yield a number of regularly shaped blades in quick succession. This type of tool production results in blades with flat ventral surfaces and faceted dorsal surfaces, the "facets" being the remnants of previous blade scars. The cross section of such blades are either triangular or trapezoidal. Obsidian blades generally have smooth edges, although examples of serrated edges have also been recovered. The distal end of the blade can be flat, pointed, or hinged, whereas the proximal end of the blade often exhibits a noticeable bulb of percussion, indicating where force was applied to the core to detach the blade. Fully formed tools made of chipped obsidian are occasionally found, although obsidian blade forms are far more common in the Maya lowlands.

A little less than half of the BREA project obsidian was found during surface collection; the rest of the assemblage was obtained through excavation. In this analysis, I focus on obsidian from excavated areas, where spatial contexts could be compared between pieces from the same site, or at nearby sites. The analyzed obsidian assemblages came from Ik'nal (Operation 13), Otley's Flat (Operation 8), and Ma'xan (Operations 1 and 2). The first task in this analysis was to create an obsidian database for the three sites noted. To accomplish this task, each blade was observed and both quantitative and qualitative data collected. Many of the obsidian pieces were individually scanned. This method is more useful for capturing the visual image of the obsidian than is standard photography. In addition, scanning with a backlit scanner shines light through the obsidian and thus the color, clarity, and any striations within the piece can be easily discerned.

The obsidian database includes characteristics such as size (length, width, thickness in centimeters, and weight in grams), color, clarity, and damage. Each piece is identified by the site, operation, zone, and square it was found within. The database facilitates comparison within and between sites in terms of physical characteristics, quantities, and spatial and temporal distributions. Below, the results of the analysis are described, and some preliminary interpretations are posited.

Obsidian Data from BREA Settlements

Ik'nal

Excavations at Ik'nal (Operation 13) focused on exposing portions of a Terminal Classic circular shrine building (see Harrison-Buck, Chapter 8). Operation 13 was a large excavation unit that exposed the exterior portions of the circular structure and the interior room of this shrine. Thirty-nine pieces of obsidian were recovered here. Theses specimen were mostly gray in color, and were mostly cloudy in clarity. As the majority of the pieces were broken, the length of the obsidian blades varies widely, from 1.01 cm to 3.85 cm in length. Blade thickness ranges from .13 to .38 mm; width ranges from .59 cm to 1.90 cm. What is potentially the most

interesting piece of information concerning the obsidian at Ik'nal is the similarity of the pieces in terms of clarity and color. About 20% of the specimen had dark gray or black striations, with some more visible than others; the rest were grey in color and opaque. The uniformity of color and clarity in the majority of these pieces suggests that they came from the same source, and were possibly produced from the same initial core. In addition, one green bladelet was recovered, indicating a very different obsidian source than the rest of the assemblage (perhaps from the Pachuca deposits in Mexico; the rest of the assemblage likely derived from Guatemalan sources). Several studies have been conducted on sourcing obsidian visually, and have been met with some success. This research has shown that sourcing Mesoamerican obsidian visually is only slightly less accurate than the more expensive XRF compositional sourcing (Braswell et al. 2000:269).

Ik'nal was excavated with a 15 x 15 m unit consisting of 25 squares measuring three meters on a side. Only 10 squares were excavated (Squares G, H, L-O, Q-T, and V-X; **Figure 11.1**). Of these squares, obsidian was found eight squares (G, H, L, Q, S, T, V, and W).

A	B	C	D	E
F	**G** (3)	**H** (5)	I	J
K	**L** (5)	**M**	**N**	**O**
P	**Q** (7)	**R**	**S** (2)	**T** (3)
U	**V** (8)	**W** (6)	**X**	Y

Figure 11.1 Squares excavated at Ik'nal. Squares yielding obsidian are noted in bold, and the number of obsidian is indicated in parentheses.

Most of the obsidian derived from the upper zones of the Ik'nal excavation (**Table 11.1**). When considering the spatial distribution of the obsidian, it is interesting to note that only two pieces were found within the circular structure, in Square S (see Figure 8.2). The rest were found scattered amid the walls and directly outside of the structure. This suggests that the obsidian bladelets were discarded haphazardly after their usage. Considering that obsidian is not a locally available material, it is curious that more careful conservation of the obsidian was not carried out, and indicates that perhaps some degree of conspicuous consumption or ritual deposition was in play. Unfortunately, the rest of the site was not excavated, so we cannot get a sense of the distribution of obsidian and whether there is more or less obsidian concentrated at this circular structure.

Of the five pieces found in Square H, three revealed striations. These striated specimen were all similar in color and thickness ($\mu = 0.28$; stdev = 0.015) suggesting they may have been struck from the same core. Square L contained five pieces, found in Zones 4 (1), 5 (3), and 9 (1). Square Q revealed seven obsidian bladelets, and those found in Zone 1 differed from the ones

found in Zone 2. Zone 1 pieces feature prominent striations, whereas the pieces found in Zone 2 were uniformly cloudy and gray. Square T yielded three obsidian specimen, one of which was the Pachuca green piece, from Zone 1. The largest amount of obsidian was found in square V (n = 8). The majority of these pieces were gray and cloudy; although one specimen, deriving from Square V, Zone 2, was characterized as a pointed, distal blade tip with speckled coloration. No other similarly colored obsidian bladelets were recovered from this site.

Table 11.1 Obsidian from Ik'nal (Operation 13) by zone.

Zone	Count
1	12
2	18
3	1
4	2
5	3
6	1
7	1
9	1
Total	39

Otley's Flat

Otley's Flat (Operation 8) yielded a number of obsidian pieces (n = 48). As can be seen in **Table 11.2**, more than half (65%) of the obsidian from Otley's Flat derived from Zone 1, which was characterized as disturbed plow zone. The number of specimens drops off accordingly with depth. Squares C–F were the only ones excavated; Table 2 indicates that roughly similar densities of obsidian were found in each square (C = 10; D = 9; E = 16; F = 13). Square E yielded the most obsidian pieces.

Table 11.2 Obsidian from Otley's Flat (Operation 8) by zone and square.

Zone	**Square**	**Count**
1	C	10
	D	8
	F	13
	Zone 1 Total	**31**
2	E	10
	Zone 2 Total	**10**
3	D	1
	E	6
	Zone 3 Total	**7**
Total		**48**

Due to time constraints, only Square F obsidian was analyzed, comprising only 27% of the total assemblage. Some of these 13 pieces displayed unique characteristics of composition and form; however, since these specimen only represent a fraction of the obsidian assemblage from Otley's Flat, the findings discussed below are not considered to be representative of the whole.

Of the 13 pieces analyzed, only one piece was characterized as clear. This piece also revealed darker striations. The remaining specimen had a cloudy appearance, and displayed a range of gray coloration. Two dark gray pieces (characterized as "gray-black") also had dark-colored striations. Specimen length averaged 2.69 cm (stdev = 0.76), thickness averaged 0.23 mm (stdev = 0.046), and width averaged 0.97 mm (stdev = 0.19). These summary statistics indicate that specimen thickness was most regular, with a small standard deviation. Specimen length was highly irregular, indicating much breakage in the assemblage. Only two near-complete blade specimen were recovered; the rest of the pieces were oddly shaped and irregular in form, suggesting that they were carelessly detached as flakes rather than blades. This may have been the result of haste in the knapping process, resulting in a number of flaking mistakes, or was perhaps the result of an amateur flint knapper honing their skills. In either case, it is odd that such sloppy knapping would be applied to an obsidian core, a non-local and therefore highly valued raw material.

Further analysis must be conducted on the Otley's Flat obsidian assemblage before any concrete conclusions can be drawn about the production and use of this material at the site.

Ma'xan

The greatest collection of obsidian from the Belize River East Archaeology project to date has been collected from the site of Ma'xan (Operations 1 and 2). In total, 119 pieces of obsidian were excavated at this site in 2011. The wealth of obsidian here suggests a possible production site. Craft specialization was common in Maya society, but requires a plethora of material evidence to substantiate. Specialized production of objects such as chipped stone tools (Michaels 1989; Shafer and Hester 1991), polychrome pottery (Inomata 2001; Reents-Budet and Ball 1994), worked marine shell (Fash 2001:159-160); and salt (Murata 2011) have been documented elsewhere in the Maya lowlands. Lithics studies have indicated that part time specialists likely manufactured prismatic blades for distribution among their community, rather than for export (Aoyama 1999: 203). Differing views exist concerning the articulation of social stratification and craft production. Since obsidian was a traded, non-local good, E. Christian Wells suggests that periodic obsidian tool manufacture was overseen by elites (Wells 2006: 269). Whether the obsidian craftsmen were themselves elites is unknown (cf. Aoyama 1999: 203). Furthermore, scholars do not yet understand the (perhaps causal) relationship between obsidian production and management, and elite status.

Two operations were undertaken at Ma'xan (Operation 1 and 2), as well as posthole testing. Operation 1 obsidian made up 77% of the Ma'xan assemblage, Operation 2 made up 18%, and Posthole testing comprised 5% (**Table 11.3; Figure 11.2**).

Table 11.3 Obsidian found during Ma'xan excavations.

Provenience	Operation	Zone	Square	Count
Posthole 11				1
Posthole 46				1
Posthole 56				4
Total Posthole				**6**
Excavation	1	1	A B C	1 5 8
		Total Zone 1		**14**
Excavation	1	2	A B C	9 27 20
		Total Zone 2		**56**
Excavation	1	3	A C	11 11
		Total Zone 3		**22**
Total Operation 1				**92**
Excavation	2	1	A	5
Excavation	2	2	A	7
Excavation	2	3	A	6
Excavation	2	4	A	1
Excavation	2	5	A	2
Total Operation 2				**21**
Total				**119**

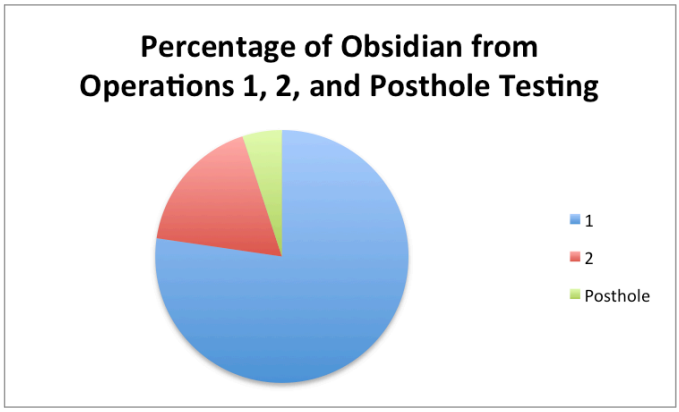

Figure 11.2 Derivation of obsidian from Max'an operations and posthole testing.

In Operation 1 at Ma'xan, 92 obsidian pieces were gathered from three squares (Squares A, B, and C). Most of the obsidian was recovered in Zone 2 (n = 56), and about half that amount derived from both Zones 1 and 3. Most of the obsidian from Square A was found in Zone 3. This square revealed variation in obsidian clarity, ranging from clear to very opaque. Also, eight of the 11 specimen from this square and zone were marked by the inclusion of dark striations.

