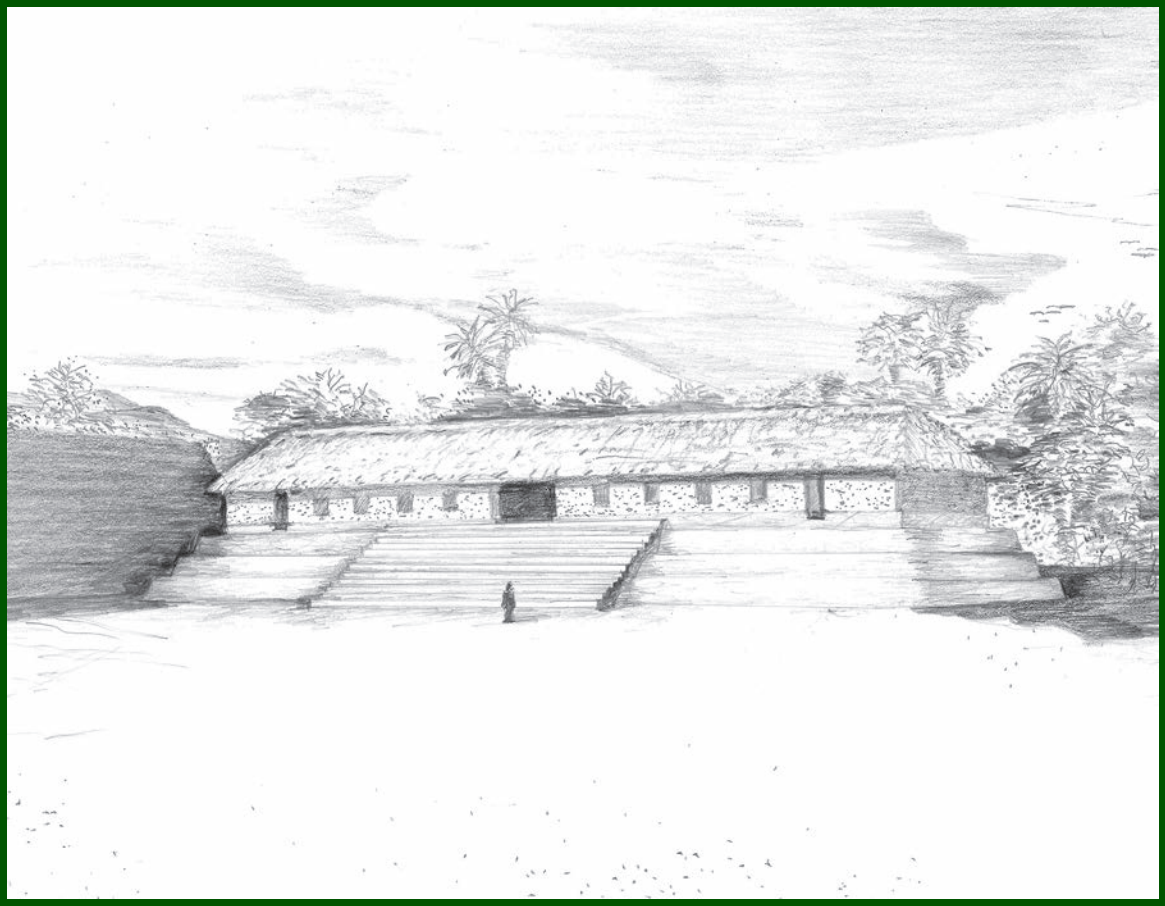
The 2013 Season of the Chan Chich Archaeological Project

EDITED BY

Brett A. Houk



Papers of the
Chan Chich Archaeological Project, Number 7
Department of Sociology, Anthropology, and
Social Work
Texas Tech University • Lubbock, Texas
2013

Chan Chich Archaeological Project
CCAP
Chan Chich, Belize - Central America

The 2013 Season of the Chan Chich Archaeological Project

EDITED BY

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WITH CONTRIBUTIONS BY

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Cover art: Architecutral reconstruction drawing of Structure A-5 at Chan Chich, by Gary Smith, 2013.

Acknowledgments

While "resort archaeology" has its perks, basing a field school at a resort comes with its own set of problems. Contracting services from an established hotel alleviates many logistical issues, but the costs are higher and the margin for error in the budget much, much smaller than for a field school in a traditional field camp. To be successful, the Chan Chich Archaeological Project (CCAP) and the Field School in Maya Archaeology (FSMA) rely on the support of a great number of organizations and people. First and foremost, I would like to thank Dr. John Morris and Dr. Jaime Awe of the Institute of Archaeology (IA) for being supportive of our work and for issuing me a permit to conduct the research in 2013. The other staff members at the IA all deserve thanks, particularly Brian Woodye, Delsia Marsden, and Melissa Badillo. Melissa graciously assisted the project with passport extensions.

It takes both a permit from the IA and permission from the landowner to conduct excavations in Belize. Therefore, I am extremely grateful to the Bowen family for allowing us to work at Chan Chich and on Gallon Jug. I was fortunate to spend a pleasant dinner with Dixie Bowen one evening at the lodge. Alan Jeal, the new manager of Gallon Jug, supported the project in many ways and facilitated not only our work at Chan Chich but also on the survey of Gallon Jug Ranch. I would also like to thank Jeff Roberson for allowing us to conduct our archaeological survey on the Laguna Seca parcel and for letting us drive through Yalbac Ranch when the bridge was still there.

The manager of Chan Chich Lodge in 2013 was my longtime friend Letty Martinez, who has our utmost thanks and appreciation for going out of her way to make our stay exceptional. We were assisted in the field by some of the staff from the lodge throughout the field season, but particularly at the bitter end when we raced to finish excavations and backfilling after the FSMA had ended. Assisting us at Chan Chich at various times were: Emil Flota, Eduardo (Yayo) Granados, Elias Romero, Don Pedro Barahona, Don Jorge Montuy, Don Eulalio Corado, Migde Perdomo, Luis Romero, Raul Martinez, and Marvin Ramirez. Jeremias (Jerry) Serminia not only helped us excavate, but he was the critical component of the archaeological survey team and deserves special thanks for keeping everyone alive in the bush. The other crucial member of the team was the head cook, Maritsa Montuy, who did a fantastic job of feeding our group with a remarkable rotation of wonderful meals. The rest of the staff all did their part to make the field school a pleasant and memorable experience. In no particular order, I would like to thank: Don Gilberto Vasquez, Massiel Carrillo, Esmeralda De La Rosa, Arlene Sanabria, Teresa Cordova, Olivia Cordova, and Rosario Vasquez. In addition to Alan, we would also like to thank the staff of Gallon Jug Ranch for helping us with access, fuel, and many other matters. Particular thanks goes to Hector Gomez for his kindness to the project.

A crucial component of research is funding. I would like to thank Interim Dean Jeffery Williams of the College of Arts and Sciences for providing scholarship funds. Leroy Lee of American Seismic has been a great friend of the project since 2012, and we would like to think him for his generous donation to Texas

Tech University (TTU), which made the survey component of the project possible. We would also like to think the National Geographic Society/Waitt Grants program for funding the mapping and remote sensing work at Structure A-5 through Grant Number W261-12.

In 2013 we were aided by a number of important consultants, visitors, and analysts. First and foremost are Dr. Chet Walker and his associate Mark Willis, who conducted the Structure from Motion and ground penetrating radar survey of Structure A-5. Chet and Mark provided feedback and imagery throughout the field season, processing data remotely from the United States. From TTU, we had Gary Smith, an associate professor of architecture, and Dr. Carolyn Tate, a professor of Art History, come visit. Gary assisted with the Structure A-5 mapping and drew the architectural reconstruction drawing of the building that graces the cover of this report. Carolyn provided a couple of guest lectures to the students and illustrated some sherd profiles in our lab. I would also like to thank Dr. Fred Valdez, our project ceramicist, for processing a large percentage of our 2013 assemblage. Norbert Stanchly generously examined our faunal material from both Chan Chich and La Milpa.

I would be remiss if I did not acknowledge the hard work and financial sacrifice of the project staff. Krystle Kelley (TTU), David Sandrock (TTU), and Kelsey Herndon (Alabama) supervised the fieldwork and trained the students in excavation methods, recording, mapping and survey. Junior staff member Ashley Booher (TTU) assisted Kelsey in the field, and returning students Erica Gallis (George Mason University), Rose Leach (TTU), Tony Mouton (TTU), and Edgar Vazquez (TTU) walked the blurry line between student and junior staff, assisting with the excavations, survey, and lab work. Carolyn Nettleton (University of Toronto) set up and operated an organized and efficient field lab for us 2013, a vast improvement over the lab we had in 2012.

The CCAP is supported by the FSMA, a program run through Study Abroad at TTU. I would like to thank Sandy Crosier, Elizabeth McDaniel, and Rachel Jarnagin for working with the square peg that our project is in the round hole of study abroad programs. The greatest thanks, however, go to the 12 first-time students who chose this project over all the other possible choices. They are from TTU: Amanda McCatherine, Samantha Mitchell, Stephanie Wuthnow, and Caitlin Yoakum. The non-TTU students are Emily Albertolle (San Francisco State University [SFSU]), Alexandra Bailey (Eckerd College), Anna Kebler (New Mexico), Christopher Kubic (Hamline University), Isabel McKay (Michigan), Devin Reaves (Baylor), Elaine Turner (SFSU), and Josh Wright (Hunter College). Eduardo (Coco) Granados, Jr., a Belizean student, joined us for three weeks in the field.

Finally, one of the things that makes working Belize so much fun is getting to see friends and colleagues on other projects. I would like to give a shout out this year to Dr. Lisa Lucero who works on Yalbac Ranch to our south. She not only made arrangements for me spend my first night in country at her "resort archaeology" camp, but she graciously transported some samples and GPS units to the IA for me after the Yalbac bridge washed out. In doing so, she saved the project at least $200 in gas and saved me 12 hours of driving. And, we got to test out a pretty sophisticated cooler transport system.

Guns up!

Brett A. Houk, December 2013

2013 CCAP staff and students at Xunantunich. From left to right, front row: Amanda McCatherine, Samantha Mitchell, Anna Kebler, Carolyn Nettleton, Ashley Booher, Krystle Kelley, Kelsey Herndon, Rose Leach. From left to right, second row: Devin Reaves, Stephanie Wuthnow, Isabel McKay, Elaine Turner, Emily Albertolle, Alexandra Bailey. From left to right, third row: Brett A. Houk, Edgar Vazquez, Erica Gallis, Caitlin Yoakum. From left to right, back row: Tony Mouton, Josh Wright, David Sandrock, Chris Kubic. Not pictured: Gary Smith, Chet Walker, and Mark Willis.

Dr. Lisa Lucero (left) and her field crew ferry a cooler containing GPS units and samples for export across a swollen, angry creek. With the bridge at Yalbac Ranch's south gate washed away, our travel time from Chan Chich to Belmopan would have been approximately 6 hours each way. Dr. Lucero graciously delivered the contents of the cooler to the IA for us.

An Introduction to the 2013 Season of the Chan Chich Archaeological Project

Brett A. Houk

The 2012 field season of the Chan Chich Archaeological Project (CCAP) marked the renewal of research at Chan Chich after an 11-year hiatus that followed the 2001 season (Houk 2012). In addition to investigations in the Upper Plaza at Chan Chich (Kelley et al. 2012; Walker 2012), the CCAP mapped and excavated the nearby satellite center of Kaxil Uinic (Harris and Sisneros 2012). In 2013, teams continued excavations in the Upper Plaza and investigated Structure A-5 in the Main Plaza, and the project's focus expanded to include a survey component. The CCAP is a research project that operates alongside Texas Tech University's (TTU) Field School in Maya Archaeology, a study abroad program that offers students the opportunity to learn archaeological methods and techniques while contributing to an active research project.

This chapter includes relevant project minutia (dates, staff, permits, funding, etc.), summaries of the 2013 excavations, and an updated description of Chan Chich's site plan and chronology, based on the results of seven seasons of research at the site by the CCAP. Finally, the chapter closes with a preview of the rest of the volume.

PROJECT AREA

The ruins of Chan Chich are in the southwestern corner of Gallon Jug Ranch, which is owned by Bowen and Bowen, Ltd. and operated as Gallon Jug Agro-Industries (Figure 1.1). Prior to the 2013 season, Bowen and Bowen, Ltd. sold over 100,000 acres to Yalbac Ranch, retaining an irregularly shaped parcel covering approximately 28,000 acres and encompassing the headquarters of Gallon Jug Ranch, Sylvester Village, and Chan Chich Lodge. Gallon Jug is now surrounded on all sides by properties controlled by Yalbac Ranch, which includes the Laguna Seca parcel (the former Gallon Jug land that was conveyed to Yalbac in early 2013). The boundary between Gallon Jug Ranch and Yalbac Ranch proper passes through the ruins of Chan Chich, south of the Upper Plaza. The site of Kaxil Uinic is now on Laguna Seca.

PROJECT TIME LINE, STAFF, AND CONSULTANTS

The project began on May 13, 2013, with the arrival of the project director in Belize (Table 1.1). On May 14, Dr. Chet Walker and Mark Willis of Archaeo-Geophysical Associates (AGA), LLC and Gary Smith, an associate professor of architecture at TTU, arrived to conduct preliminary work funded by a grant from the National Geographic Society/Waitt Grants (NGS/Waitt) program (see below). Senior project staff (Kelsey Herndon, David Sandrock, Krystle Kelley, and Carolyn Nettleton) arrived on May 17. Twelve first-time

Houk, Brett A.
2013 An Introduction to the 2013 season of the Chan Chich Archaeological Project. In *The 2013 Season of the Chan Chich Archaeological Project*, edited by Brett A. Houk, pp. 1–14. Papers of the Chan Chich Archaeological Project, Number 7. Department of Sociology, Anthropology, and Social Work, Texas Tech University, Lubbock.

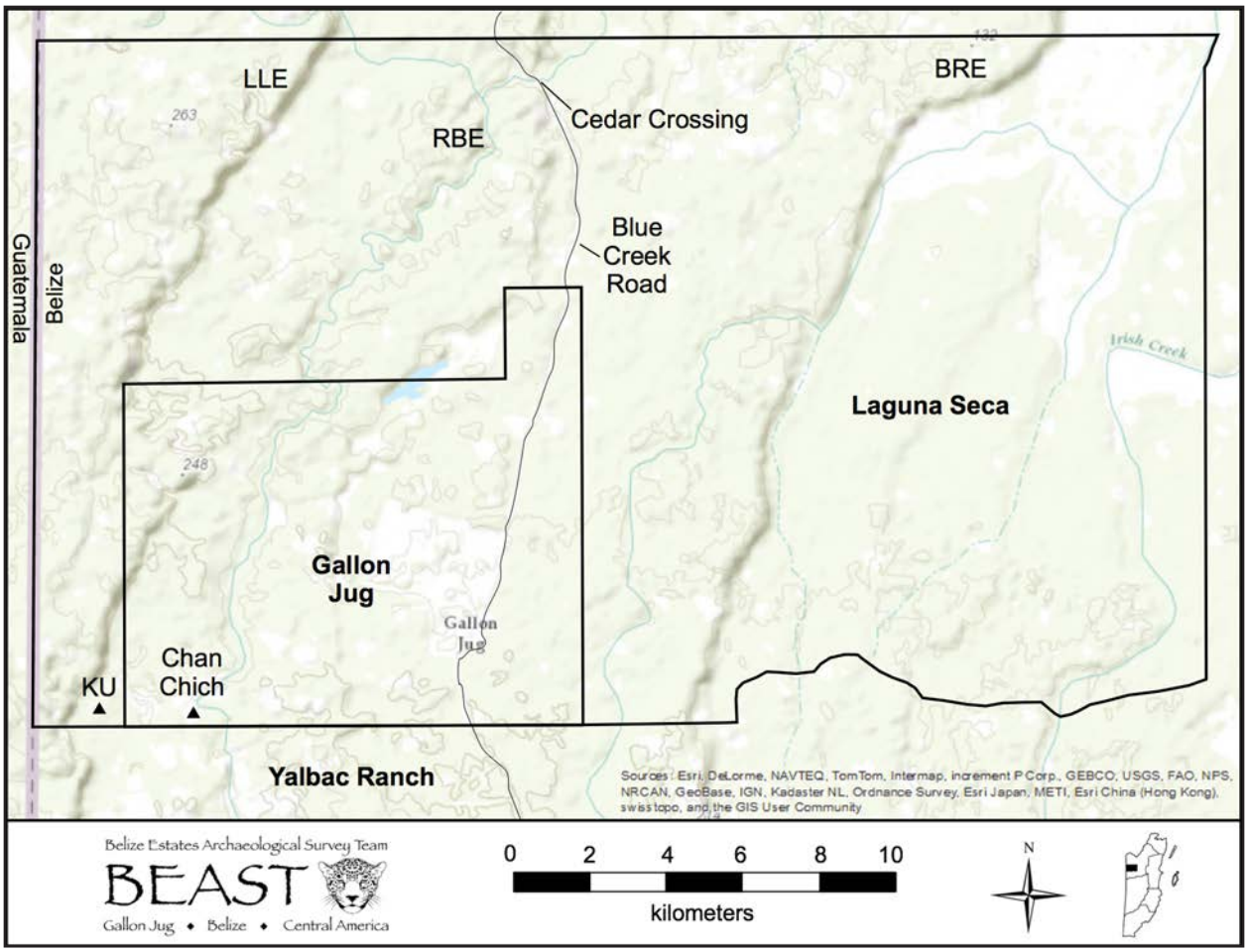

Figure 1.1. Map of the Chan Chich Archaeological Project's permit area in 2013 showing the property boundaries between Gallon Jug, Laguna Seca, and Yalbac Ranch. Chan Chich and Kaxil Uinic (KU) are plotted in the southwestern corner of the map. From east to west, the three escarpments that shape the physiography of the project are the Booth's River Escarpment (BRE), Río Bravo Escarpment (RBE), and La Lucha Escarpment (LLE).

field school students, four returning students, and junior staff member Ashley Booher arrived on May 20. Willis and Smith departed that same day, and Walker departed two days later. A Belizean high school student joined the project on May 24 and worked with us for three weeks. The field school students spent either 25 nights or 30 nights at Chan Chich, with the last students departing on June 19. Most of the project's staff departed on June 21, but Houk and Herndon continued excavating Structure A-5 with workers from Chan Chich Lodge until July 1, which marked the end of the 2013 field season.

PROJECT FUNDING

Texas Tech's Field School in Maya Archaeology, a cost-sharing program run through Study Abroad, was the primary source of funding for the 2013 season of the CCAP. The College of Arts & Sciences provided funding for one Belizean student to participate on the project. Additional funding came from the NGS/Waitt grant awarded to the project director for mapping and remote sensing at Structure A-5. The initial season of survey work was generously supported by a private donation to TTU earmarked for that purpose.

Table 1.1. Project Staff and Consultants, Sorted by Arrival Date

Name	Role	Affiliation	Arrival	Departure
Dr. Brett A. Houk	Project Director	TTU (Anthropology)	5-13-13	7-1-13
Gary Smith	Consulting architect	TTU (Architecture)	5-14-13	5-20-13
Dr. Chet Walker	Consulting Archaeo-geophysicist	AGA, LLC	5-14-13	5-22-13
Mark Willis	Mapping Specialist	AGA, LLC	5-14-13	5-20-13
Kelsey Herndon	Operation Director	University of Alabama (Anthropology graduate student)	5-17-13	7-1-13
Krystle Kelley	Operation Director	TTU (Anthropology graduate student)	5-17-13	6-21-13
Carolyn Nettleton	Lab Director	University of Toronto (Graduate)	5-17-13	6-21-13
David Sandrock	Survey Operation Director	TTU (Anthropology graduate student)	5-17-13	6-21-13
Ashley Booher	Assistant Operation Director	TTU (Anthropology undergraduate)	5-20-13	6-19-13
Dr. Carolyn Tate	Consulting art historian	TTU (Art History)	6-14-13	6-19-13
Dr. Fred Valdez, Jr.	Project Ceramicist	The University of Texas (Anthropology)	--	--
Norbert Stanchly	Consulting faunal analyst	Trent University (Anthropology graduate student)	--	--

PROJECT PERMITTING

The Institute of Archaeology (IA), part of the National Institute of Culture and History, issued Permit No. IA/H/2/1/13(08) to the author for the excavations at Chan Chich and the survey of Gallon Jug and Laguna Seca. At the time the permit was issued, Dr. Jaime Awe was the Director of the IA, and Dr. John Morris was the Associate Director of Research and Education. Both landowners gave permission, as well, for the research.

AN OVERVIEW OF THE 2013 SEASON

During the 2013 season, our efforts targeted three specific objectives: the completion of a two-season study of the stratigraphy in the Upper Plaza at Chan Chich (Figure 1.2); mapping, remote sensing, and excavations at Structure A-5 in the Main Plaza; and survey on the Gallon Jug and Laguna Seca properties. The project afforded field school students opportunities to participate in each area of research and work in the field lab, as well, to gain exposure to artifact processing and analysis.

Investigations at Chan Chich

Upper Plaza

In 1997, during the CCAP's first season of excavations, we discovered a Terminal Preclassic tomb in Upper Plaza at Chan Chich (Houk et al. 2010). With the renewal of the project, we decided an intensive investigation of the Upper Plaza would be a primary component of our research. TTU graduate student Krystle Kelley oversaw the day-to-day investigations of the Upper Plaza for her thesis research. The goal of these investigations was to target the oldest part of the site to expand our understanding of the founding of Chan Chich

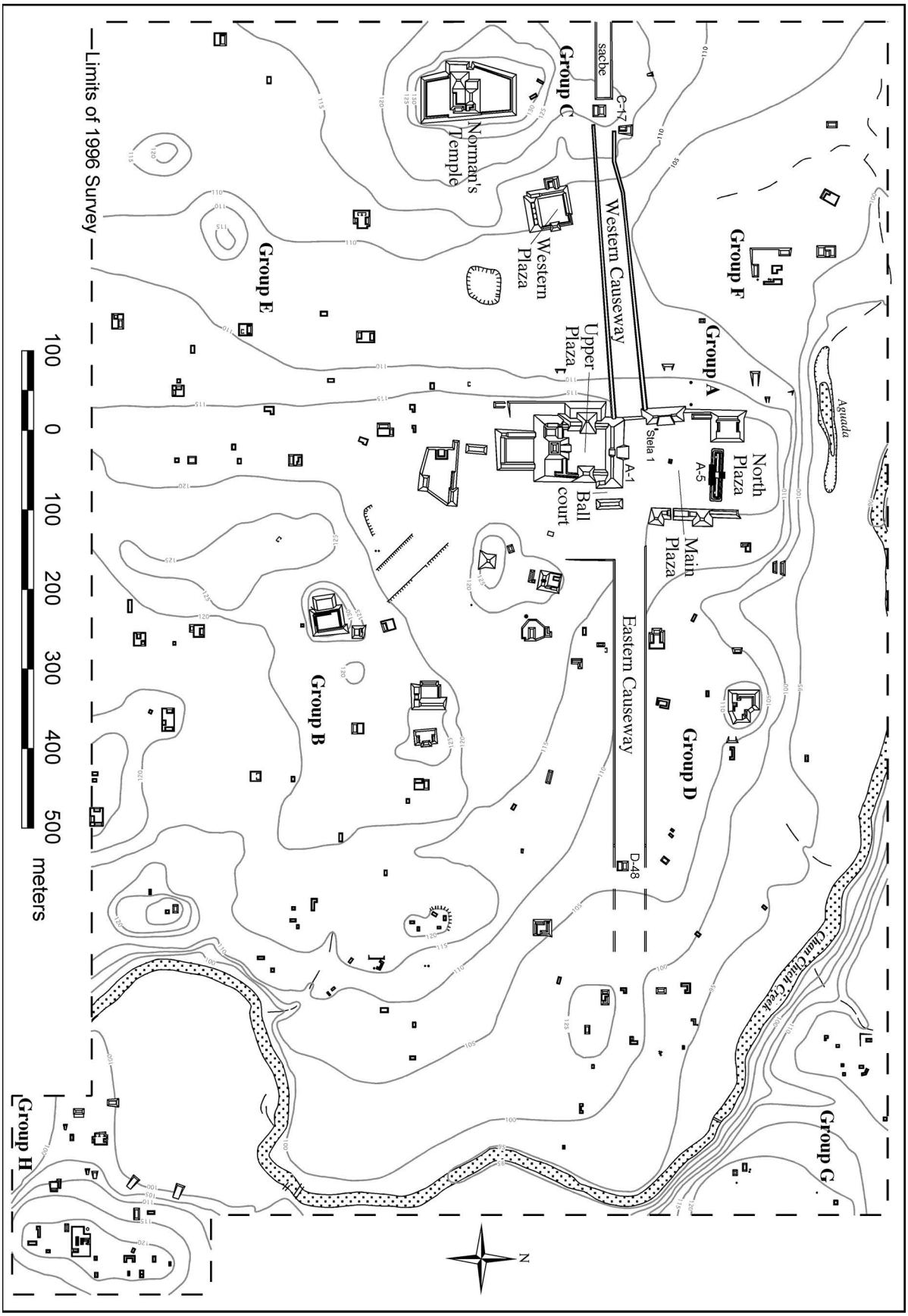

Figure 1.2. Map of Chan Chich. Contour interval is 5 m.

and the evolution of the architectural core of the city. The Upper Plaza work was planned as a 2-year study, and the 2012 work included preliminary remote sensing work by Dr. Chester Walker (2012) followed by exploratory excavations (Kelley et al. 2012).

In 2013 the research design built on the previous season's findings (Kelley et al., this volume). Kelley supervised the excavations; returning students Rose Leach and Erica Gallis assisted her, as did a crew of approximately six field school students and two workers. Crews opened 14 new suboperations and reopened two suboperations from the previous season in 2013. Spatially, these suboperations extend from the northernmost end of the plaza to the southernmost edge, providing a nearly complete north-south cross section of the plaza. Work in 2013 also specifically targeted Burial 10, which had been exposed near the end of the 2012 season but not excavated.

Excavations in 2013 encountered an elevated platform buried in the northern portion of the plaza. This is an important find that explains the differences in stratigraphy between the northern and central plaza units excavated in 2012 (see Kelley et al. 2012). It is possible this platform represents a Late Preclassic structure that once formed the northern edge of the Upper Plaza but was subsequently buried by a Late Classic expansion of the group.

A significant goal of the proposed research was to tie the 2012 and 2013 stratigraphy into the sequence documented by Robichaux (2000) and Houk et al. (2010) in the area of Tomb 2. Houk et al. (2010) interpret the tomb as a chamber cut through a series of Late Preclassic floors and into bedrock, covered with capstones at the level of bedrock, and then capped by a low shrine. Kelley et al. (this volume) successfully correlated the stratigraphy from their excavations with the floors that Robichaux (2000) encountered during the tomb excavations. Most importantly, comparing the elevations of the floors recorded by Robichaux (2000) to those excavated in 2013 indicates that the floor in use immediately prior to the creation of Tomb 2 was the compact dirt surface that extends over all of the tested portion of the Upper Plaza south of the platform mentioned above (see Kelley et al., this volume).

First exposed near the end of the 2012 season, Burial 10 constituted a significant research agenda. Rose Leach and Krystle Kelley supervised the excavations of the feature over the course of the field season (Figure 1.3). The burial, which was cut through a Middle Preclassic floor and capped by a Late Preclassic floor, represents one of the oldest burials documented thus far at Chan Chich. The remains included an adult of undetermined sex. Included with the human bone were 19 domestic dog teeth (Kelley et al., this volume).

Structure A-5

Prior to 2013, aside from minor exposures on the steps of Structure A-1 (Houk 1998) and excavations of Structure A-11, an enigmatic pile of rocks in the middle of the plaza (Houk 2000), no excavations had been conducted on the buildings surrounding the Main Plaza. In 2013, the CCAP targeted Structure A-5 for investigation with funding from NGS/Waitt (Houk et al., this volume). Structure A-5 is a 64-m long range building that borders the Main Plaza on the north. Based on his mapping data, Guderjan (1991:38) speculated that "collapsed vaulted rooms once faced into the plaza," but clearing the vegetation on the mound down to ground level revealed the building to be a long platform. The objective of the NGS/Waitt-funded study was to test a new technique for mapping Maya mounds and predicting the location of buried architecture (Houk et al., this volume). The research combined Structure from Motion (SfM) and ground penetrating radar (GPR) survey of the mound; Chet Walker

Figure 1.3. Rose Leach at work on Burial 10 in the Upper Plaza.

and Mark Willis conducted the investigations. As discussed in Houk et al. (this volume), the SfM mapping was extremely successful. The GPR data are still being analyzed, but show promise despite the complicated nature of the buried fill and architecture in the mound (see Herndon et al., this volume).

Kelsey Herndon, assisted by Ashley Booher, directed a team of approximately six students in the excavations of Structure A-5 (Figure 1.4). Following the completion of the field school, Houk and Herndon continued working at Structure A-5 with four workers from Chan Chich Lodge for approximately 10 more days. The two most important discoveries of the work at Structure A-5 are that the area north of the building was actually a functioning plaza and that the building has multiple construction episodes. Long considered an unmodified area outside of the Main Plaza, the presence of a north-facing stairway on Structure A-5 suggests the space north of the Main Plaza, now called the North Plaza, was part of the urban core of Chan Chich. The presence of multiple construction phases in the building, as described by Herndon et al. (this volume) means that the large structures surrounding the Main Plaza are not the product of a single construction event.

The final form of Structure A-5 was a platform with stairs on its northern and southern sides that climbed from the plazas to the summit of the building. The substructure supported long rooms on both sides of the building composed of low masonry walls and, presumably, a perishable superstructure made of pole and

Figure 1.4. Project Director Brett A. Houk and Operation Director Kelsey Herndon discuss the excavations at Structure A-5 over a mid-morning cup of Gallon Jug coffee.

thatch. The architectural reconstruction drawing on the cover of this volume (see also Herndon et al., this volume) depicts the building as it likely looked around AD 800. Gary Smith, an associate professor of architecture at TTU, produced the drawing based on mapping and excavation data.

Belize Estates Archaeological Survey Team

Supervised by David Sandrock (this volume), the Belize Estates Archaeological Survey Team (BEAST) conducted survey on Gallon Jug Ranch and the Laguna Seca parcel of Yalbac Ranch during the summer 2013 field season (Figure 1.5). BEAST derives its name from the fact that both these properties are former holdings of the Belize Estates Land and Produce Company. The survey work was entirely funded by a generous donation to TTU from Mr. Leroy Lee of American Seismic, LLC. In 2012, American Seismic cut six transects across what was then Gallon Jug Ranch. These transects offered the CCAP an excellent opportunity to conduct a systematic linear survey without having to cut new survey lines.