Square B contained 32 out of the 92 pieces found in Operation 1. Of the five pieces found in Square B, Zone 1, two were clear, two were cloudy, and one was fully opaque. The size of the specimen were similar, with the exception of two flakes that were shaped differently than the rest of the pieces. One of the blades also has a serrated edge.

Square C yielded 39 pieces of obsidian. In Zone 1, many of the pieces were similar with a few exceptions: one smaller flake featured part of the bulb of percussion, but was seemingly broken off or heavily damaged. Another piece was either a failed blade or a core rejuvenation flake. This piece retains the distal end of the core, and flake scars are clearly visible. The color and clarity of the obsidian found in Zone 1 was consistent, with the exception of the two dark-gray pieces. Zone 2 of Square C yielded 20 very distinct obsidian specimen, most of which were recovered at the bottom of this zone and coincide with the top of Zone 3, which appears to have been a termination deposit. It is perhaps not surprising that so many obsidian blades (n = 20) were found both whole and fragmentary at the interface of these two zones. Roughly half of the sample is characterized as cloudy and the other half of the sample is characterized as clear. Clear pieces also contained a unique clouding, which is not the same as striations seen in other pieces. A number of distal forms were visible in this group, from flat to pointed and rounded ends. In Zone 3 of Square C, 11 obsidian pieces were recovered.

Operation 2 at Ma'xan revealed far fewer obsidian artifacts (n = 21). This was unexpected, as the surface of the area had yielded an overabundance of obsidian blades and cores during pedestrian survey conducted in 2011 (n = 92; see Harrison-Buck 2011, Chapter 13). However,excavation here failed to present evidence of *in situ* lithic production. As noted by Murata in Harrison-Buck (2011: 104), the obsidian found on the surface of Operation 2 appears to date to a separate and much later date of reoccupation (Postclassic), while non-obsidian artifacts found below the plow zone date to a much earlier initial occupation (Preclassic). As for most of Ma'xan's obsidian, the obsidian found in square A of operation two features a range of coloration and clarity. Most were cloudy and exhibited heavy damage, especially those recovered in Zone 1. Among the damaged pieces is a very long blade, nearly 8.5 cm in length. There were also several flakes found in Operation 2 that skew the average thickness of the group.

Obsidian was also obtained from three postholes at Ma'xan. Posthole 11 featured a reworked proximal blade. Posthole 46 featured a smaller medial piece of obsidian that was clear in opacity. Four pieces were found in Posthole 56, and they were all cloudy and gray. Two of these four pieces were reworked, indicated by notching along the edges. The other two pieces contain striations or are speckled with dark gray or black.

Considering the great amount of obsidian recovered at Ma'xan, it is interesting to note the variation in coloration and clarity. Although some similarity occurs between pieces,

especially those deriving from the same zone and square, the overall picture seems to indicate that a number of cores with different coloration and clarity were in use at the site. In addition, the volume of obsidian found at Ma'xan indicates that either a) blade production took place here, perhaps during a single event, or b) that a termination event took place here, during which time broken obsidian from various sources was deposited. The proximity of the site to the Belize River is also intriguing, suggesting that perhaps this was an exchange location on well-tread trade routes that funneled materials from Guatemala into Belize and out to the coast.

Comparisons and Conclusions

The most common theme of the obsidian analyzed here is the wide diversity among the pieces regarding coloration, clarity, and shape. However, it is still possible to construct some interpretations concerning the use of obsidian at individual sites, as well as the use of this exotic material across sites in the BREA project area.

At the site of Otley's Flat, a significantly smaller amount of obsidian was recovered than at other BREA site. It can thus be concluded that obsidian may have been used differently here in terms of production and use. Obsidian was an important ritual object used in Maya religious ceremonies, but was also used for practical cutting purposes. A site yielding less obsidian implicates that this material was used for different purposes than at a site yielding lots of obsidian. While the mounds at Otley's Flat appear utilitarian in nature, owing to the small amount of expediently used obsidian, the circular shrine at Ik'nal appears to have been a ritual space, suggested by the high density of obsidian blades found around the exterior of the shrine. Such occurrences indicate that bloodletting activities may have taken place in the vicinity. The difficulty in transport the Maya faced due to their lack of a wheel and pack animals means that a precious resource like obsidian would not be sent anywhere it was not needed. Thus, there was clearly a preference for obsidian as a tool stone material over more commonly occurring tool stone at Otley's Flat, although we cannot say what the significance was.

The diversity in obsidian coloration indicates the obsidian from this region derived from various sources, both in Guatemala and Mexico. It is clear that the BREA sites were well connected to local and regional trade routes, and were perhaps located directly on trading routes, or were trading centers themselves. The sites' proximity to the Belize River would have constituted a strategic location from which to send and receive goods between the interior and the coast. Of the sites analyzed in this study, Ma'xan–with its great wealth and variety of obsidian forms–is the most likely candidate of a trading center.

The obsidian found at the three sites of Ik'nal, Otley's Flat, and Max'an is an important line of evidence that can help elucidate more about who the Maya were and how they lived in the central Belize valley. Even though this analysis represents only a partial window into the world of obsidian procurement, trade, production, and use, it shows that there is great potential to learn more about the ancient Maya from the obsidian samples collected in the BREA project area.

Furthermore, when paired with other lines of archaeological evidence, a fuller picture of Maya activities in this area of Belize can be gained.

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Chapter 12

Chipped Stone Tool Production at Ma'xan

Evelyn French

One of the first steps in the lithic tool production process involves removing large blades or macroblades from a core of raw material. These macroblades will eventually be chipped into the final product through a series of more fine and precise chipping (McKillop 2004:251). Two different types of blades, unifacial or bifacial, are produced from cores. A bifacial blade is chipped on both sides to form two sharp edges whereas a unifacial blade is only chipped on a single side. The manufacturing process of stone tools is a reductive method and leaves behind a large amount of debitage, the waste of tool production, which can be examined and analyzed. Different pieces of the debitage can often indicate different stages of production. The debitage waste of lithic tool production often can tell us just as much or more about the production of stone tools as the tool itself. By examining the different diagnostic evidence left behind in the debitage waste one is able to determine if a site was used for production and for what stage of production.

In this study, I examine evidence of chipped tool production found in a small residential plaza group at the site of Ma'xan (**Figure 1.2**; Kaeding et al. 2011). The samples of chert were recovered from Square A of Operation 2, a 2 x 2 m test excavation unit investigated during the summer of 2011 (Murata 2011). This small excavation unit yielded a high density of chert debitage. Due to time restraints, however, not all of the debitage from the excavation was able to be examined and logged. The pieces that were selected for analysis were considered to be the most informative of the sample and will hopefully provide a holistic view of the production in this area of the site.

Methods of Analysis for Maya Lithic Tool Production

There has been little archaeological evidence of specialized lithic production workshops in ancient Mesoamerica. Because of this there have been almost no comparative studies done on chert production conducted in the Maya area (Speal 2009:92). One exception to this is the site of Colha in northern Belize where there has been extensive documentation of specialized lithic tool production from Preclassic to Postclassic times. This site sits on one of the most extensive and finest outcrops of chert in the Maya area. Great steps were taken in chert analysis in the 1980s and 1990s based on research done at Colha. From this work, scholars developed a widely accepted model called the 'producer-consumer' model, which became the rubric for chert lithic analysis for many years. This model suggested that the inhabitants of Colha and other lithic-rich

sites in northern Belize were the 'producers' and by tracing the distribution of particular colors and types of chert at sites across the Maya Lowlands one could determine who consumed the lithic products. More recently, the model has been rejected for being overly simplistic. Scott Speal (2009) notes that the producer-consumer model implies that one group did all the production while the other simply consumed them. Yet, separating these two categories has proven difficult. "How much local production makes a producer? How much constitutes a consumer? What kind of variations is there within the two categories?" (Speal 2009:93). Furthermore, what constitutes "formal" tool production for the Maya remains ill defined (Speal 2009:94). Instead, researches have taken to looking at specific diagnostic flakes and tools to gauge the stages and different types of production found at particular sites.

A very clear diagnostic of tool flaking activity that is used by chert lithic researchers begins with Early-Stage Reduction (ESR) debris. Because chert tools come from chert boulders with a rough often brown or white exterior known as cortex, the first several stages of reduction (ESR) must include removing the surrounding cortex. The frequencies of these flakes with high percentages of cortex are often used to quantify the ESR along with grading based on the flake size. These theories have been backed up by several experimental studies that have shown there are higher frequencies of cortex connected with earlier stages of core reduction (Speal 2009:94).

A second way of determining the stage of production is by carefully counting the flake scars on the dorsal side of the flake. Flake scars are the negative impressions left behind from when a previous flake was broken away from the core. It is important to count how many of the scars are on a single flake as it can tell us how many times it was hit before that particular piece was looped off. The less flake scars left behind on the dorsal side, the earlier the stage of production. The greater amount of flake scares the later the stage of production.

Until recently, most research has focused primarily on the context(s) in which lithics are found and far less attention has been given to identifying and studying the lithic production locales (Yerkes and Kardulias 1993:90). The methods discussed above offer important insights into the production process, but do not tell us what the different tools were used for in ancient times. Yerkes and Kardulias (1993) believe that the only way of truly understanding how the tools were made and used is through replication and experimental research. Replicating the production and use of tools provides comparative examples of the wear marks that shed light on how these different tool types may have been used by the ancient Maya (Yerkes and Kardulias 1993:112-113).

Lithics Analysis from Operation 2 at Ma'xan

To gauge the presence of ESR, debitage and chert nodules from Ma'xan Operation 2 were categorized into groups according to their percentage of cortex remaining (**Table 12.1** and **Figure 12.1**). There was no chipped tool with more than 50% cortex remaining and only 4 out of the 15 with any cortex at all. The other 11 tools had no cortex remaining. All of the chert nodules had cortex remaining in varying degrees. The majority of the debitage, 95 pieces out of

180, were absent of cortex. Only 10 out of the 180 pieces of debitage cataloged had more than 90% cortex remaining. This shows that although there was a large amount of debitage found at the site, the majority of the flaking done was not during early stage reduction. If the flaking had been done during ESR then there would have been more cortex remaining on the majority of the flakes. Since the majority of debitage flakes and pieces had little to no cortex left on them they must have been from secondary flaking. This then raises the question of where the early stage reduction was taking place and why there were whole chert nodules remaining at the site.

The flake scar count on the debitage from Ma'xan Operation 2, ranged anywhere from zero to six scars on the dorsal side. However, only a single flake contained 6 scars whereas the majority of the flakes had zero or one scar on the dorsal side. This tells us that although not all of the flakes were from the earliest stages of production (as they do not have high amounts of cortex remaining upon them), they are from a secondary early stage because there only single scars on the dorsal side of the flakes.

Table 12.1 Percentage of cortex detected on chipped stone tools at Ma'xan.