As discussed by Sandrock (this volume), who is using the survey for his thesis research, BEAST investigated two seismic lines covering a total of nearly 40 km during the 2013 field season. The project also revisited several sites recorded by Guderjan et al. (1991) to assess their current conditions, verify their maps, and update their locations. The survey team assigned BE (for

Figure 1.5. David Sandrock (right) and Josh Wright discuss a site map while on survey.

Belize Estates) numbers to larger sites, defined as those with four or more structures, at least one of which is 4 m or taller, not within 1 km of another recorded site, and to named sites recorded by Guderjan et al. (1991).

During the 2013 field season, BEAST recorded 184 structures, not including individual structures from the four previously recorded sites that were revisited, and documented four new BE sites. Crews encountered the majority of structures, 99 in total, and Ix Naab Witz (BE-11) along the first line surveyed. Most of the newly discovered structures occur in a 1.6-km long stretch along this line beginning 1 km east of the Gallon Jug-Blue Creek road. These structures comprise a sizable and dense settlement area with structures of varying size and form. Because BEAST did not encounter a similar mound density anywhere else in the surveyed areas, it is possible the structures are part of a larger, as yet undiscovered Maya site.

The largest newly discovered ruin is Ix Naab Witz, a site located on a 100-m tall hill, approximately 1.5 km east of the Rio Bravo and 1 km west of the Gallon Jug-Blue Creek road. The site core is unlooted and comprises 15 structures around two plazas, with a connected courtyard to the north and a plazuela group to the southwest. The site has one small, uncarved stela, and the tallest mound is approximately 6 m high.

AN UPDATED DESCRIPTION OF CHAN CHICH

Chan Chich sits near the southern limits of the Three Rivers adaptive region, approximately 4.25 km east of the border between Guatemala and Belize (Figure 1.6). The ruins are on the western bank of the northward flowing Chan

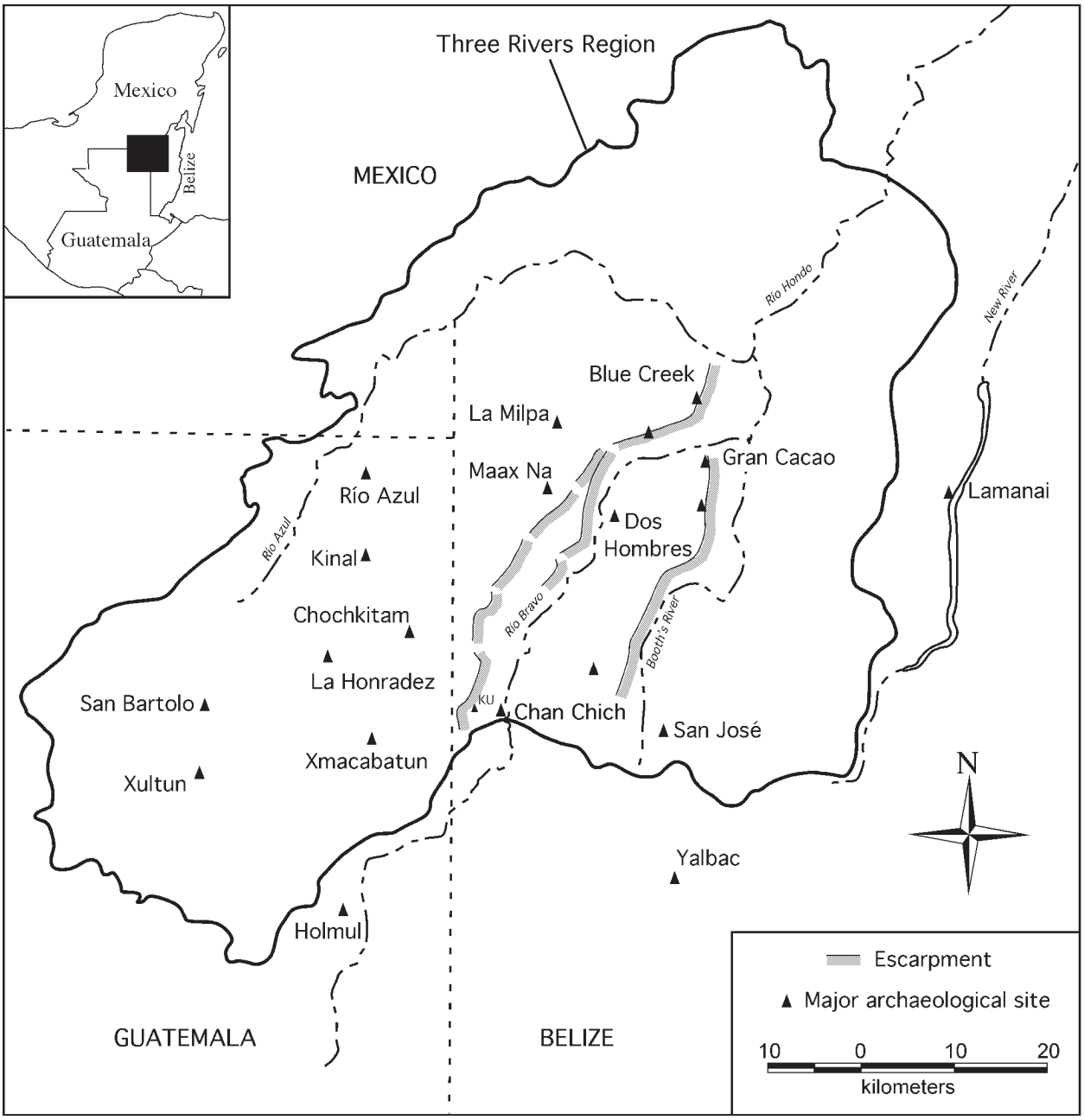

Figure 1.6. Map of the Three Rivers adaptive region (after Garrison and Dunning 2009:Figure 2).

Chich Creek, which joins Little Chan Chich Creek a few hundred meters north of the site to become the Río Bravo. The Río Bravo is one of three rivers from which the region draws its name. The site occupies a physiographic zone known as the Río Bravo Terrace Lowland. Irregular *bajos* and conical hills characterize the area.

From the tops of the mounds in the Main Plaza at Chan Chich, the steep face of the La Lucha Escarpment is visible approximately 3.75 km to the west where it dramatically and abruptly rises over 120 m. The Yalbac Hills are 18 km to the south, forming the divide between the Río Hondo and Belize River watersheds and marking the southern limit of the Three Rivers

adaptive region according to Garrison and Dunning (2009).

The major architecture at the site (see Figure 1.2) is centered on the Main Plaza (Plaza A-1) and the Upper Plaza (Plaza A-2). The Main Plaza is square in plan and is the third largest plaza in the region, encompassing 13,080 m^2 (Garrison 2007:Table 6.3). Mounds border the plaza on all sides, but gaps between structures allowed formal and informal access points. With the North Plaza at one end and the smaller Back Plaza at the other, the contiguous series of plazas and buildings extend approximately 350 m from north to south.

Structure A-1 is the largest building at Chan Chich; it is a 70-m long tandem range building that divides the Main Plaza from the Upper Plaza. A central landing on the summit of the building allowed access into the enclosed and private Upper Plaza, which is 7 m higher in elevation than the Main Plaza.

The Upper Plaza is arguably the site's acropolis and was home to the tomb of an early king at the site (Houk et al. 2010). Structure A-15 across the plaza from Structure A-1 is the tallest building at the site. It and the western temple-pyramid, Structure A-21, have multiple looters' trenches and tunnels that reveal older architectural phases of unknown ages beneath the Late Classic buildings.

Two causeways enter the Main Plaza from the east and west in front of Structure A-1. Curiously, the two have contrasting architectural styles. The eastern causeway is an elevated *sacbe* that is a 40 m wide. The western causeway, however, is composed of two parallel, linear mounds forming a 40-m wide corridor between them. The two causeways terminate at remarkably similar structures (Structure C-17 on the west and Structure D-48 on the east), which are mapped as small temple-pyramids with low platforms extending to the south.

The site's ball court is in the southeastern corner of the Main Plaza, built on a level platform that extends off the eastern causeway. The ball court is atypical in that its western structure is physically attached to the base of Structure A-1, while its eastern structure is freestanding. When considered together, the two causeways with their termini structures, Structure A-1, and the ball court must have been important architectural elements of ritual processions entering the Main Plaza (Houk 2013).

Surrounding the core architecture are numerous smaller courtyards, the largest of which are the Western Plaza and Norman's Temple group. These two elite residential groups are approximately 250 m west of the Main Plaza. The Western Plaza sits at the base of a large hill, which is crowned by Norman's Temple group, a tightly enclosed courtyard with a small temple on its western edge and a range building on the north. Artificially leveled platforms extend north and south of the courtyard, and a low wall encircles the entire assemblage.

Another important group of architecture is Group H, which is located in the southeastern corner of the mapped portion of the site. Situated on the opposite bank of Chan Chich Creek, Group H comprises small house mounds interspersed with lithic workshops, made evident by mounds of chert flakes (Meadows and Hartnett 2000).

UPDATED SITE CHRONOLOGY

In 2012, students excavating a test pit the base of Structure 3 at nearby Kaxil Uinic discovered an Early Preclassic sherd (ca. 1100–1000 BC) that is stylistically identical to Cunil ceramics, the earliest documented ceramics in Belize (Harris and Sisneros 2012:56; Valdez and Houk 2012:68). The deposit from which the sherd was recovered had a mixture of ceramics from the Middle and Late Preclassic periods, as well, but the find suggests settlement began

in the Chan Chich area by the end of the Early Preclassic. Excavations in the Upper Plaza at Chan Chich discovered a buried Middle Preclassic period midden deposit, with a calibrated radiocarbon age of 770 BC (Robichaux 1998:34). To date that is the oldest documented cultural material at Chan Chich, itself. Excavations show greater evidence of Late Preclassic occupation, as evidenced by floors and features in the Upper Plaza (Kelley et al. 2012; Robichaux et al. 2000), the Main Plaza (Houk 1998; Houk 2000), Structure C-8 in the Western Plaza (Guderjan 1991:41), and Norman's Temple group (Meadows 1998).

In the Terminal Preclassic period, the builders at the site cut through the floors and into bedrock to construct Tomb 2 (Houk et al. 2010). Kelley et al. (this volume) correlate the youngest floor cut through by the tomb with the 20-cm thick compact dirt surface that covers the southern and central portions of the plaza. The tomb itself measured 3.25 m long and 0.8 m wide. It was originally sealed by 12 large capstones. A low shrine platform capped the tomb and marked its location within the plaza until a final Late Classic construction episode buried it (see Kelley et al., this volume). The tomb's occupant was interred with the trappings of an early Maya king, making Tomb 2 one of the oldest royal burials in the lowlands (Houk et al. 2010).

Although Early Classic architecture and discrete deposits continue to elude excavators, Guderjan (1991:45) found two broken Early Classic polychrome bowls in a looters' camp. It is possible that one of the construction phases exposed in looters' trenches in Structure A-15 and/or Structure A-21 is from the Early Classic period, but the CCAP has not yet excavated either structure to test that hypothesis.

It is clear that Chan Chich expanded greatly in the Late Classic period, and renovations to existing buildings and the construction of new buildings and features gave the site its final form ca. AD 700 or later. The architectural expansion included the final floors in the Upper Plaza and Main Plaza, where construction efforts completely buried older Late Preclassic features (Houk 1998, 2000; Kelley et al., this volume), and the final (perhaps only) phase of the ball court (Ford 1998). The Western Plaza and Norman's Temple were both expanded during the Late Classic period (Ford and Rush 2000), and Richard Meadows and Kristen Hartnett (2000) found that the Group H lithic workshops date to the Late Classic period, as well.

The site apparently went into decline during the Terminal Classic period around AD 800 before being abandoned around AD 850. Construction at the site at the end of the Late Classic was of noticeably inferior quality. At Structure A-5, the final phase of the southern stairs included robbed vault stones in the construction (Herndon et al., this volume), and the Terminal Classic occupants of Structure C-6 in the Western Plaza built a crude wall using robbed vault stones (Harrison 2000). That same structure included a Terminal Classic burial of a single adult male beneath a bench in the room. He was buried with a black-slipped anthropomorphic bowl and two shell discs (Harrison 2000:83).

Deposits of elite artifacts left broken on the steps to the range building in the Norman's Temple group and of the largest structure in the Western Plaza are Terminal Classic in age, likely deposited at or shortly after the time of the site's abandonment (Houk 2011). Even though Chan Chich fell into ruin at that point, Postclassic pilgrims made periodic visits to leave offerings, including an incense burner on the stairs to Structure A-5 (Herndon et al., this volume) and another on the top of Structure A-4 (Guderjan 1991:45). At Kaxil Uinic, pilgrims propped up one half of the broken stela and placed offerings of *incensarios* around its base,

during either the Late Postclassic period or Colonial period (Houk et al. 2013).

ORGANIZATION OF THIS VOLUME

In Chapter 2, Krystle Kelley, Rose Leach, and Erica Gallis summarize the 2013 excavations in the Upper Plaza. Chapter 3 is basically a condensed version of the final report submitted to NGS/Waitt on the remote sensing and SfM work at Structure A-5. In Chapter 4, Kelsey Herndon, Ashley Booher, and I describe the results of the excavations at Structure A-5, which immediately followed the NGS/Waitt research. David Sandrock summarizes the findings of the first season of survey on Gallon Jug and Laguna Seca in Chapter 5. Carolyn Nettleton, the lab director in 2013, outlines the lab procedures used by the CCAP in Chapter 6. Edgar Vazquez presents a research proposal for the Back Plaza in Chapter 7. Finally, Chapter 8 is a compilation of project lists, which will be updated each season.

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Under the Surface: Excavations in the Upper Plaza at Chan Chich

Krystle Kelley, Rose Leach, and Erica Gallis

INTRODUCTION

The 2013 season of archaeological excavations in the Upper Plaza of Chan Chich constituted the second half of a research project that began in 2012. The Upper Plaza is built on a natural rise overlooking the Main Plaza of the site and offers an opportunity to explore the very early construction history at the architectural core. The 2013 excavations in the Upper Plaza were part of Operation CC-10; they began in May and continued over 4 weeks. Research in this operation took place under the direction of operation director Krystle Kelley and the overall guidance of the Chan Chich Archaeological Project (CCAP) director Brett A. Houk. This 2-year project was not the first archaeological work to take place in the Upper Plaza, but was designed to build on previous research conducted there by Hugh Robichaux (2000) and his CCAP team in the late 1990s (see also Houk et al. 2010).

Over the course of the 2012-13 project, excavations were conducted beneath the modern plaza surface with the goals of better defining the construction sequence at the oldest part of the site and determining how the architectural layout of this elite plaza space may have evolved through time. Excavations focused on the plaza surface itself, though attempts were made to tie in the plaza floor with the architecture of the structures surrounding it.

The research design for the 2013 season was based on findings in the Upper Plaza during the 2012 season of the CCAP, specific details of which can be found in Kelley et al. (2012). In total, 14 new suboperations were opened this season, and two suboperations from the previous season were reopened. Spatially, these suboperations extend from the northernmost end of the plaza to the southernmost edge, giving us a view of a nearly complete north-south cross section of the plaza architecture as shown in Figure 2.1.