	Absent	Present	<50%	50-90%	>90%
Chert Nodule	0	0	4	7	6
Debitage	95	37	27	11	10
Tool	11	3	1	0	0

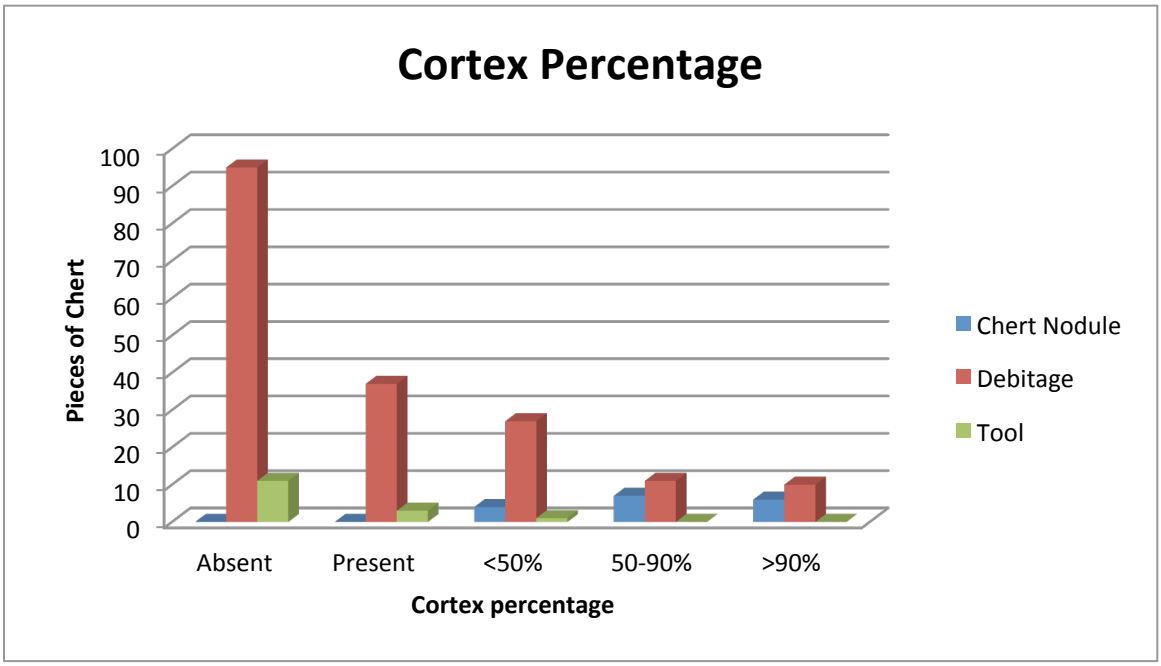

Figure 12.1 Cortex percentage from Ma'xan chipped stone assemblage.

Flint knapping was generally done on an outdoor patio surface and the waste and debitage would often be discarded in waste dumps away from the residence (Speal 2009, 96). At

Ma'xan Operation 2 there were very few whole tools. The only completely intact tools collected were found on the surface. The rest are fragments of the original tools, with the exception of one found within Zone 1 of Operation 2 (**Figure 12.2**). This could possibly suggest that this was a midden area or proximate to an area were the waste from production was discarded, including tools that had broken.

Figure 12.2 Broken tool fragment found in Operation 2, Zone 1 (photo by M. Brouwer Burg).

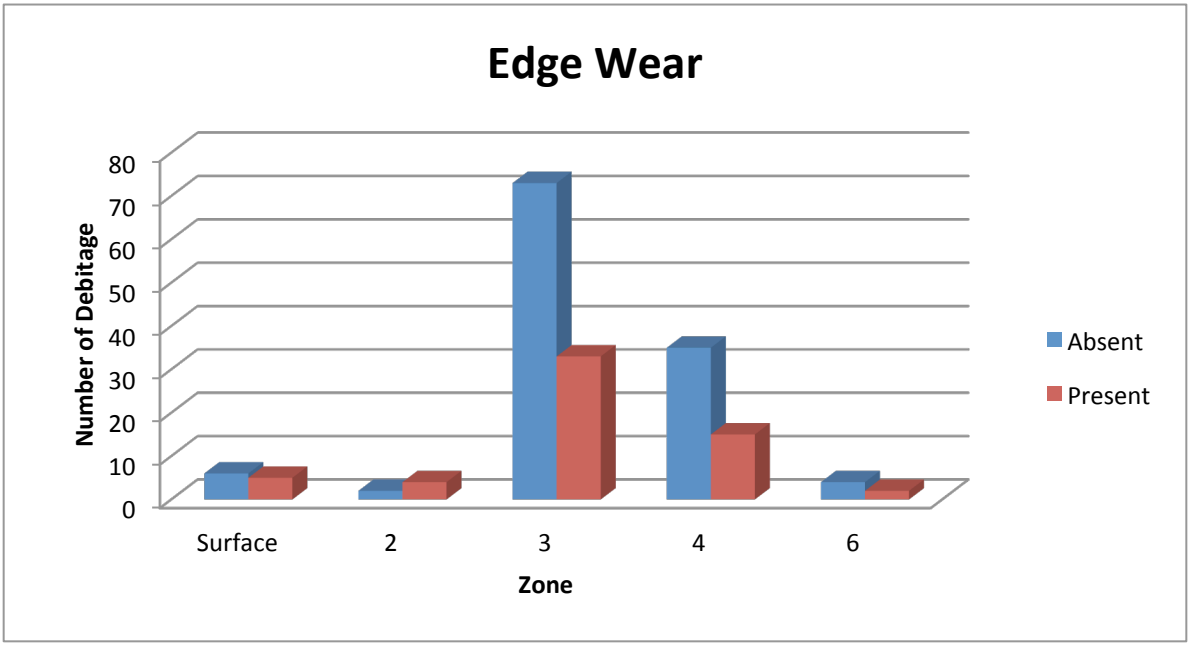

Figure 12.3 Edge wear by Zone on Chipped Stone Tools.

Each debitage flake cataloged from Operation 2 at Ma'xan was determined to have marginal edge wear or patination or neither. Each flake was examined for both wear along the edges and patination as both are diagnostic for the usage of the tool. If a piece of debitage shows signs of patination or edge wear it is important to note because the debitage flake was most likely attached to the finished tool at some point. If the flake shows edge wear it can be determined that the flake was knocked off as a way of sharpening the tool when it had become dull from overuse. These pieces of flake would not represent the primary stages of tool production, but would have been done long after the initial production of the tool. The majority of debitage from all zones lacked patination, but there was some marginal edge wear present among the debitage in varying degrees from the different zones of the excavation unit (**Figure 12.3 and Table 12.2**).

Table 12.2 Marginal Edge Wear on Chipped Stone Tools.

Zone	**Surface**	**2**	**3**	**4**	**6**
Absent	6	2	73	35	4
Present	5	4	33	15	2
Percent present	45.45455	66.66667	31.13208	30	33.33333

A total of 33 pieces of debitage from Operation 2 was examined. The majority of chert debitage was found in Zone 3. Each of the logged zones had more than 30% of the debitage flakes with some amount of edge wear, the greatest percentage being from Zone 2 where 4 out 6 flakes had edge wear making the percentage of flakes with edge wear present roughly 66%. This suggests that across time in this location there was some form of retouching taking place on the already produced tools. The evidence suggests that it may not have been a specialized production area carried out on a large scale, but consisted of a smaller, more localized production activity that produced tools for its own use and had the knowledge needed to sharpen tools after wear.

The average size of the debitage flakes can also be diagnostic when attempting to categorize the stage of production. Drawn from experimental studies, larger flakes come from earlier stages of production, whereas the smaller more precise flakes come from later stages of production. The average measurements of the flakes from Ma'xan are 21 mm tall, 22 mm wide and about 7 mm thick (**Figure 12.4 and Table 12.3**). This suggests the flakes were neither large early stage reduction debris nor the smallest most precise flakes. Perhaps the flakes found at Ma'xan came from a production stage somewhere between the two extremes resulting in medium sized flakes.

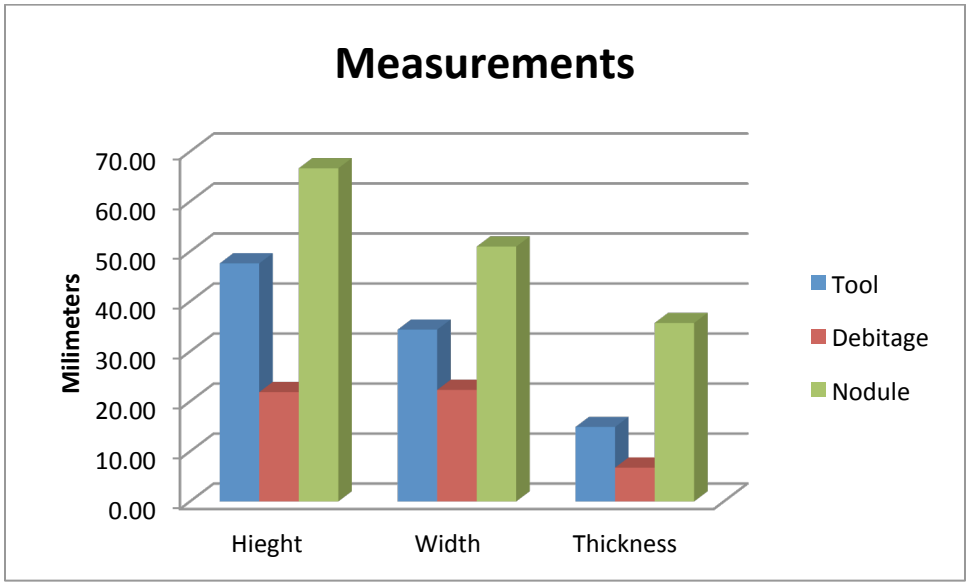

Figure 12.4 Measurements (mm) of chipped stone tools.

Table 12.3 Measurements (mm) of chipped stone tools at Ma'xan.

	Height	Width	Thickness
Tool	47.61	34.36	14.89
Debitage	21.86	22.30	6.76
Nodule	66.64	50.98	35.69

Concluding Thoughts

While there are only a few studies conducted that compare the lithic production across the Maya Lowlands, there have been many more studies done on the trade of lithic tools. One example is Kazuo Aoyama's (2001) study of chipped stone evidence in the Copan Valley and its hinterland communities. Although the article focuses mainly on the production and trade of obsidian tools, it does discuss general patterns found in other lithic material, including chipped chert tools. Aoyama suggests that the smaller supplies of the more prestigious lithics such as green obsidian from Mexico and ritual eccentrics had no economic importance, but the larger quantities of raw material that was transported to Copan had some managerial overseers who ensured the procurement and transportation of the raw materials (Aoyama 2001:357). Therefore, although chert was transported much shorter distances then obsidian cores, there was still care involved in ensuring there was enough to maintain the economy and the demand of the people.

Although not traded on the scale of obsidian over long distances, chert tools were important commodities that were locally exchanged among the Maya as part of their economy.

One question that remains unanswered in this and other studies of lithic tool production is who was creating the tools. Was it a specialist or did most locals have the skill set and knowledge base needed to create the toolkit necessary for their own everyday use. The producer-consumer model based on Colha in Belize discussed above suggested that there was some local understanding, but that the majority of the production was done by seasonal specialists at a select few sites, such as Colha. A craft specialist is defined as a person who repeatedly manufactures a craft product for exchange. It is suggested that at Colha there was a large number of chert specialists because there was a large quantity of very fine raw chert material readily available, making specialization and export of the good worthwhile (Shafter and Hester 1991:79).

There is no doubt that Colha was a large producer site of chipped chert as it is clear from archaeological evidence they produced large quantities of tools that surpassed the local needs of this relatively small community. In their study of lithic craft specialization and product distribution at Colha, Harry J. Shafer and Thomas R. Hester (1991) provide two clear examples of formal tools both used and produced, which included both utilitarian and non-utilitarian tools. Utilitarian tools were made for the immediate consumers in the nearby area. These tools were for everyday use, whereas the non-utilitarian tools were eccentrics and stemmed microblades whose range extended much further regions of the Maya civilization based on studies of trade that have sourced this material to the Colha chert bed in northern Belize. Shafter and Hester (1991) conclude that Colha had control over the production at a site level during the Late Preclassic period, while other sites such as Altun Ha controlled the majority of the production during the Late Classic. They also suggest that the regional area was controlled by the elites but that craft and trade was left to the craft specialist (Shafter and Hester 1991:94-95).

Although not on the level of the intensive craft specialization found at Colha, the lithic evidence from Ma'xan suggests there was some stage of local production occurring in the vicinity of Operation 2. In contrast to Colha, the evidence does not suggest that Ma'xan withstood heavy producer-like production of stone tools that was supplying more than local demands. The material remains suggest that the inhabitants of the site were producing utilitarian tools that were probably destined for local household use. There is no evidence to suggest the tools were exported after production or imported from somewhere else. Local production is indicated by the presence of several whole chert nodules found associated with the Operation 2 plaza group at Ma'xan. The raw material was transported to the site in the form of large boulders and at least some of the tools were produced on site, rather than being done at the place of procurement and it is possible that Operation 2 square A was near the local trash site for the debitage waste. While future investigations of special contexts at Ma'xan, like caches or burials, may reveal the presence of select imported chert, the finds from Operation 2 discussed herein suggest that the inhabitants of Ma'xan transported their own raw chert material to the site and produced tools for their own local use, rather than importing tools from producers somewhere else, like Colha.

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Chapter 13

A Study of Ground Stone from Sites in the Middle Belize Valley

Katrina Miamis and Eleanor Harrison-Buck

Introduction

Ground stone tools were used across Mesoamerica for a variety of purposes. In the Maya world, the art of grinding corn was passed down generationally. Ground stone *manos* (hand-held stones) and *metates* (mortars) were the primary toolsets used in Maya households mostly for maize grinding purposes. The mano is the tool used to crush and grind the maize, and is the focus of this study. The dataset from the BREA study area analyzed herein comes from the sites of Hats Kaab, Hum Chaak, Ik'nal, Ma'kaax, Ma'tunich and Ma'xan, which are all located in the middle Belize Valley proximate to the Belize River (see **Figure 1.2**). Of this dataset, there are a total of thirty-two mano fragments (two of which are refits) and one whole mano, which make up about 14.6% of the total ground stone that was recovered from excavations and surface collection at these sites, conducted during the 2011 and 2012 BREA field seasons (**Table 13.1**). The overall goal of my analysis was to create a mano typology for the BREA study area using a serration method developed by Gordon Willey (1972), which characterizes different mano types primarily in terms of mano form and, secondarily, in terms of rock type.

A diverse array of mano forms were found in the BREA assemblage and it was difficult to assign any particular type to a given time period. The selection of rock material used for manos was relatively restricted, with granite predominating in the BREA assemblage. Sources of hard limestone were readily available in the nearby hills and outcrops around the middle Belize Valley. However, inhabitants in the middle Belize Valley opted for the harder stone that comes from the nearby Maya Mountains. When more immediate sources of stone were used, it was not limestone, but river cobbles that were occasionally selected for mano production. Such stone was readily available in the Belize River and its tributary creeks adjacent to the middle Belize Valley sites examined herein. There does not appear to be much change in the rock sources used for manos over time. Pink and gray granite persist from Preclassic to Terminal Classic times and the more rare occurrences of river cobble manos also do not seem to be restricted to a particular time period.

Below we discuss the methods used in our analysis of the groundstone manos and describe the findings from the assemblage from the middle Belize Valley sites. We discuss not only the patterns of the different forms of the manos, but also compare the rock sources that were used in the Belize Valley in comparison to sites in the Peten, namely Altar de Sacrificios.

Methods

As noted above, my analysis of the BREA manos relies on a mano typology developed by Gordon Willey (1972:104-125) in his study of the groundstone from the site of Altar de Sacrificios (henceforth, Altar) in Peten, Guatemala. In his study of the groundstone, he outlines standards for analyzing each type of mano, judged by shape in profile of thickness and width, and of length and width. Using this methodology, the length and thickness of each mano was measured using a set of calipers for the most accurate reading, taking measurements based on how each fragment would have been oriented. Willey (1972:116-124) defined ten discrete mano types at Altar. Of his nine different varieties, five of these types were identified in the BREA collection analyzed herein and the remaining four varieties were not present in the collection.

The four varieties defined by Willey that were not identified in the BREA collection include Triangular, Pentagonal, Overhang, and Large Square manos. The Triangular manos are triangular in cross-section with somewhat rounded edges, but the ends of this mano varied from pointed ends to blunted ends. The Triangular manos, present from Preclassic to Late Classic times at Altar, are mostly made of limestone with some conglomerates and one was sandstone (Willey 1972:120). In cross-section, the Pentagonal manos have five sides and appear to have been square at one point and shaped pentagonally by adding another side (Willey 1972:123). These manos date to the Preclassic and appear to be very well made, with even grinding surfaces on each of the sides (Willey 1972:123). The overhang variety tends to be made of hard limestone, is ovular in cross-section, and has smoothing surfaces on the broader surfaces and an overhang feature on the ends (Willey 1972:123). While there were two Square type manos found in the BREA assemblage, there were no Large Square types, which are separated typologically by a width greater than 8.0 cm (Willey 1972:120-123). Although the majority of manos from the BREA study area were fragmentary, we saw nothing that approximated these four types. The five varieties that I was able to identify include Willey's Thin-Rectangular, Thick-Ovate-Rectangular, Plano-Convex, Square, and Round types (see **Table 13.1**). Each type is further described below and discussed in terms of the findings from the BREA study area.

Analysis of BREA Groundstone Manos

Thin-Rectangular Variety

The first grouping of manos defined by Gordon Willey (1972:116-118) is called the Thin-Rectangular type. The top and bottom appear to be the primary grinding surfaces, making the most contact with the metataes. The small ends had some tapering and rounding. From a cross section, this mano is either more ovular, or rectangular than the others. In plan view, the thin rectangular mano is more rectangular than others. These manos seem to be smaller in size in terms of length and width compared to both the Thick Ovate Rectangular and the Plano-Convex.

Of the BREA assemblage, 30.3 % of all of the manos are Thin-Rectangular, representing a relatively common form.

According to Willey (1972:118), the Thin Rectangular type at Altar is mostly made from limestone and "dark grey to black conglomerate," with a few sandstone pieces. In the BREA assemblage, the rock material used for the Thin-Rectagular types is prominently granite, with a few river cobblestones and one made from basalt (see **Table 13.1**). It is worth noting that at the site of Ma'kaax, a mano was made of grey and black granite, but looks very similar to non-vesicular basalt in features like color, weight, and grain size. An orangey-red color mano also was found, which looks similar to a dark pink granite (**Figure 13.1)**. Perhaps these locally available rocks were chosen as substitutes for the "real" basalt volcanic stone and pink granite source material that were acquired through long-distance trade. While neither is readily found in the middle Belize River valley, the pink granite source is not terribly far away. As noted above, pink (and gray) granite can be found just to the south in the mid-to-upper reaches of the Sibun River valley where pink granite boulders and cobbles are found lying in the river channel, transported down river from its source in the Maya Mountains. Excavated contexts containing pink granite mano and metates from the site of Hats Kaab have been dated to the Terminal Preclassic, suggesting that this source material was acquired during the earliest documented phase of occupation in the middle Belize Valley, perhaps through trade (M. Brouwer Burg, personal communication, June 2013).

The Thin-Rectangular mano seems to be used at numerous sites across the BREA region. The data is sporadic; many of the sites where the Thin Rectangular manos were found were surface finds and have not been solidly dated. The site of Ma'kaax contained several different types of the Thin-Rectangular mano. A preliminary study of the ceramics found on the surface at this site point to a Terminal Classic date. Four Thin Rectangular manos were found at other Terminal Classic sites in the BREA study area, including Hum Chaak, Ik'nal, and Ma'xaan. All of the Thin-Rectangular manos were fragments from 2.6-12.9 cm in length.

Figure 13.1 Pink granite mano fragment (LCB #3240) found at Ik'nal repurposed into a granite pounder (photos by K. Miamis).

Thick-Ovate-Rectangular Variety

The second grouping defined by Gordon Willey (1972:118) is the Thick-Ovate-Rectangular manos. Thick-Ovate-Rectangular manos are thicker than the Thin-Rectangular type. These manos have a larger variety of shapes when it comes to cross-section, from more ovate to more rectangular. In Willey's (1972:118) study of this type, the end fragments varied greatly, from rounded edges to sharp points. In data from the BREA area, only those with rounded edges were discovered. In a plan view, these manos often have softer and more rounded corners of their rectangle, often they are more ovular than rectangular (**Figure 13.1**). Those found in the BREA area were more ovular in plan view than those from Altar. The top and bottom appear to be the primary grinding surfaces. Thick-Ovate-Rectangular manos are the most abundant type of mano found in the BREA assemblage, representing about 42.4% of all of the manos.

At Altar, limestone was the most common material used for the Thick-Ovate-Rectangular mano, along with a few from conglomerates and sandstones (Willey 1972:118). In comparison to the BREA assemblage, there was not a single limestone piece found and pink granite was overwhelmingly the most common material used. Ten out of 13 of the Thick-Ovate-Rectangular manos were made from pink granite. This mano type was discovered at all six sites in the BREA area and when found in Terminal Classic period contexts, 66.7% of manos were made from pink granite. The majority (over 50%) of the Thick-Ovate-Rectangular manos were found at the Terminal Classic site Ik'nal, all of which were granite.

A Thick-Ovate-Rectangular mano made from a river cobble was found at the site of Hats Kaab, which dates primarily to the Terminal Preclassic-Early Classic. The range of length for Thick-Ovate-Rectangular manos is 3.6-24.1 cm, with the latter being a whole mano.