SUMMARY OF 2012 INVESTIGATIONS

In 2012, suboperations were initially laid out to target anomalies detected in data acquired from an archaeo-geophysical remote sensing survey of the Upper Plaza conducted by Chet Walker (2012). However, the strategy of targeting the anomalies was abandoned once it was concluded that the anomalies reflected in the data were simply air pockets between stones in the dry-laid construction fill below the most recent plaza surface. We then modified our approach but continued working to gather a clear understanding of the construction sequence of the Upper Plaza and draw a comparison in stratigraphy from the northern to southern end of the plaza (Kelley et al. 2012). Over the course of the 2012 season, six suboperations were opened in total; five of which targeted plaza deposits, and one of which was intended to expose the final plaza

Kelley, Krystle, Rose Leach, and Erica Gallis
2013 Under the Surface: Excavations in the Upper Plaza at Chan Chich. In *The 2013 Season of the Chan Chich Archaeological Project*, edited by Brett A. Houk, pp. 15–26. Papers of the Chan Chich Archaeological Project, Number 7. Department of Sociology, Anthropology, and Social Work, Texas Tech University, Lubbock.

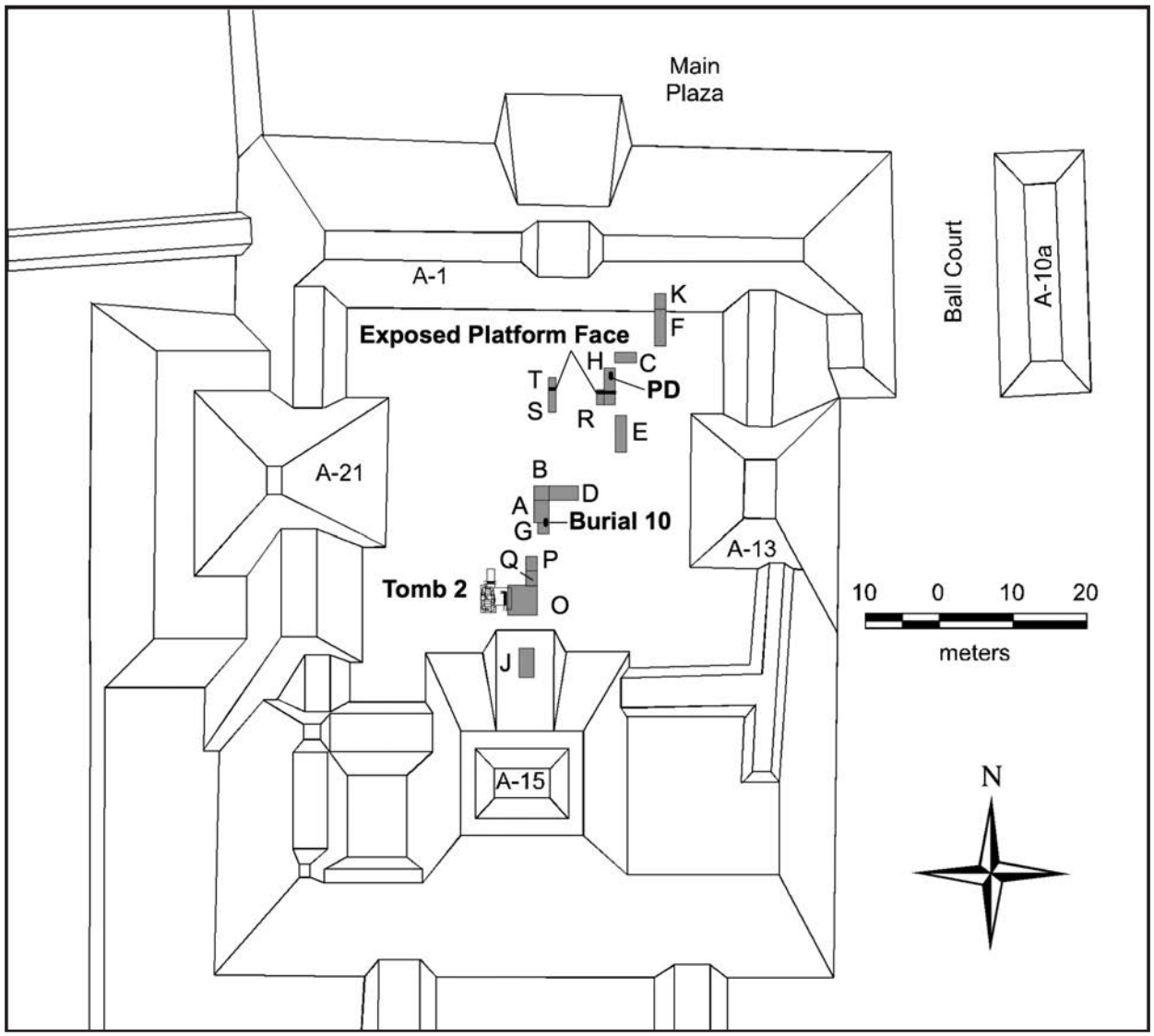

Figure 2.1 Map of the Upper Plaza showing suboperations excavated in Op CC-10 in 2012 and 2013 along with features mentioned in the text. PD marks the problematic deposit's location.

floor where it meets the base of Structure A-1 on its southern side.

We determined that the most recent plaster floor lies near the modern plaza surface, although it was badly deteriorated and in most places undetectable. Below this surface, we encountered approximately a meter of dry-laid fill, ranging from small cobbles near the top to large boulders at the bottom, all of which was associated with a single large-scale construction event. Directly beneath this meter of fill in the central area of the plaza we consistently came across a compact dirt surface approximately 20 cm thick made of a silty loam, though it was notably absent in the northern end of the plaza in Suboperation (Subop) CC-10-C. Deeper excavations uncovered a series of plaster floors, some of them badly deteriorated and separated by little to no construction fill.

Multiple questions were raised in these excavations that guided our research plan for the 2013 season. Included in our findings from 2012 that sparked further investigation in the 2013 season was Burial 10, discovered

in Suboperation CC-10-A near the end of the season. Due to time constraints, Burial 10 had to be reburied and returned to in 2013. A significant difference in the construction sequence between the center and northern end of the plaza was also noted in 2012 and further motivated our research goals for 2013. Our 2012 placement of Suboperation CC-10-F on the southern side of Structure A-1 was slightly too low on the mound, causing us to miss the face of the structure, prompting us to extend a unit further to the north on Structure A-1 in 2013.

RESEARCH DESIGN AND METHODOLOGY

The ultimate goal in this 2-year project was to expand our understanding of the founding and long occupational history of Chan Chich by targeting the oldest part of the site. We also planned to tie our excavations in to the previous work conducted by the CCAP under Hubert Robichaux (1988) on a Terminal Classic tomb in the southwestern quadrant of the plaza and a Middle Preclassic midden pit at the northern end of the plaza. The research design for the 2013 field season expanded on these goals and was based substantially on answering questions that arose through our findings the previous field season (see Kelley et al. 2012). We planned to return to Subop CC-10-A to excavate Burial 10. We also intended to place a unit in the area where we had determined an architectural interface must be present to account for the discrepancy in floor sequences in the northern and southern ends of the plaza. Lastly, we would return to our efforts of documenting the association of the southern face of Structure A-1 with the most recent plaza floor.

Both seasons of our research in the Upper Plaza followed the field methodologies outlined in *The La Milpa Core Project Field Manual* by Houk and Zaro (2011). The primary deviation from the strategies outlined in this manual was the use of a digital data collection system that incorporated iPads into the field reporting process. This electronic system allowed us to instantly digitize forms and streamline the information gathered into a searchable relational database (Houk 2012).

RESULTS

Burial 10

As our first order of business in the 2013 season, we removed the backfill from the southern half of Subop CC-10-A and opened Subop CC-10-G to excavate Burial 10, which we had discovered in 2012 below plaster floor number 5 in the southern end of Subop CC-10-A. Although the burial was the primary purpose for opening Subop CC-10-G, meticulous and systematic excavations were completed of each lot to bolster our confidence in the somewhat complex floor sequence found in the connected units the previous season. In lot CC-10-G-7, protruding through plaster floor 5, we came across two conspicuously large unworked stones, approximately 40 cm in diameter, which we concluded were associated with Burial 10 (Figure 2.2). It was near these rocks that most of the skeletal remains were found, both human and faunal, which were placed in a cut through plaster floor 5 that ran south of the stones.

The bone we found associated with Burial 10 was extremely fragmentary and very brittle, but a number of well-preserved teeth were recovered, including eight of an adult human and 19 of domestic dog (Figures 2.3 and 2.4). The dog teeth are likely from one animal (Norbert Stanchley, personal communication, 2013). Among the artifacts found associated with Burial 10 were a piece of mica, some ceramic sherds, lithic flakes, mussel shell, and spire-lopped jute. Only one human individual was present in the burial, and unfortunately the

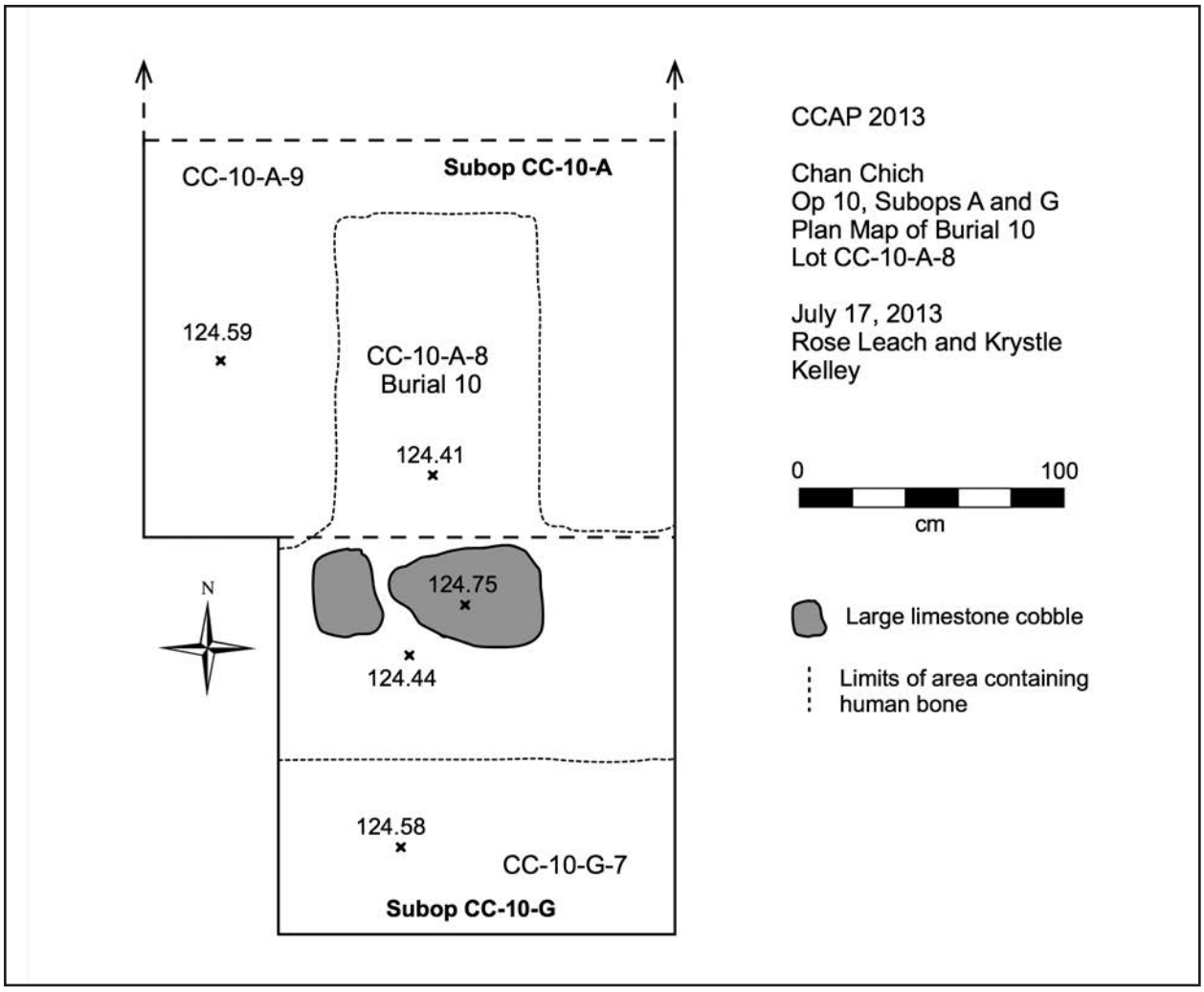

Figure 2.2. Plan map of Suboperation CC-10-A and CC-10-G where Burial 10 was excavated.

Figure 2.3. Human teeth in Burial 10.

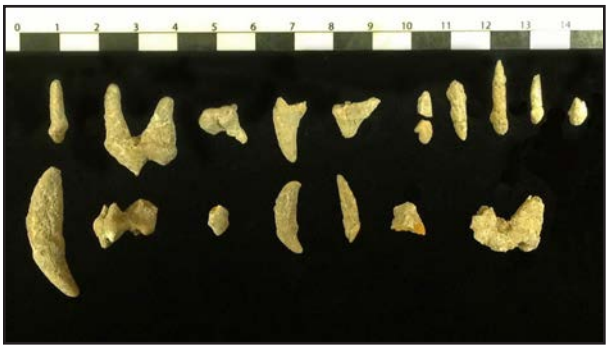

Figure 2.4. Domestic dog teeth in Burial 10.

preservation was too poor to estimate the sex or a precise age.

Plaza Stratigraphy and Platform Feature

In our first season of excavations we noticed a discrepancy between the elevations and sequence of floors in the central area of the plaza when compared to those in the northern end. Notably, in all central units we had encountered a particular stratigraphic sequence that consisted of humus, followed by about 1 meter of construction fill, and then an approximately 20-cm thick compact dirt surface followed by a series of plaster floors that continued down to bedrock (see Tables 2.1 and 2.2 for plaster floor elevation and construction sequences north and south of interface). However, in Subop CC-10-C near the northern end of the plaza no compact dirt surface was found. We attempted to find the spot where the floor sequences diverged in 2012, but were unsuccessful. We returned to this effort in the 2013 field season with Subop CC-10-H. At the opening of Subop CC-10-H we noted a number of large stones protruding through the surface at the southern end of the unit, a feature that was not typical throughout the rest of the plaza area. As Subop CC-10-H was excavated, atypical stratigraphy was continually encountered in the southern half where the rock feature was located until finally we came down on an unworked stone alignment running east to west, bisecting the unit. Below the unworked stone alignment we came on a plastered cut-stone platform face, the top of which matched the elevation of the compact dirt surface to the south of it. The same compact dirt surface did not exist to the

Table 2.1. Stratigraphic Sequence in the Central and Southern Portions of Upper Plaza

Lot Description	Lot #		Tomb 2 Floor*	Approximate Elevation	Ceramic Assessment
Topsoil/Final Plaster Floor 1	Lot 1 of Subops CC-10–A, -B, -D, -E, -G, -H, -P, -Q, -R		N/A	125.90 m	Late Classic
Compact Dirt Surface	CC-10-A-3 CC-10-B-3 CC-10-D-3 CC-10-E-3 CC-10-G-3	CC-10-H-7 CC-10-O-2 CC-10-P-3 CC-10-Q-4 CC-10-R-4	F4	125.00 m	Terminal Preclassic/ Early Classic
Plaster Floor 2	CC-10-A-4 CC-10-B-4 CC-10-D-4 CC-10-G-4	CC-10-H-9 CC-10-O-3 CC-10-Q-5	F3	124.83 m	Late Preclassic
Plaster Floor 3	CC-10-A-5 CC-10-D-5 CC-10-E-4	CC-10-G-5 CC-10-H-11 CC-10-O-4	F2	124.74 m	Late Preclassic
Plaster Floor 4	CC-10-A-6 CC-10-D-6 CC-10-E-5	CC-10-G-7 CC-10-O-5	F1	124.63 m	Late Preclassic
Plaster Floor 5	CC-10-A-7b CC-10-D-7	CC-10-G-7 CC-10-O-6	N/A	124.58 m	Middle Preclassic
Plaster Floor 6	CC-10-D-8 CC-10-O-7		N/A	124.52 m	Preclassic
Bedrock	CC-10-D CC-10-O		Bedrock	124.30 m	--

*Houk et al. (2010:Figure 5)

Table 2.2. Stratigraphic Sequence in the Northern Portion of Upper Plaza

Lot Description	Lot #	CC-2-H Floors*	Approximate Elevation	Ceramic Assessment
Topsoil/Final Plaster Floor 1	CC-10-C-1	F6, F5	125.89 m	Late Preclassic (?)
Dry-laid Construction Fill	CC-10-C-2	--	125.75 m	Late Preclassic
Plaster Floor 2	CC-10-C-3	--	124.62 m	Late Preclassic
Plaster Floor 3	CC-10-C-4	F4	124.49 m	Late Preclassic
Plaster Floor 4	CC-10-C-5	--	124.36 m	Late Preclassic
Plaster Floor 5	CC-10-C-6	--	124.34 m	Preclassic
Midden	CC-10-C-7	--	124.28 m	Middle Preclassic
Plaster Floor 6 to bedrock	CC-10-C-8	F2	123.90 m	--
Bedrock	--	F1	123.74 m	--

*Robichaux (1998:Figure 5-3)

north of the wall, affirming that this was indeed the architectural interface we were attempting to locate.