Plano-Convex variety

Gordon Willey's (1972:118-120) third type of manos is the Plano-Convex variety (**Figure 13.2**). From a cross-section view, one side is basically flat (the one making the most contact with the metate), and the other is quite curved, almost in a D-shape (shown in **Figure 13.2b** cross-section). It appears that both the top and bottom surfaces of the Plano-Convex manos were the most used sides. According to Willey (1972:118), the Plano-Convex mano resembles an elongated rectangle or oval in plan view. At Altar, the Plano-Convex tended to merge with triangular manos, and have a very large variety of forms (Willey 1972:119). Of the five samples (15.2% of the BREA assemblage), we did not find there was much variation among the Plano-Convex manos in terms of form, but rock sources were among the most diverse of any type. Of the five Plano-Convex manos from the BREA assemblage, two were basalt, three were granite (all different color ranges), and one was made from a river cobble. Notably, while the forms of the Plano-Convex varied at Altar, the source material did not. The majority of the Plano-Convex manos at Altar were made from quartzite or quartz, with only a few made of limestone and conglomerate (Willey 1972:119). The Plano-Convex manos from the BREA study area range from 5.5-12.9 cm in length. The Plano-Convex mano was found in a wide range of contexts and did not appear to mark a particular time period in the BREA study area.

Unlike the Thick-Ovate-Rectangular mano that was repurposed, the Plano-Convex mano fragment shown in **Figure 13.2a** (which is an end fragment) shows the larger end with the most amount of wear, whereas the smaller would have been held.

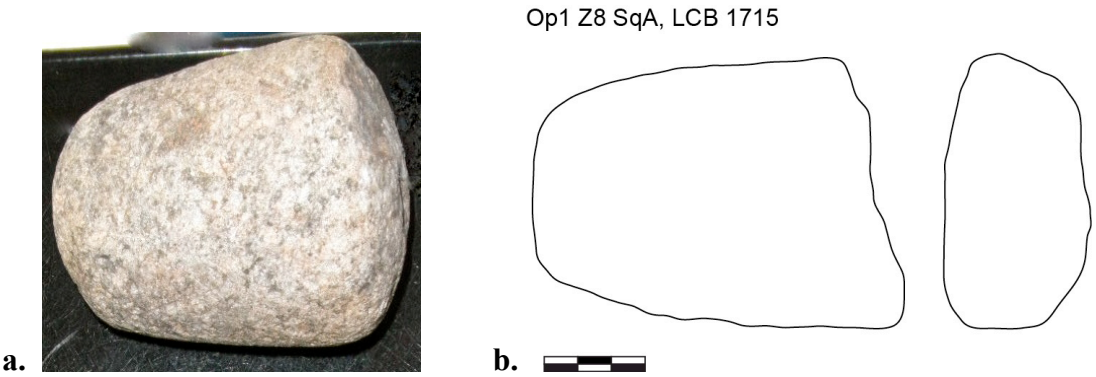

Figure 13.2 a) Plano-Convex mano repurposed into a pounder (Ma'kaax, LCB#1715); b) plan view (left) and cross-section (right) of Plano-Convex mano (Ma'xan, LCB#572; drawing and photo by K. Miamis; digitized by M. Brouwer Burg).

Square Variety

The fourth group defined by Willey (1972:120-121) is the Square type. The cross-section is a square, with a variety of roundness at the edges. The Square manos are well made, and the surfaces are all even. In the Altar collection, the Square variety is the most numerous, while in the BREA collection it is among the most rare. Of the two examples, one was found at the Terminal Classic site of Ik'nal (**Figure 13.3**) and the other was found at Hats Kaab, a E-Group complex that primarily dates to the Terminal Preclassic-Early Classic (Runggaldier and Brouwer Burg, Chapter 7). Combined, the two Square manos make up only 6.1% of the total mano assemblage.

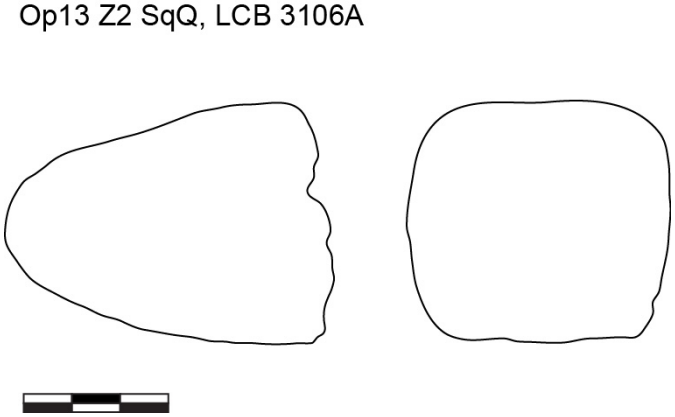

Figure 13.3 Square mano fragment from Ik'nal (LCB # 3106 [A]; drawing by K. Miamis; digitized by M. Brouwer Burg).

Square manos at Altar were predominantly limestone, with a few that were quartz and sandstone. Both of the Square manos from BREA sites are pink granite. The Square type at Altar is limited to the Late Classic period, which was also the case at Barton Ramie (Willey 1972:124). However, the contexts in which the two Square manos were found does not support a consistent Late Classic date for this mano type. The length measurements for the two Square mano fragments are 6.4 and 7.1 cm.

Round Variety

Another grouping defined at Altar is the Round group (Willey 1972:123). These manos have been used on all sides, but the sides are not as smooth as the other types. Willey (1972:123) speculates that the Round manos are "new" tools and that the other types are created from the Round type by flattening the sides with use. This would make the Round mano the original (pre)form of all manos. Yet, Round manos seem to date no earlier than the Late Classic period at Altar (Willey 1972:123). Like other mano types, limestone is the most common material, along with a few grey and black conglomerates and sandstone. The one Round mano in the BREA collection (representing 3.0% of the assemblage) was found at Hats Kaab and is made from a river cobble. In his analysis, Willey (1972:123) describes a variant that he calls the Large Round mano, which is not present in the BREA assemblage. This mano is the same as the Round type, yet its diameter ranges from 8-11cm. These appear to be mostly made from limestone and a grey colored conglomerate.

Source Material for Manos

The Belize Valley is roughly 270 km from the site of Altar in the Peten and the two areas show marked differences in the groundstone assemblages in terms of the rock sources that were utilized, which seem to largely reflect what is locally available. Limestone is a readily available resource across much of the Maya lowlands and is the stone that predominates in the ground stone assemblage at Altar (Willey 1972). Yet, this material was not used for manos at the sites examined here from the middle Belize Valley, probably because harder stones, like granite, are readily available from nearby sources. In addition to granite, the inhabitants of the middle Belize Valley made use of local resources for groundstone manos, including river cobbles from the Belize River. While both the BREA sites and the site of Altar are both situated on major rivers, the Maya at Altar do not appear to have used the river stone from the nearby Usumacinta River, but instead preferred the local limestone as a source for their groundstone.

While river cobbles were occasionally used for manos in the middle Belize Valley, the preferred stone was granite. The results of this study suggest that this was the most common type of rock used for groundstone in the BREA study area from Preclassic to Terminal Classic times. According to the geography of Belize, granite is found in the nearby Maya Mountains, as well as the Cuchumatanes Mountains in Guatemala (The Geological Society of America). The

Cuchumatanes Mountains are about 110 km away from the site of Altar. While the Maya from Altar were down the Usumacinta River from the Cuchumatanes Mountains, making travel much easier, granite does not seem to be represented in the assemblage. The distance between the sites in the middle Belize Valley and the Maya Mountains is about fifty kilometers to the farthest point, but granite cobbles and boulders can be found in middle and upper reaches of the Sibun River, which drains from the Maya Mountains and carries these materials downstream. From the confluence of Beaver Dam Creek on the Belize River, which is located adjacent to the sites of Ma'tunich and Ma'kaax, one could travel south up the creek about 17km and then overland about 3 km and reach the Sibun River where gray and pink granite could be procured (**Figures 1.1 and 1.2**). While not immediately available to the Belize inhabitants, this creek would have facilitated the acquisition and trade of this material to settlements along the Belize River.

Basalt in both the BREA and Altar groundstone assemblages is relatively rare, which is not terribly surprising given the distance to this source, hundreds of kilometers to the south in the volcanic mountains of Highland Guatemala.

Concluding Thoughts

The Thick-Ovate-Rectangular mano was the most common mano form representing in the BREA assemblage. It was found at all six sites in the middle Belize Valley. The highest densities of this type were found in the collections recovered at Ik'nal and Hats Kaab, where it represented 50% and 60% of the assemblages, respectively. That these two sites have very different historical trajectories suggests that the Thick-Ovate-Rectangular mano is not a temporally sensitive diagnostic, but was a type that was used from Preclassic through Terminal Classic times. At Altar, this form was not as common, which may be a signature of differing use or preference, rather than an indication of temporal difference.

In the BREA assemblages, limestone was not used for groundstone. Granite, namely pink granite characteristic of the Maya Mountains and found in the Sibun River to the south of the middle Belize Valley was the most common material used for manos. To acquire this raw source material, the inhabitants had to travel about 20 km to the Sibun River valley to the south or trade for these materials through an intermediary source.

The only two specimens of basalt that were found in the assemblage probably date no earlier than the Late to Terminal Classic period. Further investigation may demonstrate that the inhabitants of the middle Belize Valley diversified their sources of stone and began acquiring an "exotic" volcanic basalt via long-distance trade with highland Guatemala toward the end of the Classic period. However, while the adoption of basalt groundstone may represent a late development, the presence of obsidian, which likely stems from the same volcanic source, has been found in Preclassic contexts at Hats Kaab, suggesting that long-distance trade networks with the highlands of Guatemala had been established long before Classic times.

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Table 13.1 Data results of BREA mano analysis.

LCB No.	Site	Weight (g)	Length (cm)	Width (cm)	Thickness (cm)	Mano Type	Rock Type	Fragment Type	Context
185	HC	384.5	7.3	7.1	5.6	TOR	Grey/white/black Granite	End	OP.15 Z.2 SQ.B
115	HC	218.1	5.4	7.3	3.2	TR	Pink/grey Grey Granite	Center (close to end)	OP.4 Z.2 SQ.H
181 A	HC	152.2	7.7	3.5	4.5	TR	Pink/grey Granite (lighter pink, contains more grey)	End	OP.4 Z.2 SQ.P
181 B	HC	38.6	2.6	3.9	4.5	TR	Pink/grey Granite (lighter pink, contains more grey)	Center	OP.4 Z.2 SQ.P
181*	HC	190.8	7.7	6.4	4.5	TR	Pink/grey Granite (lighter pink, contains more grey)	End	OP.4 Z.2 SQ.P
1042	HK	101.4	4.2	4.2	5.1	R	River cobble	End	Surface Collection
1208	HK	132.8	5.6	4.6	3.2	TOR	River cobble	Middle	Surface Collection
872	HK	176.6	6.9	5.2	3.8	TR	Cobble stone	Side/slight end frag	Surface Collection
3593	HK	304.9	7.1	6.2	6.7	S	Pink/grey Granite (light pink)	End	OP.7 Z.10 SQ.D
892	HK	660.3	9	8.6	5.7	TOR	Pink/grey Granite (light pink)	End	Surface Collection
962	HK	600.7	8.5	7.5	5.4	TOR	Grey Granite	End (not intact)	Surface Collection
859	HK	156.6	4.4	6	4.1	TR	Grey/white Granite	Center (close to end)	Surface Collection
1075	HK	272.4	7.4	5.5	5.4	TOR	Pink/grey Granite		Surface Collection
1283	HK	912.5	12.9	7.9	4.6	PC	Basalt	End	Surface Collection
972	HK	150.7	4.8	4.1	6	TOR	Pink/Grey Granite (very quartz filled)	End	Surface Collection
3106 A	IK	267	6.4	5.5	5.3	S	Light pink/grey Granite	End	OP.13 Z.1 SQ.Q
3106 B	IK	878	8.7	8.3	6.4	TOR	Pink/grey granite (mostly grey)	Center	OP.13 Z.1 SQ.Q

LCB No.	Site	Weight (g)	Length (cm)	Width (cm)	Thickness (cm)	Mano Type	Rock Type	Fragment Type	Context
185	HC	384.5	7.3	7.1	5.6	TOR	Grey/white/black Granite	End	OP.15 Z.2 SQ.B
115	HC	218.1	5.4	7.3	3.2	TR	Pink/grey Grey Granite	Center (close to end)	OP.4 Z.2 SQ.H
181 A	HC	152.2	7.7	3.5	4.5	TR	Pink/grey Granite (lighter pink, contains more grey)	End	OP.4 Z.2 SQ.P
181 B	HC	38.6	2.6	3.9	4.5	TR	Pink/grey Granite (lighter pink, contains more grey)	Center	OP.4 Z.2 SQ.P
181*	HC	190.8	7.7	6.4	4.5	TR	Pink/grey Granite (lighter pink, contains more grey)	End	OP.4 Z.2 SQ.P
1042	HK	101.4	4.2	4.2	5.1	R	River cobble	End	Surface Collection
1208	HK	132.8	5.6	4.6	3.2	TOR	River cobble	Middle	Surface Collection
872	HK	176.6	6.9	5.2	3.8	TR	Cobble stone	Side/slight end frag	Surface Collection
3593	HK	304.9	7.1	6.2	6.7	S	Pink/grey Granite (light pink)	End	OP.7 Z.10 SQ.D
892	HK	660.3	9	8.6	5.7	TOR	Pink/grey Granite (light pink)	End	Surface Collection
962	HK	600.7	8.5	7.5	5.4	TOR	Grey Granite	End (not intact)	Surface Collection
859	HK	156.6	4.4	6	4.1	TR	Grey/white Granite	Center (close to end)	Surface Collection
1075	HK	272.4	7.4	5.5	5.4	TOR	Pink/grey Granite		Surface Collection
1283	HK	912.5	12.9	7.9	4.6	PC	Basalt	End	Surface Collection
972	HK	150.7	4.8	4.1	6	TOR	Pink/Grey Granite (very quartz filled)	End	Surface Collection
3106 A	IK	267	6.4	5.5	5.3	S	Light pink/grey Granite	End	OP.13 Z.1 SQ.Q
3106 B	IK	878	8.7	8.3	6.4	TOR	Pink/grey granite (mostly grey)	Center	OP.13 Z.1 SQ.Q

Chapter 14

Soil Characteristics across a Settlement Intensity Gradient in the Maya Lowlands of Belize

Serita D. Frey and Melissa Knorr

Overview

The objectives of this research were to conduct soil biogeochemical analyses to (1) examine how settlement intensity altered soil characteristics, (2) trace the local source(s) of clay for ceramic production, and (3) determine the locations of ancient cacao plantations. Soil samples were collected from three sites along a settlement intensity gradient, as well as from a suspected ancient cacao orchard and a modern-day cacao plantation. The soils were analyzed for soil texture, pH, macro- and micronutrients, and a cacao biomarker (theobromine).

Research Approach

Soil samples were collected in January 2012 from three locations within each of three sites representing different settlement intensities: Saturday Creek (high settlement intensity), Xaman (moderate settlement intensity), and Chik'in (low settlement intensity; **Figure 14.1**). The Chik'in site, located at the confluence of Saturday Creek and the Belize River, has an area of low-lying floodplain, which locals refer to as "Otley's Flat." This low-lying floodplain that borders the Belize River is also suspected (based on the ethnographic literature) of being the site of an ancient cacao orchard. Three soil cores were collected at two depth increments (~0-30 and 30-50 cm) from each of three locations within each site. Samples were composited by location for a total of three replicate samples per depth increment for each of the three sites (18 samples total).

We also collected surface soil from a currently managed cacao plantation (Hershey). All samples were uniformally air-dried, sieved (2 mm) and analyzed for soil texture (%sand, silt and clay), pH, macro- and micronutrients, total carbon content (a proxy for soil organic matter), and theobromine. Soils analyzed for the presence of cacao (theobromine or 3,7-dimethyl xanthine) were extracted through ultrasonication, filtered to remove precipitates and pH adjusted (Henderson et al. 2007). Filtrates were then fraction purified with Supelclean LC-18 SPE cartridges, where theobromine was collected by extraction with chloroform. Extracts were then nitrogen-evaporated, reconstituted, and filtered through a 0.22 μm filter before injection onto a

Shimadzu SCL-10A Liquid Chromotographer coupled with a Shimadzu SPD-M10A Mass Spectrophotometer (Srdjenovic et al. 2008).

Figure 14.1 Example soil pit (top photo) and soil sampling area (bottom photo) at Saturday Creek (SC), the most intensively settled area sampled (photos by S. Frey).

Results

Soils collected from the three sites were significantly different ($P < 0.01$) from one another as indicated by a non-metric multidimensional (NMDS) analysis of the soil nutrient data (Figures **14.2** and 1**4.3**). Saturday Creek, the most intensely settled site, was associated with significantly higher concentrations of soil phosphorus and potassium.

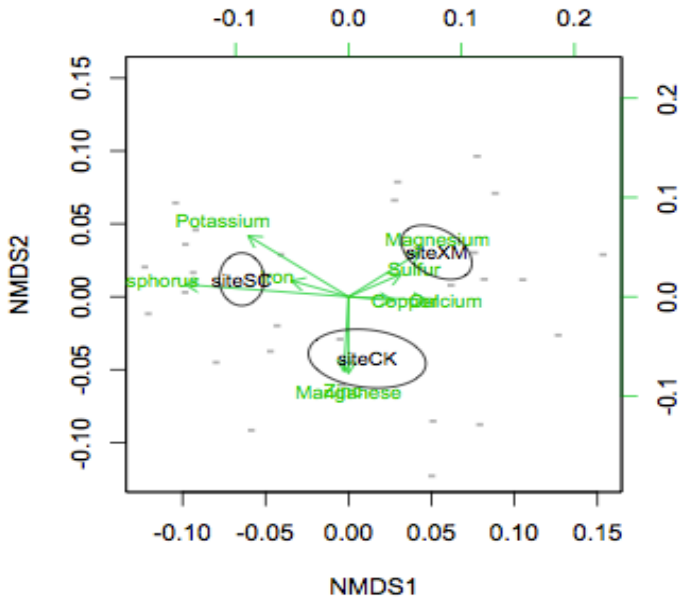

Figure 14.2 Non-metric multidimensional scaling (NMDS) analysis of soil macro- and micronutrient data for surface soil (~0-30 cm) collected at three sites along a settlement intensity gradient. SC = Saturday Creek; XM = Xaman; CK = Chik'in.

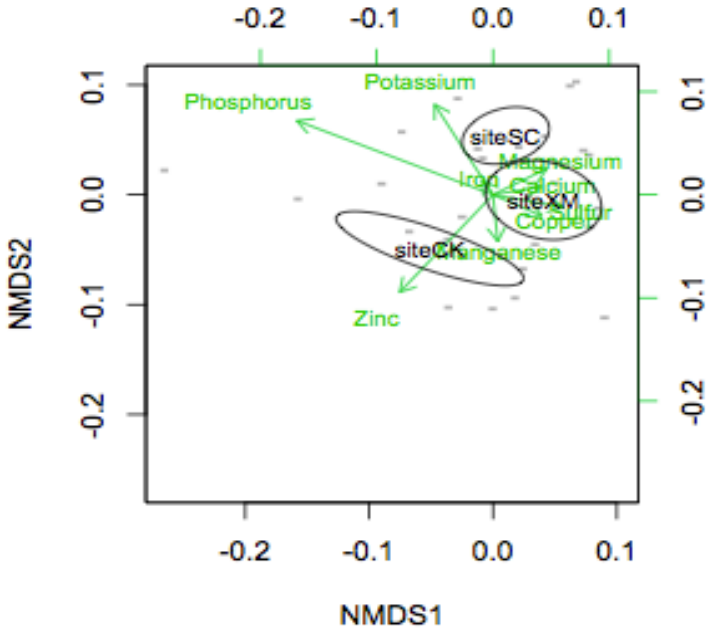

Figure 14.3 Non-metric multidimensional scaling (NMDS) analysis of soil macro- and micronutrient data for subsurface soil (~30-50 cm) collected at three sites along a settlement intensity gradient. SC = Saturday Creek; XM = Xaman; CK = Chik'in.

Results from the cacao biomarker analysis indicate that this method is viable for detecting the presence of theobromine in soils. Theobromine was detected in soil samples collected from Hershey, a modern-day cacao orchard (**Figures 14.4** and **14.5**). We are currently analyzing control soils (with no history of cacao cultivation), along with samples collected at the three settlement locations to determine if cacao was potentially grown at any of these sites.