The area of Subop CC-10-H where the platform face was found was then extended to the west with Subop CC-10-R to get a wider view of the feature. With Subop CC-10-R we determined that the wall seemed to be continuing along to the west in a straight line, and affirmed that the unworked stones atop the lower plaster feature were indeed a part of the wall. Subop CC-10-S was opened 5 m west of Sobop CC-10-R to probe the central area of the northern end of the plaza where the wall was expected to continue. As it turned out, the northern edge of Subop CC-10-S was directly in line with the southern face of the wall (Figure 2.5). Subop CC-10-T was then opened on the last day of excavations just to the north of CC-10-S to uncover the top of the wall, which was much more intact in this area of the plaza. Subop CC-10-S confirmed our assumption that the wall or platform face continued across the plaza. It is possible this platform represents a buried structure that once formed the northern edge of the Upper Plaza but was subsequently buried by a Late Classic expansion of the group.

Figure 2.5. Southern face of the platform or wall in Subop CC-10-T at the northern end of Subop CC-10-S, facing north.

Problematic Deposit

In the northern end of Subop CC-10-H we excavated a problematic deposit, which we came across at the bottom of Lot CC-10-H-4, below the dense deposit of dry laid construction fill found over the entirety of the plaza and above the underlying plaster floor. The deposit was defined as Lot CC-10-H-5 and consisted of a dense concentration of Late Preclassic ceramic sherds, spire-lopped jute shell, marine shell, human and faunal bone, including teeth and phalanges, and nine obsidian blade fragments (Figure 2.6). There was not a complete burial associated with the deposit, so the purpose and meaning behind the deposit are still unknown.

Tying Our Excavation in with the Royal Tomb

One of the goals of the project was to tie the new excavations in with the exact location of the Terminal Preclassic tomb excavated by Hubert Robichaux and team in 1997 (Houk et al. 2010). Unfortunately, Chan Chich Lodge back filled the tomb excavations, which had been left open since 1997, prior to their 2012 celebration in the Upper Plaza. This complicated our task, because the stratigraphy uncovered by Robichaux (1998) was no longer accessible. Our investigations in the area began with Subop CC-10-I, which was set east of the approximate location of the tomb to look for architecture documented by Robichaux (1998) and reported by Houk et al. (2010) buried beneath the backfill. However, no architecture was found in Subop CC-10-I, which was then expanded with Subops CC-10-L, -M, and -N. In Subop CC-10-L the edge of one of Robichaux's unit was found, revealing that our units were set just east of the tomb. It was then that a 50-cm extension was opened on the western end of Subop CC-10-I, where we uncovered an alignment of four worked stones, which were part of a wall first recorded during the 1990s excavations. Having successfully found the edge of Tomb 2's excavations we decided to continue our excavations deeper and extend them to the north to capture a more extensive view into the Upper Plaza stratigraphy from north to south. We combined the areas of Suboperation CC-10-I, -L, -M, and -N into one large suboperation, CC-10-O, and excavated it to bedrock to draw a comparative sample of this southern area of the plaza (Figure 2.7). The stratigraphy encountered in Subop CC-10-O was analogous to that found in the central suboperations (Figure 2.8).

Figure 2.6. Obsidian blades found associated with the problematic deposit in CC-10-H-5.

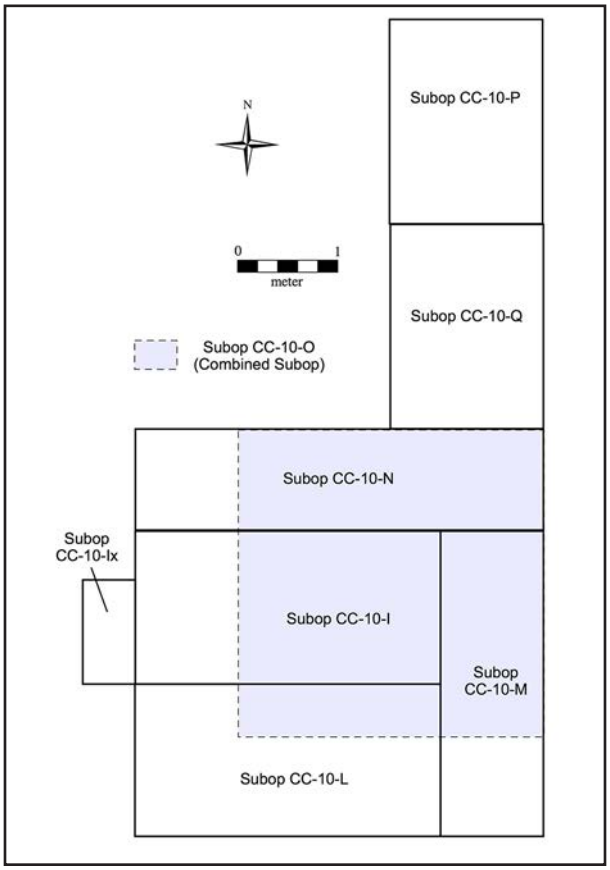

Figure 2.7. The layout of Subop CC-10-I, L, M, N, P, Q and the combined Subop CC-10-O.

Houk et al. (2010) interpret the tomb as a chamber cut through a sequence of Late Preclassic floors and into bedrock, covered with capstones at the level of bedrock, and then capped by a low shrine. Excavation data from Subop CC-10-O provide a close correspondence to the stratigraphy reported in Houk et al. (2010), although excavators documented more floors in Subop CC-10-O than are reported in the tomb excavations (see Table 2.1). Most importantly, comparing the elevations of the floors recorded by Robichaux (2000) to those excavated in 2013 indicates that the floor in use immediately prior to the creation of Tomb 2 was the compact dirt surface (see Table 2.1) that extends over all of the tested portion of the Upper Plaza south of the platform in Subops CC-10-H, -R, and -T.

Structural Excavations

Structure A-1

In 2012 we opened Suboperation CC-10-F on the southern face of Structure A-1, the long-range structure that separates the Upper Plaza from the Main Plaza. The goal was to document the architectural face of the structure and its association with the plaza surface.

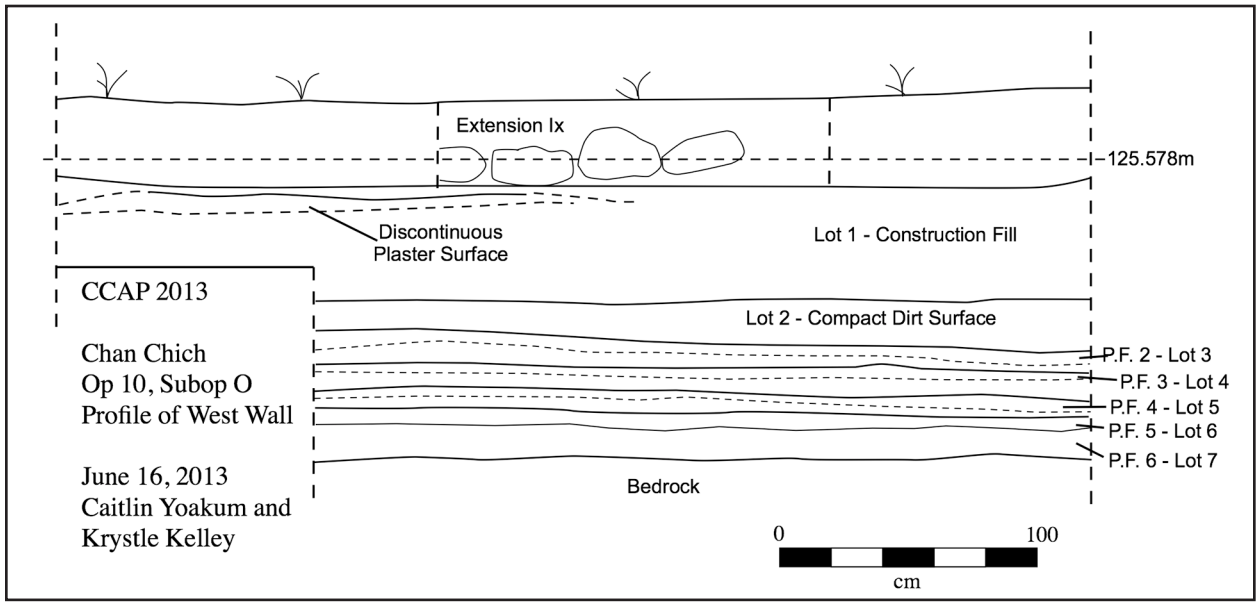

Figure 2.8. Profile of west wall of Subop CC-10-O.

However, excavators only encountered large amounts of collapse debris in Subop CC-10-F before finally coming down on the plaster of the final plaza floor. In 2013 a second attempt was made to find the face of Structure A-1, first by removing backfill from Subop CC-10-F and then extending the excavations farther up onto the face of the mound with Subop CC-10-K, a 1.5-x-2-m unit that connected directly to the northern edge of Subop CC-10-F. In lot CC-10-F-2 we came down on the plaster surface of an interior room on Structure A-1 about 2 m higher than the modern plaza floor. The top outer edge of the platform had apparently collapsed, but we did find the outer platform face of Structure A-1 connecting to the most recent plaza surface in the eastern profile of the units (Figure 2.9). We did not go deeper in Subop CC-10-K than the most recent plaster floor, but we were satisfied to accomplish our goal of establishing the location of the southern face of the structure.

Structure A-15

Structure A-15 is the tallest structure at Chan Chich; it sits at the southern side of the Upper Plaza. We intended to establish the architectural association between Structure A-15 and the plaza surface with the 2-x-4-m Subop CC-10-J on its northern face. Unfortunately Subop CC-10-J was placed too low on the mound, and all we encountered was an extraordinary amount of limestone collapse debris covering the most

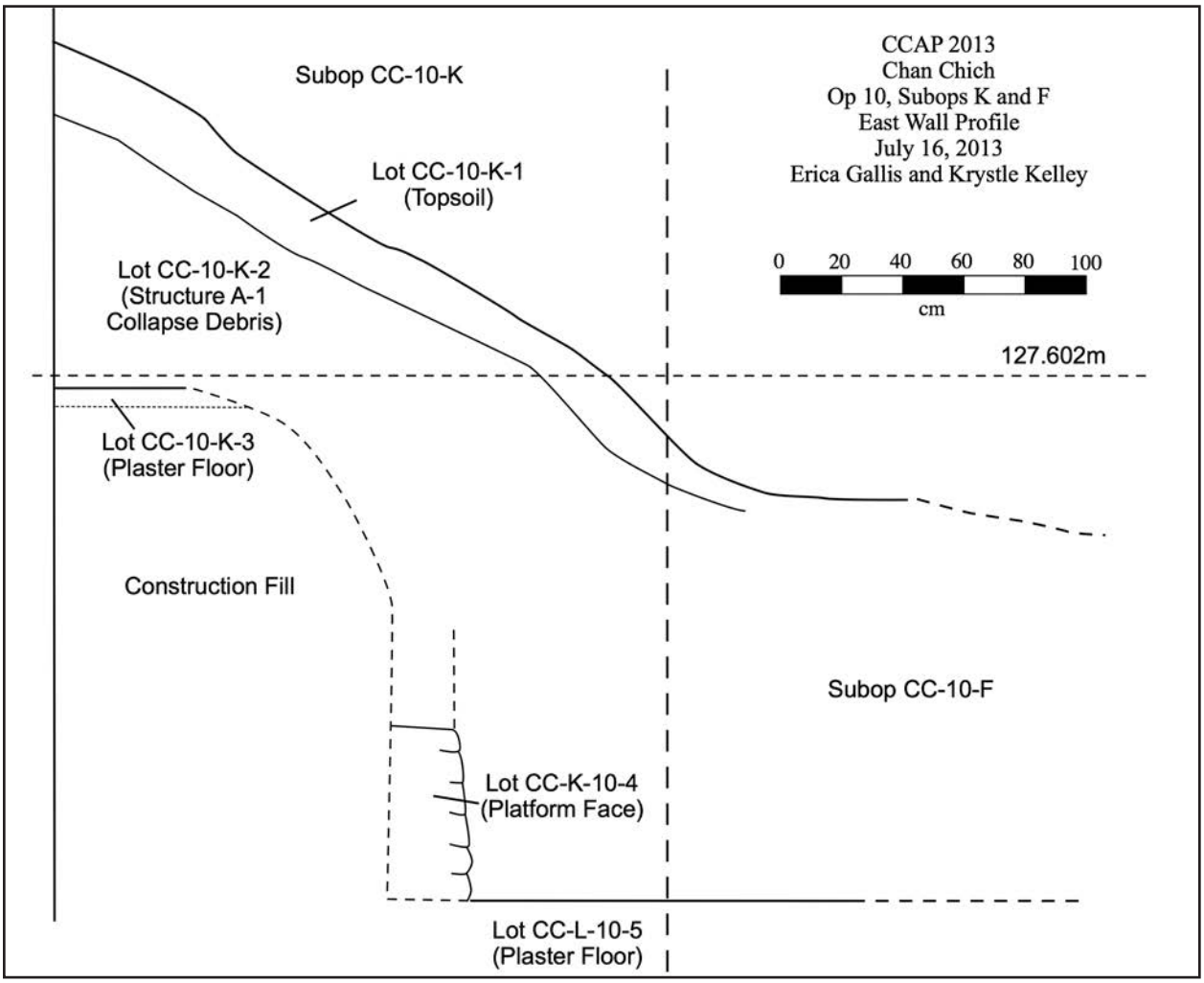

Figure 2.9. Profile of the east wall of Subop CC-10-K and part of Subop CC-10-F.

recent plaza surface, which had been very well preserved by the collapse (Figure 2.10). Though no architecture was found on Structure A-15, Subop CC-10-J did inform us that the face of the structure must have been much steeper than previously thought.

Figure 2.10. Excavations in Subop CC-10-J down to the plaza surface through collapse debris of Structure A-15, facing south.