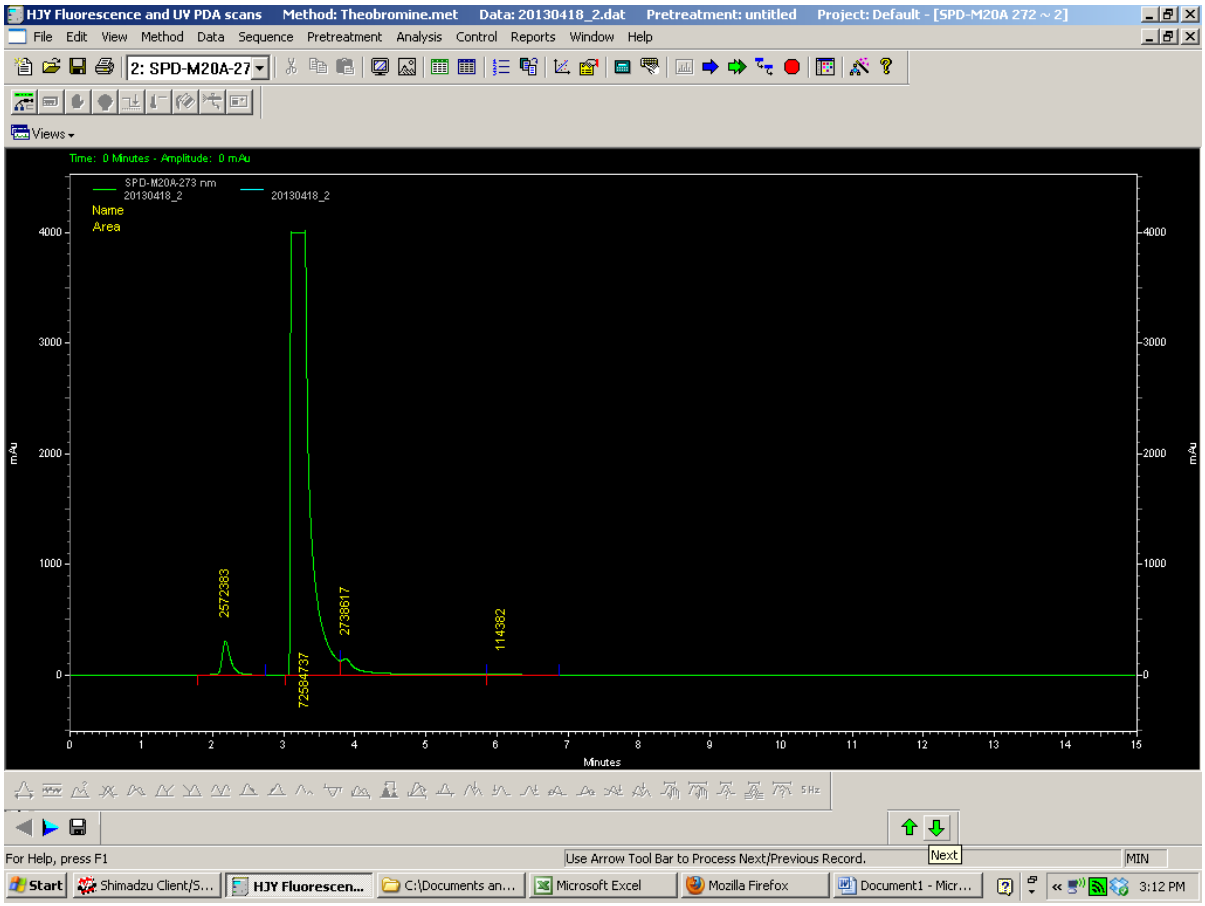

Figure 14.4 HPLC chromatogram of the theobromine standard (0.8 mg ml^{-1}) depicting the peak identifier at 3 min 12 sec.

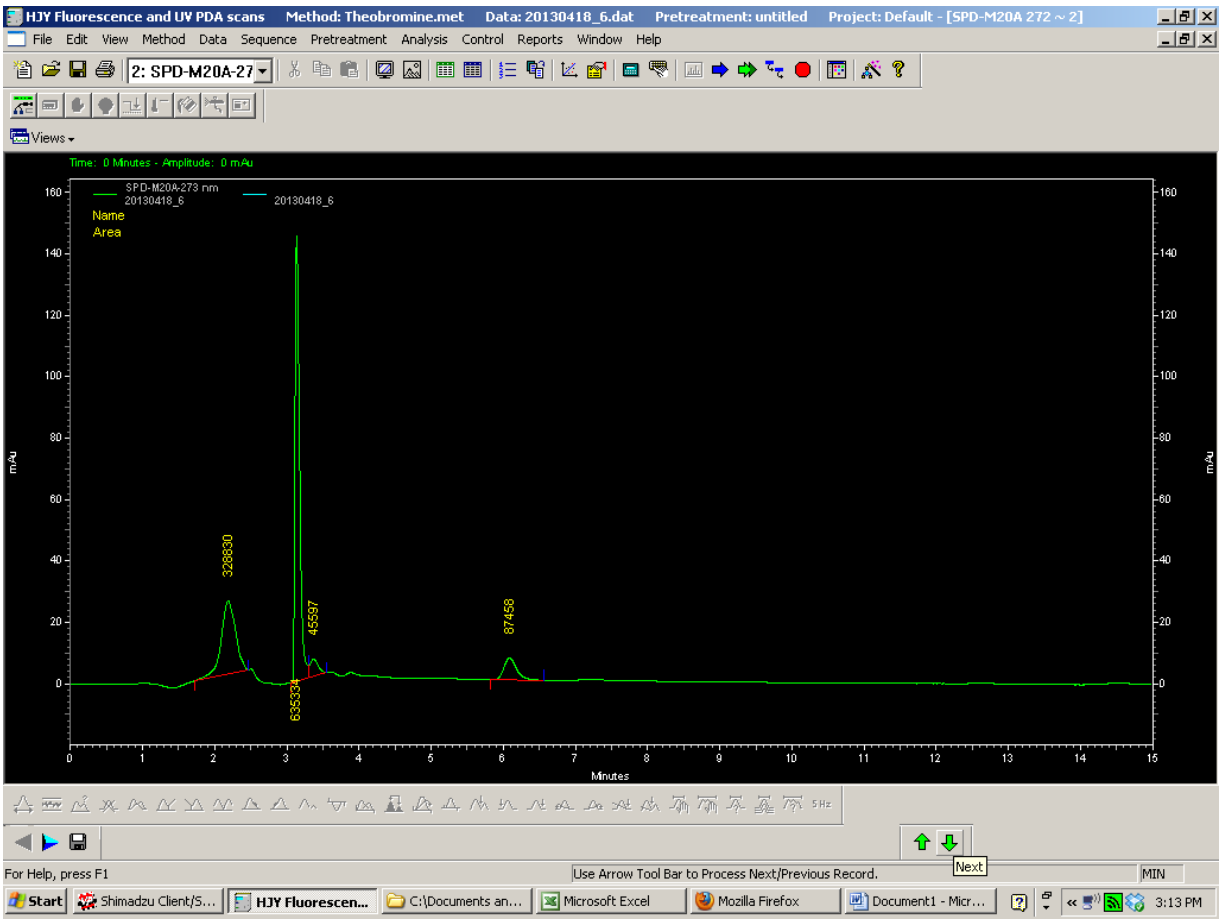

Figure 14.5. **HPLC chromatogram of the same peak identifier detected within the top 10 cm of mineral soil collected from a modern cacao orchard.**

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Chapter 15

At the Close of the 13th Baktun: Future Directions for BREA

Eleanor Harrison-Buck

The year 2012 marked the end of the Great Baktun cycle and the end of the current world for the ancient Maya. For BREA, it marked the end of another incredibly successful field season and the sprouting of new beginnings. By the end of the 2012 season, the BREA project had identified some 600 mounds representing over 50 different sites in the middle Belize Valley alone, which had never been mapped before (**Figure 1.2** [Harrison-Buck 2011]). In 2013, we plan to spend the summer doing a lab season and will return in 2014 to build on our prior research, carrying out further survey, mapping, and excavation of select sites in the BREA study.

Future Research Objectives

Our main research objectives for future seasons will continue to build on the 2012 fieldwork presented herein. During the summer of 2013 we will hold a lab season and conduct artifact analysis. In January of 2014, we will continue to focus our efforts primarily in the middle parts of the Belize River valley in the area between the confluences of Saturday Creek and Labouring Creek. During the summer of 2014, we plan to conduct preliminary reconnaissance in the eastern, lower part of the watershed in and around the vast wetlands that occupy many of the tributaries, such as Black Creek and Labouring Creek (**Figure 1.1**) where we plan to carry out survey, mapping, and test excavation in future seasons. Below we outline a number of specific goals we have in mind for future field seasons:

1. Map with the Total Station the sites of Saturday Creek and Mount Pleasant.
2. Conduct additional test excavations at Kaax Tsaabil.
3. Continue our intensive pedestrian survey of a north-south transect from the east gate of the Yalbac property due south to the Belize River in the vicinity of the Saturday Creek site.
4. Survey the area around the Belize River at the confluence with Labouring Creek, east of Baakche and Nohochtunich, and also across the river from Ch'uul'ook to securely identify the site center of Married Woman's Point.
5. Carry out an initial reconnaissance and begin a mapping program of the lower Belize Watershed in and around the site of Jabonche on Black Creek and the Washing Tree Wetlands located proximate to the site and conduct test excavations.

6. Investigation of possible salt- and pottery-making sites in the easternmost part of the Belize watershed, closest to the coast, along with soil sampling here and elsewhere in the valley.

Proposed Future Activities

One of our overall research objectives for the BREA project is to develop a more comprehensive settlement history and a more specific understanding of changes that occurred among the Belize Valley settlements of the eastern half of the watershed. Through our archaeological investigations, we seek to understand how these settlements were impacted during periods of significant cultural transformation in Maya history—first during the Preclassic-Classic transition, then later during the so-called Classic Maya "collapse" period, and finally during the Spanish Conquest in the sixteenth and seventeenth centuries. Our future research objectives, outlined below, will continue to build on these overarching goals.

Objective 1

The Spanish ethnohistoric accounts mention a north-south overland route that the colonial period friars used in their attempts to pacify the Maya living at sites, such as Tipu, along the Belize River, and the Itza living farther to the west in the Peten region of Guatemala (Jones 1989; Scholes and Roys 1977). This overland route was said to stem from the headwaters of the New River and run south, crossing Labouring Creek to where it intersected the mid-section of the Belize River. Our survey suggests that the densely settled site of Saturday Creek and the associated ceremonial group we refer to as Hats Kaab just to the north mark an important crossroads where we suggest the north-south overland route may have entered the mid-section of the Belize River. Therefore, further investigation of Saturday Creek, including a more updated and comprehensive map of the site and its hinterland settlement, including Mount Pleasant directly across the river, is necessary to better understand the density of settlement, time depth, and inhabitants of this important crossroads in the landscape. Therefore, in future seasons we plan to devote the time to surveying and mapping the site core of Saturday Creek and its immediate hinterlands.

About 100 mounds were observed in the site core of Saturday Creek by Dr. Lisa Lucero and her team, who mapped the site fifteen years ago using an optical transit and stadia rod (Lucero 1999:10). Since this time, additional forest clearing for agriculture has revealed a greater density of mounds in the hinterland areas (numbering in the hundreds), which surround the site core. The majority of these mounds are not on Lucero's original site map. Due to intensive clearing and cultivation activity, the site is more open and exposed, but as a result, it is also at a greater risk of being erased by repeated plowing, particularly the smaller mounds in the hinterlands to the north, east, and west of Saturday Creek. The mapping proposed for future seasons will allow us to record more detailed topographic information for the core of the settlement as well as the more subtle mound features in the landscape exposed in more recent

years by the expanded clearing. The mapping will provide more nuanced settlement data for this important site along the middle Belize River and allow us to more accurately tie the site into our existing GIS map of the BREA study area using our GPS and Total Station.

Objective 2

A second goal of future field seasons will involve further test excavation at the hilltop site of Kaax Tsaabil (**Figure 1.2**). In January 2012, we mapped this hilltop site with a Total Station (Kaeding, Murata, and Norris, Chapter 2). When we returned in May of 2012 much of the area surrounding the hilltop had been burned and bulldozed by the new owners, Green Tropics Ltd. During the summer 2012 season, our survey team recorded many additional mounds in the surrounding, low-lying areas. During this time we also performed test excavations in Plaza A, one of the main elite residential groups on the northernmost hilltop (Murata et al., Chater 10). Our proposed plan for future seasons is to expand one of our prior excavations (Operation 14) located on the northern range structure in this plaza group, where we exposed a cache of inverted ceramic vessels, likely a termination deposit, which capped an unusual burial of an individual who may be a sacrificial victim (for further discussion, see Murata et al., Chapter 10). Further investigations in this area during the January 2014 season are aimed at clarifying whether this is an isolated burial or part of an extended termination deposit. During our investigations of the area in 2012, the PI observed that more possible pit features appear on the same surface where the informal burial was found, suggesting that there may be other similar deposits present. Our aim during the future field seasons is to further expose this area and test this hypothesis.