CONCLUSIONS

In summary, our excavations were successful in documenting buried architecture within the plaza and documenting the construction sequence. A platform interface was discovered in the northern end of the plaza, which was confirmed to be the point of divergence between the elevation of plaster floor sequences in the northern end and the rest of the plaza and is likely associated with a buried structure that originally formed the northern edge of the Upper Plaza. We also established that this apparent platform did run east/west from one side of the plaza to the other in a straight line. The successful excavation of Burial 10, which had been cut into the fifth plaster floor and marked with large unworked stones, yielded one human individual along with the remains of domestic dog. A problematic deposit was found north of the platform interface in the northern end of Subop CC-10-H, though the nature of this deposit is still not entirely understood. The southern edge of Structure A-1 was found and documented, and, although we did not uncover intact architecture on Structure A-15, we did learn something about the condition of the mound. Ultimately, the goals we set out to accomplish at the beginning of the 2013 field season were realized, as well as the long term goals of the 2 seasons of work in the Upper Plaza.

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Structure from Motion Mapping and Remote Sensing at Structure A-5, Chan Chich, Belize

Brett A. Houk, Chester P. Walker, Mark D. Willis, and Kelsey E. Herndon

INTRODUCTION

During the 2013 season of the Chan Chich Archaeological Project (CCAP), the National Geographic Society/Waitt Grants (NGS/Waitt) program funded Structure from Motion (SfM) mapping and remote sensing at Structure A-5. Grant Number W261-12, issued to the senior author and Texas Tech University (TTU), funded innovative research that shows tremendous potential in Maya archaeology. This chapter is a condensed version of the final grant report, which Houk et al. (2013) submitted to NGS/Waitt upon completion of the initial data processing, which took place during the 2013 season of the CCAP. Although the original grant report included information on subsequent excavations, conducted by the CCAP and the TTU Field School in Maya Archaeology, Herndon et al. (Chapter 4, this volume) discuss the excavation data, and this chapter strictly comments on the mapping methods and results. While the use of ground penetrating radar (GPR) constituted a primary component of the research, as discussed below, interpreting the GPR data is a complicated process and analysis of the data is ongoing.

BACKGROUND

Chan Chich is a medium-sized Maya city in northwestern Belize (Houk et al. 2010). The major architecture at Chan Chich is clustered around the Main Plaza, a very large public space measuring approximately 110 x 110 m (Figure 3.1), and the visible architecture dates to the Late Classic period, ca. AD 600–850 (Houk et al. 2010).

Because the Main Plaza is home to a small eco-resort (Chan Chich Lodge), researchers have avoided excavating the large buildings surrounding the Main Plaza. One of these buildings, Structure A-5, was the subject of the NGS/Waitt grant funded research. The building was completely unknown outside of basic dimensional data prior to 2013. Structure A-5 borders the Main Plaza on the north. The mound measures approximately 64 m long by 14 m wide, at its base, and is 4.5 m tall. The summit of the mound is flat and approximately 5 m wide. While Guderjan (1991:38) speculated that "collapsed vaulted rooms once faced into the plaza," the flat summit of the mound suggested to us that the structure could be a platform and not collapsed rooms, a hypothesis that proved to be correct.

When Chan Chich Lodge was built in the late 1980s, the heavily forested Main Plaza was cleared by hand. Trees were selectively removed using machetes and chain saws, and their stumps were cut back by hand to ground level. This rather time consuming approach created a rare opportunity for archaeological research. Most Maya sites in Belize are heavily wooded, meaning remote-sensing techniques cannot be easily applied because of obstructing

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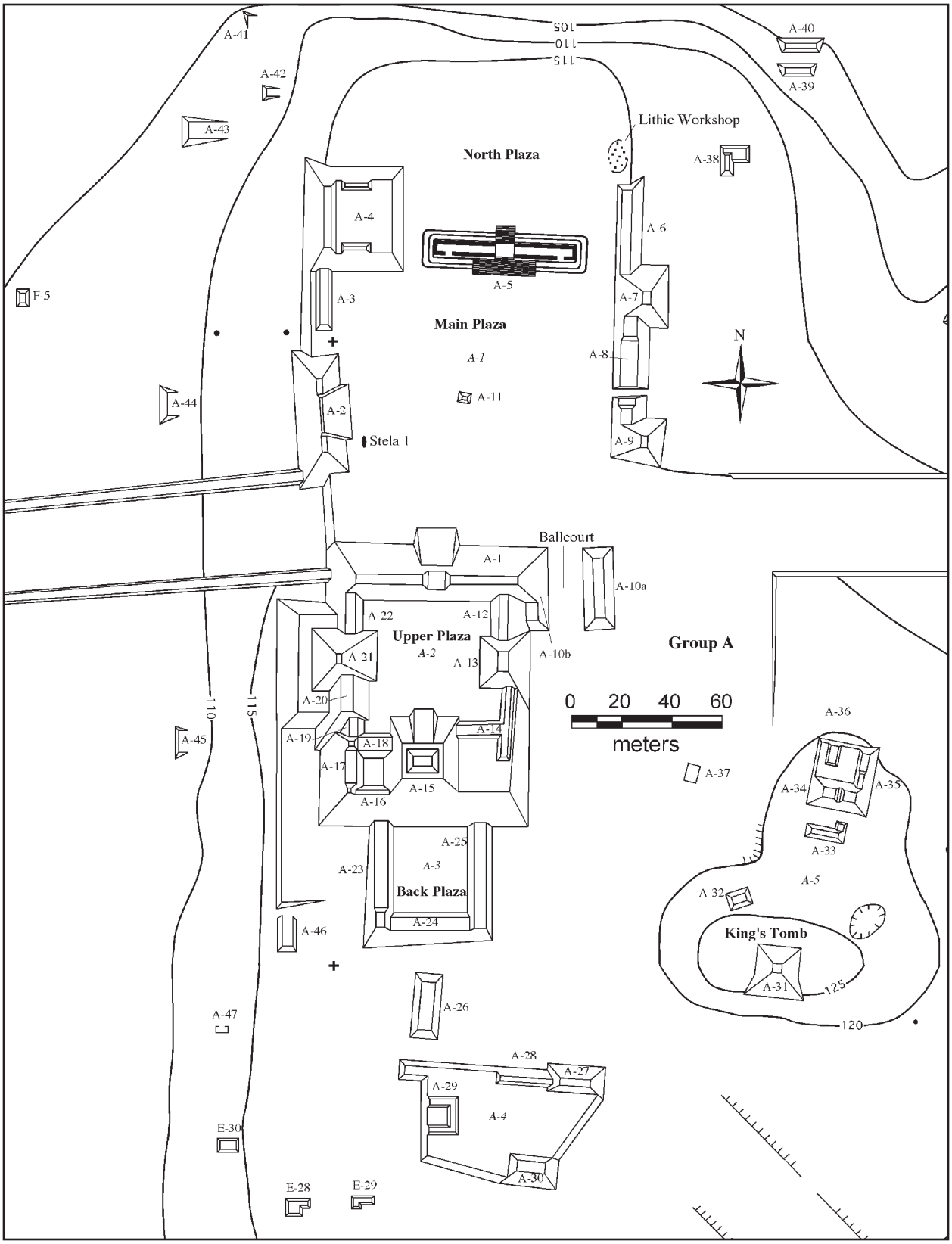

Figure 3.1. Map of Chan Chich site core with architectural plan of Structure A-5 based on 2013 data.

trees and their buttressed roots. On the other end of this spectrum, most sites that have been cleared of vegetation have been subjected to "chaining"—two bulldozers pull a large chain (usually from a ship's anchor) between them, literally ripping the trees out of the ground, causing tremendous damage to the buried architecture. In this situation, remote-sensing techniques can be employed, but are impractical given the damage to the subsurface archaeological remains. When the Main Plaza was cleared by hand, crews removed all of the trees from Structure A-5, except for two large ones near the mound's western corners. Today the mound is covered in grass, making it an excellent candidate for the remote sensing survey (Figure 3.2). Secondly, the entire mound is visible from the air, unobstructed by the jungle canopy. This proved beneficial for our SfM mapping technique, described below.

PURPOSE OF THE STUDY

Our objective with this project was to test a new technique for mapping Maya mounds and "predicting" the location of buried architecture. This study was the first use of this combination of methods to investigate a Maya building and is therefore novel. Basically, we proposed that by combining high-resolution GPR data with detailed topographic/mapping data that it would be possible to overlay the GPR data onto a three-dimensional model of the mound and identify buried architecture (walls, floors, cavities, etc.). This technique can be applied to other hand-cleared structures at Chan Chich, including the massive Structure A-1 on the southern side of the Main Plaza. We tested our results through subsequent excavations, which took place immediately following the remote-sensing survey (Herndon et al., this volume).

Figure 3.2. Photograph of Structure A-5 after clearing, taken in May 2013, facing east from Structure A-4. Photograph by Brett A. Houk.

METHODOLOGY

Mapping/3D-Modeling Methodology

Prior to the arrival of the research team, workers from Chan Chich Lodge cut the grass covering the mound down to ground level. This was necessary to facilitate the SfM mapping as well as the GPR survey. Once the mound was cleared, the research team established a metric grid that encompassed the mound and then placed 10 ground control points (GCPs) at random intervals across the structure and the surrounding area. These markers were clearly visible from the air, and their locations were surveyed in using a total data station (TDS). The team also used the TDS to tie the grid and control points into previously established survey markers at the site that had been recorded using a real time kinematic global position system receiver. All coordinates for the GCPs are therefore geo-referenced into real world coordinates. Geo-referencing allows us to overlay our points onto any other geo-referenced map, satellite image, or photograph.

We employed two approaches to mapping and 3D modeling Structure A-5 during the 2013 field season at Chan Chich, which have been used successfully at archaeological sites in New Mexico and Texas (e.g., Graves et al. 2013; Graves and Willis 2011). The first approached involved pole-aerial photography, also referred to as PAP, and the second approach used ground-based imaging. Both methods employed SfM sofware to create high-resolution three-dimensional (3D) models of the landscape and the architecture revealed through excavations. We also used a robotic total data station (TDS) to record topographic points on the mound, to compare the speed, cost, and precision of the two mapping methods.

Pole Aerial Photography Methods

Walker and Willis used PAP to document the surface of Structure A-5 before excavations began. A Canon 5D Mark III digital SLR camera was mounted on the end of 5-m long extendable pole, and an archaeologist walked a series of transects across the mound with the pole held out diagonally (Figure 3.3). This allowed for the camera to point straight down at the mound from about 4 m above the ground. While walking the transects, the archaeologist paused every meter across the mound while an assistant remotely triggered the camera. The crew took more than 800 photographs of the mound, covering an area of approximately 20 m wide by 70 m long. This novel approach allowed the photographers to document the

Figure 3.3. Project SfM expert Mark Willis operating the PAP system while project architect Gary Smith triggers the remote. Photograph by Kelsey Herndon.

entire mound from the air. We had proposed to use multiple platforms including unmanned autonomous vehicles (also known as "drones") and ram foil kites with Picavet camera mounts designed for kite aerial photography, but the pole-mounted camera proved ideal for the task.

After collecting the photographs, the analyst culled blurry and off subject images, and then processed the final dataset to create a 3D model using SfM software. The staked grid, visible in the photographs, was then used to geo-reference the 3D model. With the model referenced it was then possible to export the data as a digital elevation model (DEM) and as a single high-resolution orthorectified photo (or ortho-photo) for GIS analysis. The DEM of the mound is basically a dataset of points—representing the surface of the mound—expressed as horizontal (east and north) and vertical (elevation above sea level) coordinates, which can be manipulated and displayed in three dimensions. Orthorectificiation is the process of removing the distortion from the photograph created by the fact that the camera is closer to the object in the center of field of view than it is to the objects on the edges of its field of view.

Ground Based Photography Methods

Prior to the excavations that followed the NGS/Waitt-grant funded research, students were trained in the fundamentals of taking photographs for 3D modeling using a Sony NEX-5 digital point and shot camera. Staff and students then photographed the termination of each lot in each suboperation (or adjacent suboperations) mostly in a standard fashion by simply holding the camera and taking multiple overlapping photographs of the exposed architecture from various angles. In some case, the photographer mounted the camera on the pole to capture overhead images. As time and Internet access permitted, the digital photos were transferred to an archaeologist in the United States who then created 3D models of the excavations using the same SfM techniques described above. The 3D models from this process were then geo-referenced. This made it possible to generate GIS data, which overlapped directly with PAP data.

GPR Methodology

GPR Data Collection

We also collected GPR data on Structure A-5. The GPR unit sends a radar signal into the ground and then records the reflected signal. Different buried materials reflect the radar signal differently. The GPR collection employed multiple frequency antennas (a GSSI SIR 3000 GPR with both 200- and 400-MHz antennas) to penetrate the structure at varying depths (see Goodman et al. 2011). A trade-off exists between the depth of penetration and subsurface resolution. In this survey, the two antennas produced data of good resolution at depths between 0.1 m and 2.5 m below the ground surface. With the 200-MhZ antenna, the technician collected data by walking parallel lines north and south (Y axis) across the width of the structure. The survey crew also walked east to west (X axis) transects along the summit of the mound with both the 200- and 400-MhZ antennas.

GPR Data Processing

The initial data processing for the project involved the generation of amplitude slice-maps (Conyers 2004). Amplitude slice-maps are a 3D tool for viewing differences in reflected amplitudes across a given surface at various depths. Reflected radar amplitudes are of interest because they measure the degree of physical and chemical differences in buried materials. Strong, or high amplitude, reflections often indicate denser or different buried materials, such as archaeological features. Amplitude slice-maps are generated through the comparison of reflected amplitudes between the reflections recorded in vertical

profiles. In this method, amplitude variations, recorded as digital values, are analyzed at each location in a grid of many profiles where there is a reflection recorded. The amplitudes of all traces are compared to the amplitudes of all nearby traces along each profile. This database can then be "sliced" horizontally and displayed to show the variation in reflection amplitudes at a sequence of depths in the ground. The result is a map that shows amplitudes in map view, but also with depth.

The data were also processed as GPR profiles or "radiograms." These radiograms are the plots of the raw data files presented as two-dimensional vertical profiles. Radiograms were processed using a background filter that removes the linear banding that is often visible in GPR profiles. These radiograms were merged with the geo-referenced grid coordinates, allowing for precise locations to be generated for any anomaly located within the collection areas.

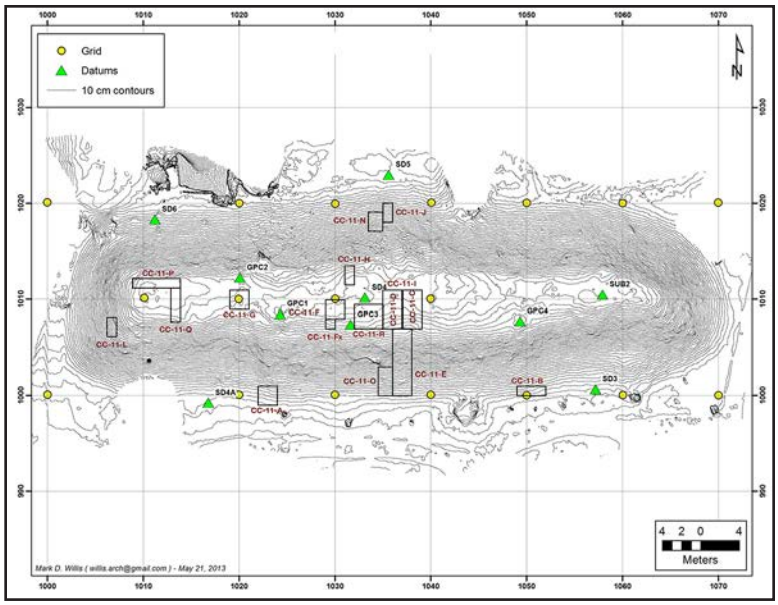

Figure 3.4. Contour map of Structure A-5 showing the local grid and locations of GCPs and datums used to geo-reference the dataset. Units excavated following the NGS/Waitt research are also shown. The rectangular shaped object in the northwestern part of the map is the roof of a small shed. Map by Mark Willis.