Objective 3

Our findings in 2012 of a Spanish coin from the eighteenth century from an area just east of Saturday Creek was our first definitive evidence of a Spanish colonial presence along the projected north-south overland route (Kaeding, Chapter 6). Our survey along a north-south transect has given us more confidence that we have correctly identified the location of the north-south overland route that the Spanish described in their sixteenth century trek from the headwaters of the New River south across Labouring Creek down to the middle Belize River (Buck, Harrison-Buck, and Divoll, Chapter 5). If we are correct, the ancient Maya site of Saturday Creek may be "the hamlet formerly known as Chantome" (Jones 1989:287-288), which was abandoned when the Spanish arrived in the sixteenth century (Harrison-Buck 2010). The Spanish described the Contact-period site of Lucu where the overland route entered the Belize River, which may be one of the Late Postclassic sites we have identified in the vicinity of Chik'in (across the river from Mount Pleasant) or possibly at Ma'xan (also known as Never Delay)—roughly the same location where Scholes and Roys (1977:48) predicted the site of Lucu to be.

Further study of the archaeology and the archival documents from the nineteenth century suggest that the area just east of the site of Saturday Creek is where ex-Confederate Colin McRae

set up his homestead and store on the Belize River, right at the confluence with Saturday Creek. Furthermore, our survey of the north-south transect in 2012 suggests we may also be close to finding the ex-Confederate town of New Richmond, which we believe is located on the hilltop on the south side of Labouring Creek proximate to the site of Liik'il (see Buck, Harrison-Buck, and Divoll, Chapter 5). Our future survey work will continue to explore these areas to expand our understanding of the use and long history of the overland route throughout colonial times.

Elsewhere, I argue that the overland route pre-dates the Spanish Conquest and was used by the Maya as early as the Terminal Classic period (Harrison-Buck 2010). In our expanded survey of this north-south route, I anticipate finding additional clusters of ancient Maya settlement lining the length of this north-south overland route. In 2014, we will continue to conduct intensive pedestrian survey along the north-south transect where we have not yet carried out any reconnaissance (see **Figure 1.2**), beginning just south of the East Gate of the Yalbac property where two sites were identified in 2011 near the headwaters of Ram Goat Creek. Survey teams will walk the area between the east gate and Labouring Creek. Here, we identified in 2012 two ancient Maya sites (Liik'il and Chu'ul Ximbal) on either side of Labouring Creek, as well as a "natural" bridge that we believe is the same partially submerged creek crossing that the Spanish described in their sixteenth century accounts. As noted above, survey teams will take a closer look at the hilltop on the south side of Labouring Creek where we suspect New Richmond may have been. Then, they will continue due south where we have not yet surveyed, following the higher ridges until they reach the northern sections of the Colorado Lagoon system. To the south of here, a number of sites (Chumu'uk Ha, Chikin Chi'Haal, and Hats Kaab) that are associated with the lagoon were identified in 2011 (Kaeding and Murata 2011). Just to the south of this point is the site of Saturday Creek.

Objective 4

In future field seasons we also plan to conduct additional survey in the area along the south side of the Belize River near the confluence of Labouring Creek where several large sites have been reported, including Married Woman Point. Descriptions provided by local informants and the site records at the Institute of Archaeology (IA) indicate that Married Woman Point is a large ceremonial site with monumental stone architecture. During the summer of 2012, we performed some reconnaissance on the south side of the Belize River and located one sizeable site with substantial stone masonry—Nohochtunich—located just east of the confluence of Beaver Dam Creek (Kaeding, Murata, Buck, and Norris 2013; **Figure 1.2**). Farther downstream on the south side of the river we also identified the smaller site of Baakche. During the 2012 season, we also sketch mapped the densely settled site of Ch'uul'ook on the north side of the river (refer to **Figure 1.2**). It is possible these sites represent the outlying settlement of Married Woman Point. Our goal with this continued reconnaissance is to locate the site center of Married Woman Point, sketch map the site, and ultimately map the site with a Total Station in future seasons.

Objective 5

A fifth goal of future fieldwork is to conduct preliminary reconnaissance in the wetlands along the tributaries of the Belize River. Within the 6000 km^2 BREA study area, there are over 122 km^2 of perennial wetlands, which is significant given there is only a total of 436km^2 of wetlands in the entire country of Belize (Meerman and Sabido 2010:Table 2). In satellite imagery that is freely available to the public (e.g., Google Earth), ditched and drained fields as well as other hydrological features are visible in many of the perennial wetlands of the BREA study area, including Labouring Creek, Western Lagoon, and the Spanish and Black Creeks. We believe there are preserved ditched and drained fields in virtually all of the perennial wetlands in the BREA study area (**Figure 15.1**). The wetland features that I have observed in the imagery from the BREA study area are strikingly similar to the hydrological features identified and excavated in the perennial wetlands of northern Belize (Baker 2003; Beach et al. 2009; Guderjan and Krause 2011; Luzzadder-Beach et al. 2012).

Our preliminary reconnaissance of wetland features and their associated sites will lay the groundwork for more extensive investigations planned for future field seasons. We will begin our investigations by doing an aerial flight in a small, low-flying plane over the BREA wetlands at the onset of the rainy season. According to Siemens and Puleston (1972:229), the ridges and canals of wetland fields tend to be particularly well defined by color differences in the vegetation at the onset of the rainy season. Guderjan and Krause (2011) note that air reconnaissance in a small, low-flying aircraft offers the best vantage point for discerning wetland fields and capturing them in oblique photographs. Our next step will be to pinpoint locations of the modified fields on our master GIS map. We will do some preliminary ground-truthing along the Spanish and Black Creeks, including Washing Tree Wetlands in the vicinity of the site of Jabonche on Black Creek, accessible via the Northern Highway. Our aim is to return to these areas in 2014 for a longer investigative season involving test excavation.

Objective 6

In our reconnaissance of the easternmost part of the Belize watershed, we also will be on the look out for locations ideal for ancient Maya salt and pottery production. At the boundary of the Sibun and Belize Watersheds, there is a large site known as Wits Cah Ak'al just east of Belize City near the modern town of Hattieville on the Western Highway, located in pine savannah and wetlands. Recent excavations have revealed a series of sizeable earthen mounds filled with debris from saltmaking, as well as pottery production (Murata 2011). The site shows little to no evidence of habitation and appears to be strictly a large-scale production locale. The local clays are ideal for pottery production and salt can be extracted from the brackish lagoon waters. The mounds contain no standing architecture and in some cases debris, such as vessel fragments, spacers and clay supports associated with salt production, are visible on the surface. Mounds containing similar debris have been reported around the vicinity of Sand Hill and will be investigated in future seasons.

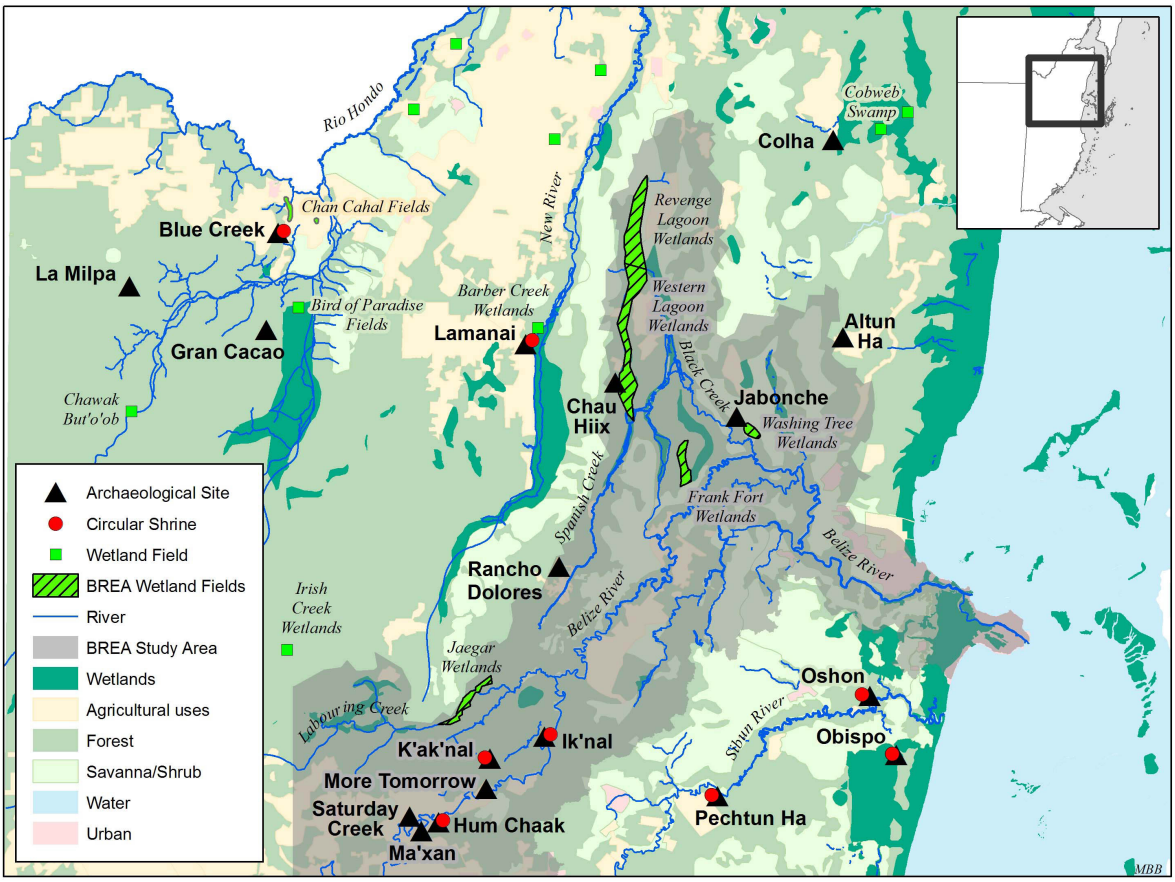

Figure 15.1. Map of BREA study area showing locations of wetland fields (drafted by M. Brouwer Burg).

Additionally, we would like to conduct systematic soil sampling in order to test soils for their clay and saline properties, which will be directed by soil specialist Dr. Serita Frey. She will conduct soil biogeochemical analyses to trace the local source(s) of clay for ceramic production and saline properties ideal for salt production in the areas where such production locales are thought to exist. Dr. Frey also will examine biogeochemical conditions of the soils throughout the valley to determine soil fertility and possible locations for cacao plantations in historic and ancient times. Soil samples also will be collected from modern cacao orchards, such as the Hershey plantation in the upper Sibun Valley, for comparative analysis along side soils from ancient and historic sites in the Belize Valley where cacao (according to ethnohistoric accounts) was cultivated in the past (see Jones 1989).

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