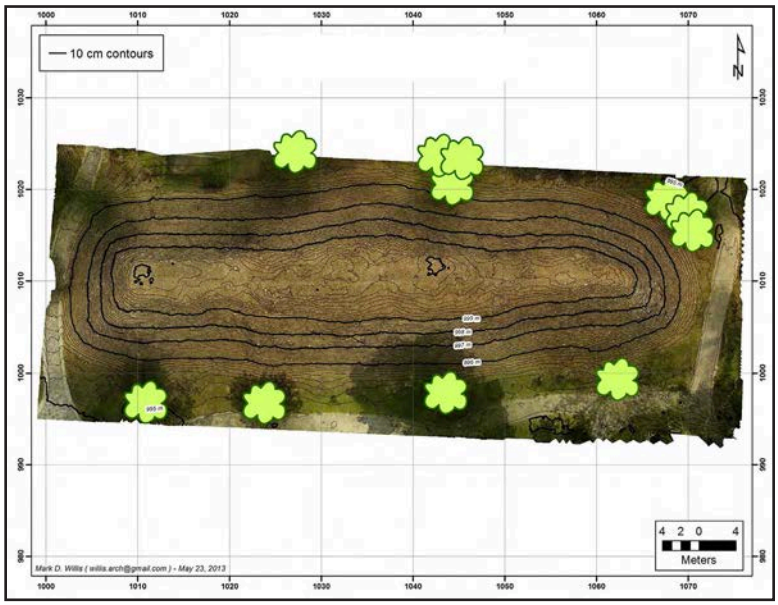

Figure 3.5. PAP ortho-photo data of Structure A-5 in GIS with 10-cm contours. Map by Mark Willis.

RESULTS

Mapping and 3D Modeling

The 800 digital photographs, which were processed through SfM software, resulted in 12,000,000 data points. Processing at full resolution would have resulted in 210,000,000 data points. The DEM of the mound and the ortho-photo were used to produce Figures 3.4 through 3.7. The mapping data immediately clarified the final form of Structure A-5. Guderjan (1991:38) had previously speculated that "collapsed vaulted rooms once faced into the plaza," but the flat summit of the mound suggested that the structure could be a platform,

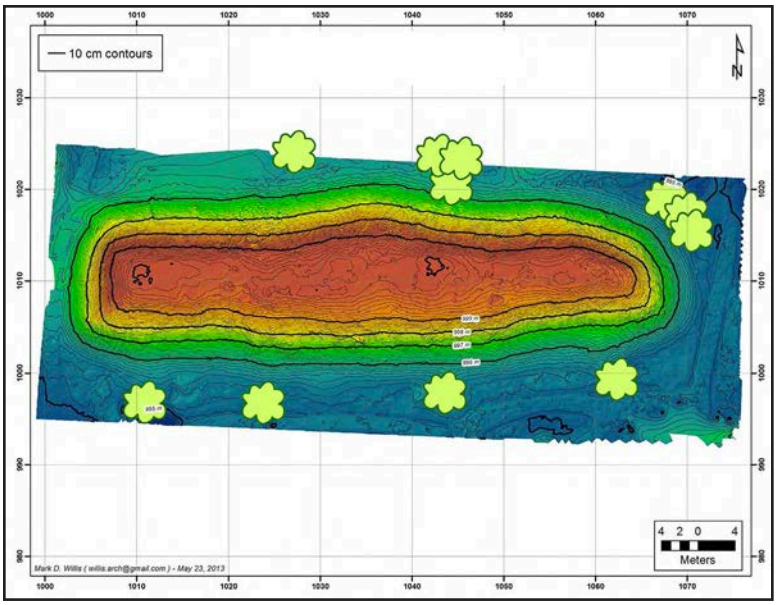

Figure 3.6. PAP-based data of Structure A-5 showing DEM and hypsography.

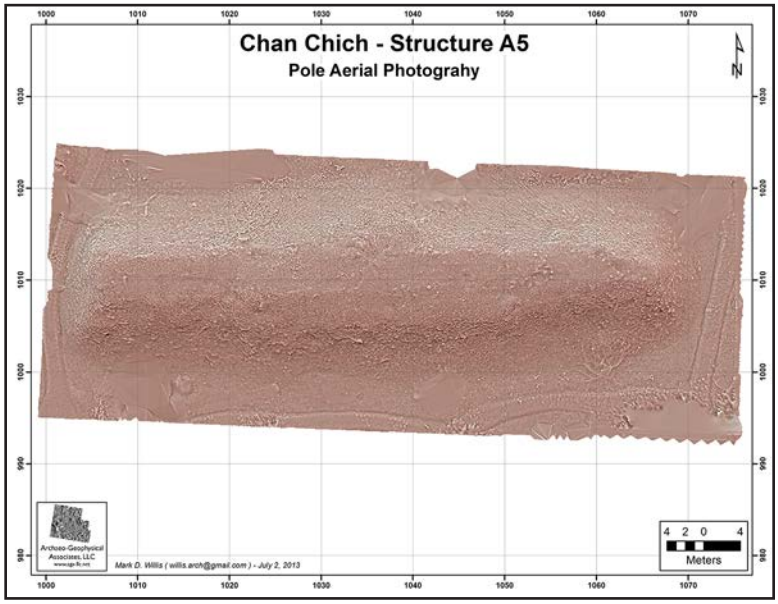

Figure 3.7. PAP data 3D model with details enhanced and texture removed. Map by Mark Willis.

not collapsed rooms. Clearing the vegetation to the ground and the mapping data confirmed that the building has two sets of stairs: a wide southern stairway, which faces into the Main Plaza, and a narrower northern stairway. Both sets climb to the top of the mound, indicating the final phase of construction was a platform and that the mound does not represent collapsed rooms. Subsequent excavations (see Herndon et al., this volume) confirmed this and documented a low masonry wall surrounding the perimeter of the summit. The structure likely included a perishable superstructure composed of pole and thatch. Importantly, the presence of a stairway on the northern side of the building indicates that the space north of the mound was a functioning plaza, which is now referred to as the North Plaza. Previously, it was assumed that this area was an unmodified section of natural hill, but now it is known to be part of the site core.

We tested using a robotic TDS to collect topographic points on Structure A-5. Working alone, the TDS could record 10,000 points in 4 hours. Working 24 hours per day, the robot would need a staggering 200 days to record as many points as we produced using the SfM technique, and over 9.5 years to collect as many points as we could generate at high resolution.

Ground Based Photography

The ground based photography of individual excavation units proved to be highly successful. Although in some cases the number of photographs taken proved to be insufficient for producing a complete model, overall the test of this method was highly successful. Although our jungle Internet connection was not the fastest, we were able to upload images

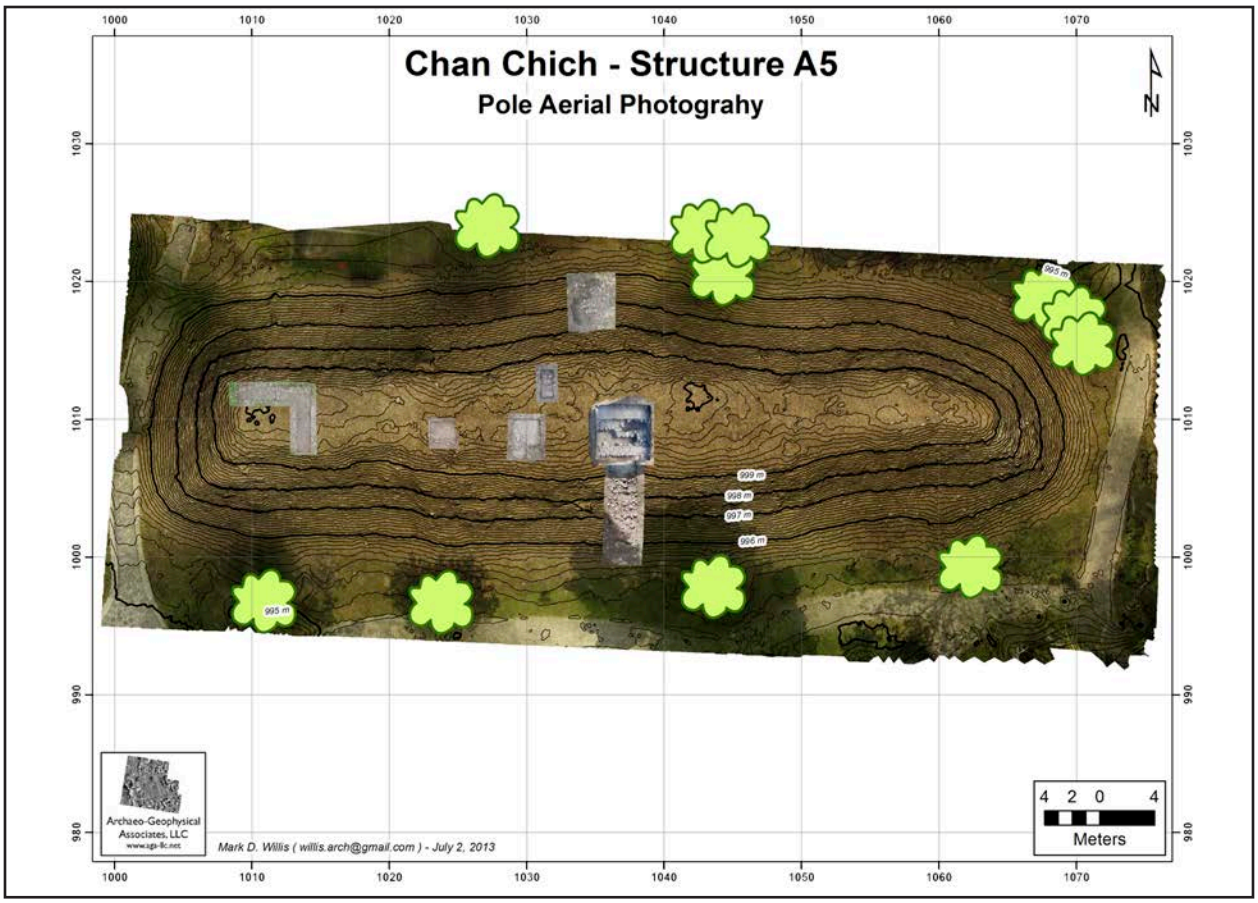

Figure 3.8. Excavation units modeled with ground based 3D modeling superimposed on PAP data of Structure A-5. This low resolution image shows multiple construction phases for demonstration purposes. Map by Mark Willis.

from many units, and Mark Willis processed them in the United States to create 3D models. This near real time feedback proved useful in the field. Figures 3.8–3.10 are examples of images of excavations created using this approach. As Figure 3.8 demonstrates, the geo-referenced excavation unit models can be superimposed on the 3D model of the mound. Figure 3.9 shows four different views of a pair of excavation units, which exposed a section of the low masonry wall that encircles the summit of Structure A-5, and Figure 3.10 shows a view of the penultimate steps on the northern face of the mound.

It is possible to export the 3D models for viewing on various platforms, like iPads, and to make animations to display the data and highlight specific angles or features. Furthermore, archaeologists can use bird's-eye-views of excavation units—because orthorectification removes the distortion present in standard photographs—in place of standard plan maps or as a base for drawing a plan map (Figure 3.11). This latter feature makes SfM technology particularly enticing provided enough photographs are taken to ensure that the software can produce an ortho-photo of the feature in question.

Preliminary GPR Survey Results

Both GPR datasets attenuated at a shallow depth. The 400-MHz antenna produced strong reflections to a depth of 20 cmbs. The 200-MHz antenna produced strong reflections

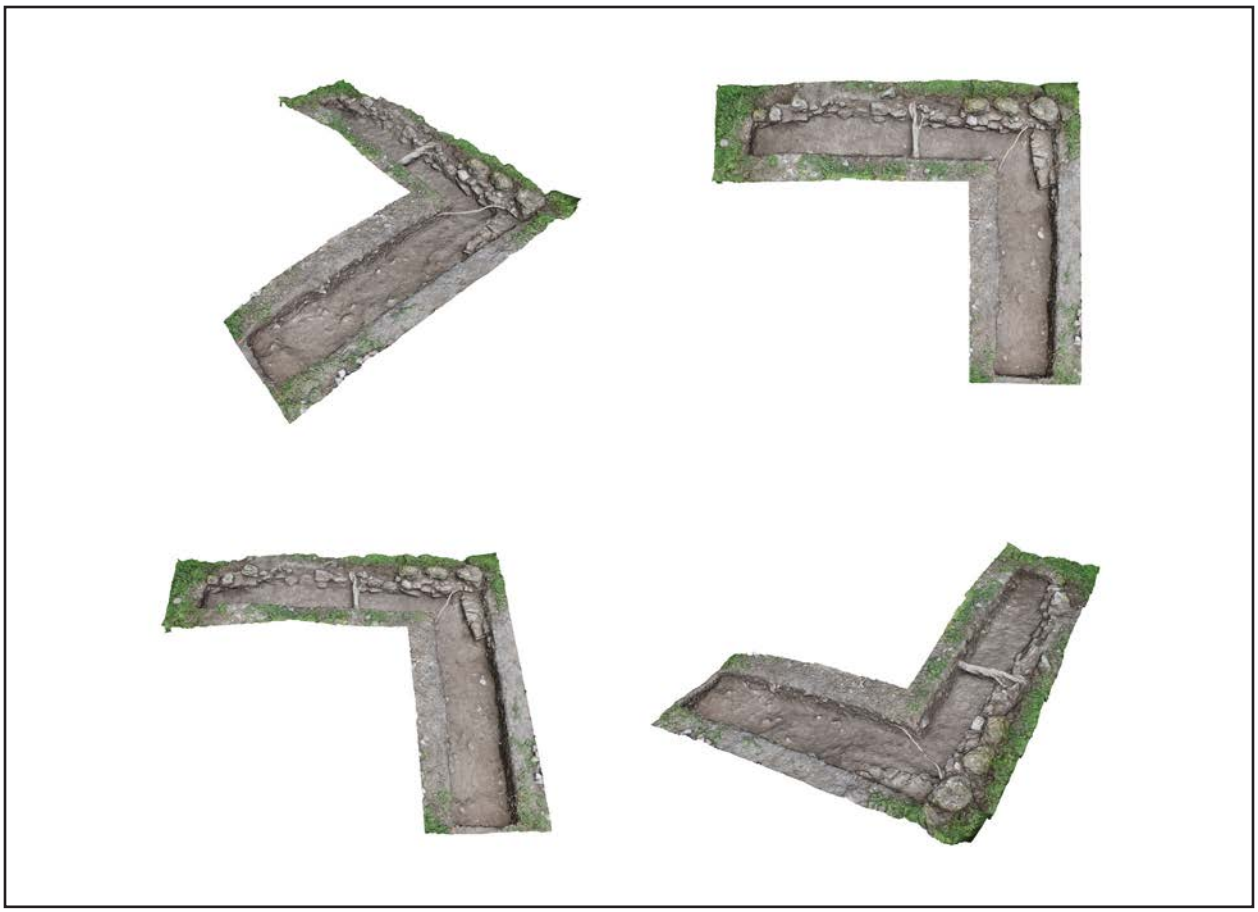

Figure 3.9. Various views of 3D model of Subops CC-11-P and -Q from ground based 3D modeling showing the low masonry wall on the summit of Structure A-5. The two excavation units are each 1 m wide.

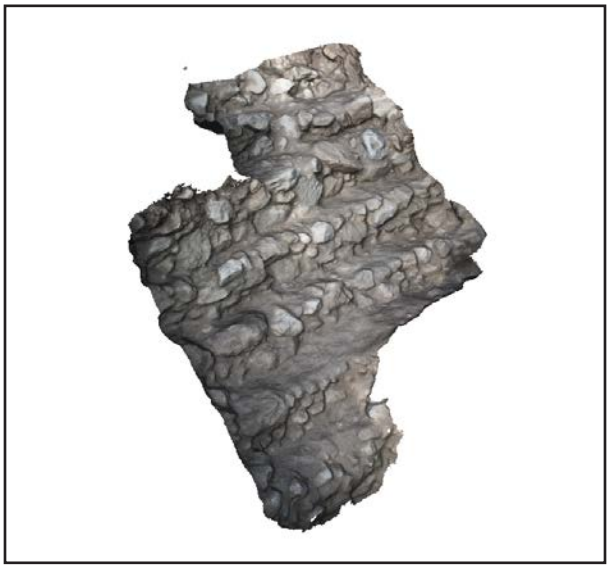

Figure 3.10. View of 3D model of excavation units from ground based 3D modeling showing the penultimate north-facing stairs on Structure A-5 in Subops CC-11-J and -N. The excavation area is 2.5 m wide.

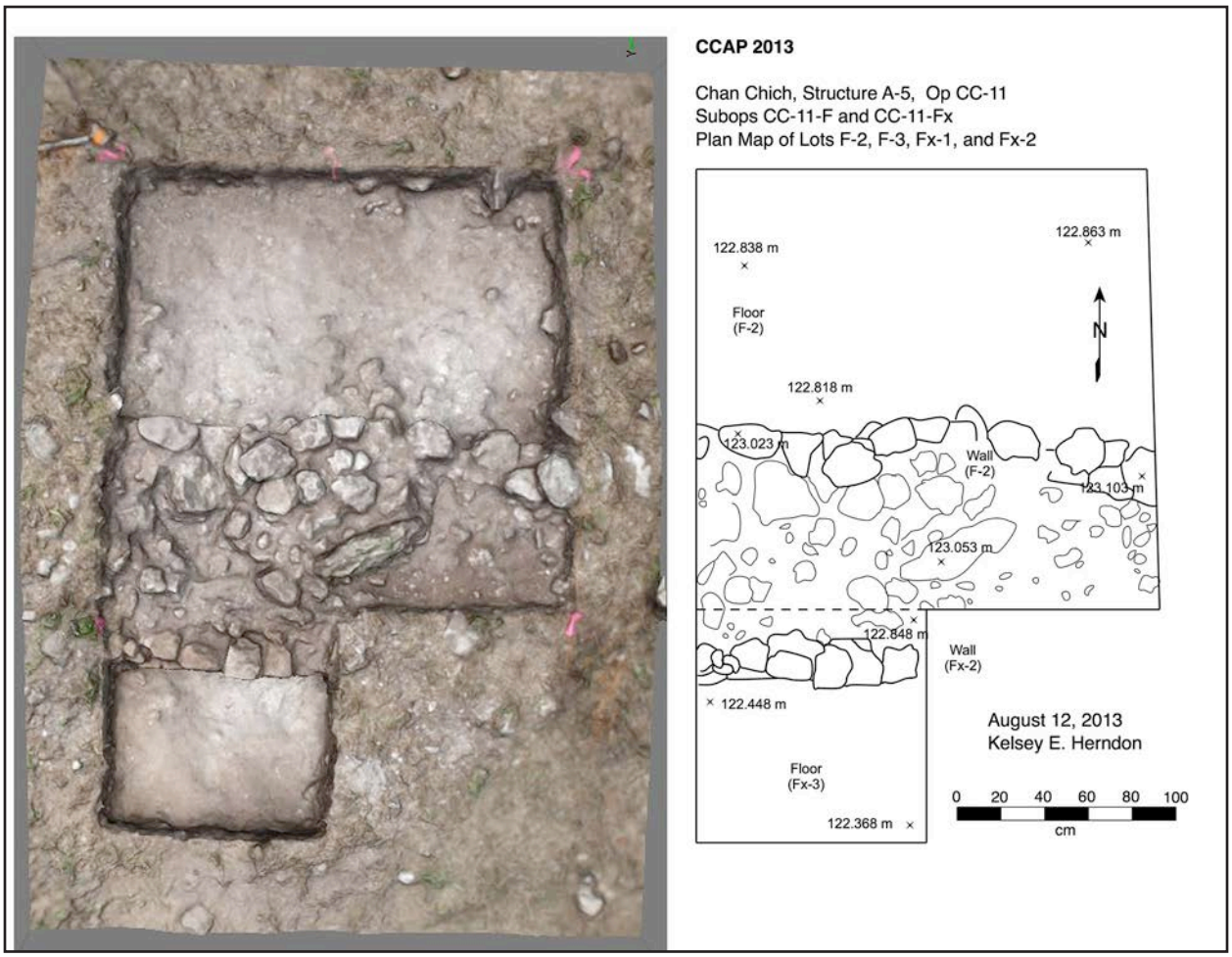

Figure 3.11. Example of 3D model of Subops CC-11-F and -Fx (left) with plan map drawn from bird's-eye-view of model (right). Drawing by Kelsey Herndon.

to a depth of 135 cmbs. In general data from both surveys show a trend of low amplitude reflections around the mound flanks and at the plaza level. Areas of high amplitude reflections are present in the center of the collection grid along the summit of the mound.

Based on the results from the geophysical work conducted during the 2012 field season in the Upper Plaza (Walker 2012), areas of high amplitude reflections are interpreted as loosely consolidated construction fill. Pockets of air in the fill and the fill's generally low degree of compaction produce higher amplitude reflections than densely packed cut stone walls.

We believe that the 400-MHz grid data are not particularly useful because of the architecture of the mound. The 4-m wide survey grid is almost entirely contained within the 3.3-m wide rooms that run the length of the mound. The walls of the superstructure are therefore located at the very edges of the grid, where the data are least reliable.

Rather than the GPR data being used to "predict" the nature of the buried features in the mound, the excavation data will be used to interpret the GPR data. With enough comparative remote sensing information and related excavation data, we believe that it will be possible to interpret GPR data from Maya structures and

plazas accurately. At this stage, however, the approach is still a work in progress.

CONCLUSIONS

Although our analysis is preliminary at this stage, we can make the following conclusions. The photogrammetric SfM mapping technique employed at Structure A-5 was tremendously effective. At the structure level, the PAP system collected data efficiently and with minimal cost. With 1 day of field time and several hours of processing, we were able to generate the equivalent of 12,000,000 topographic points using the SfM technique. To acquire that many points using a robotic TDS would require 200 days of field time. We believe that the resolution and accuracy of the SfM technique is comparable to using a 3D laser scanner, but can be accomplished for a fraction of the equipment cost. Furthermore, the PAP technique can be used under canopy, and obviates the need for drones.

Additionally, the SfM system, when used to record individual excavation units, can replace the traditional system of drawing plan maps and profiles. We state this with a degree of caution because it may not be possible to create a model from the data if the photographs are not taken correctly in the field. However, the method has additional benefits, as well. It allows the researchers to present the data in an interactive way through 3D models that can be viewed on an iPad or through short animations that can be uploaded to the Internet.

The use of GPR on Maya architecture remains a work in progress. We believe that with a greater sample of data from more contexts, we will get better at interpreting the GPR results. A complicating factor is the nature of the fill at Chan Chich and many Maya sites like it. GPR simply does not do well with dry-laid cobble fill, which comprises the bulk of Late Classic architecture at most Maya cities in the region. Because the Late Classic buildings and plazas drape the older architecture, the usefulness of GPR is diminished in most settings. However, once we learn to identify the different digital signatures of dry-laid rubble fill, we can begin to discern solid architectural features, such as walls, and nonrandom voids, such as crypts and tombs.

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Results of Excavations at Structure A-5 at Chan Chich

Kelsey E. Herndon, Ashley Booher, and Brett A. Houk

The 2013 Chan Chich Archaeological Project (CCAP) conducted the first season of excavations on Structure A-5, a range building located at the northern end of the Main Plaza of the site's center (Figure 4.1). Directly to the west of Structure A-5 is Structure A-4, and to the east are Structures A-6 and A-7. Across the Main Plaza from Structure A-5 is Structure A-1. Structure A-5 is one of the few structures at Chan Chich that had not been looted prior to the construction of Chan Chich Lodge in the 1980s. Early evaluations of Structure A-5 suggested that it was a range structure with collapsed vaulted rooms on top (Guderjan 1991).

OBJECTIVES AND METHODS

Before excavations began, project staff conducted ground-penetrating radar (GPR) and Structure from Motion (SfM) mapping on the structure, with support from the National Geographic/Waitt Grants program. See Chapter 3 of this report for a discussion of the results of the mapping work.

The research goals of the 2013 excavations of Structure A-5 fell within the overarching goals of the CCAP (Houk 2013). They included:

1. testing the ground-penetrating radar and SfM mapping data collected by Chet Walker and Mark Willis;
2. describing the terminal construction phase architecture; and
3. exploring the construction sequence of Structure A-5.

Excavations were conducted by employees of the Chan Chich Lodge and field school students participating in the Texas Tech University Field School in Maya Archaeology. The CCAP Project Director, Brett A. Houk, Operation Director Kelsey Herndon, and Assistant Operation Director Ashley Booher supervised students. Excavation and recording procedures followed the guidelines presented in the *La Milpa Core Project Field Manual* (Houk and Zaro 2011). All excavations fell under Operation (Op) CC-11. Suboperations were placed based on SfM and GPR mapping (see Chapter 3) or because of the potential to uncover architecture of interest based on the visual survey of the structure. Lot numbers were assigned based on the presence of cultural material and features and changes in matrix. In total, the CCAP opened 18 suboperations and 128 lots during the 2013 excavations. All ceramics and lithics were collected and stored in the field lab for analysis. No screening was performed on the material excavated from Structure A-5. When identified, charcoal was collected in aluminum foil packets for future radiocarbon dating.

RESULTS OF CLEARING AND MAPPING

After clearing the mound it became apparent that the top of the structure was a flat platform,

Herndon, Kelsey E., Ashley Booher, and Brett A. Houk
2013 Results of Excavations at Structure A-5 at Chan Chich. In *The 2013 Season of the Chan Chich Archaeological Project*, edited by Brett A. Houk, pp. 39–62. Papers of the Chan Chich Archaeological Project, Number 7. Department of Sociology, Anthropology, and Social Work, Texas Tech University, Lubbock.

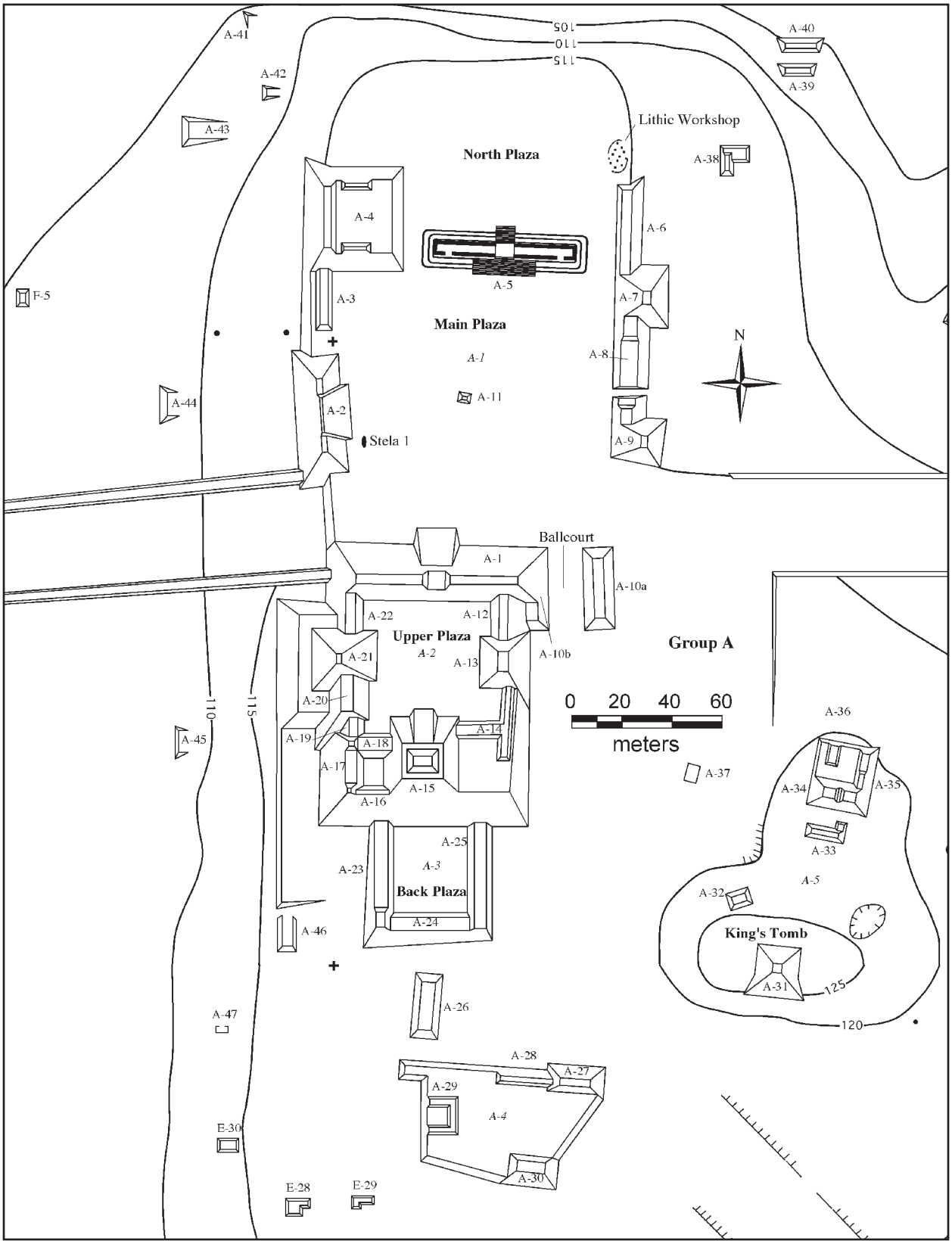

Figure 4.1. Map of Chan Chich site core with architectural plan of Structure A-5 based on 2013 mapping and excavations.

not collapsed rooms. Additionally, after mapping Structure A-5 (see Houk et al., this volume) we were able to compile accurate measurements of the structure. The mound measures approximately 64 m long by 14 m wide, at its base, and is 4.5 m tall. As noted by Houk et al. (this volume), clearing the vegetation to the ground and the mapping data confirmed that the building has a wide southern stairway, which faces into the Main Plaza, and a narrower northern stairway. The two sets of stairs climb to the summit of the mound, which is approximately 5 m wide and remarkably flat.

Visual inspection of the southern stairway noted step alignments that were poorly preserved but visible on the surface and discovered apparent vault stones used in the construction of steps in several locations. Presumably, these vault stones were robbed from some other structure and repurposed as steps during the construction of the final phase of Structure A-5. As discussed below, project members noted and collected multiple artifacts from the surface of the mound.

SUMMARY OF EXCAVATIONS

This section describes the individual excavation units opened at Structure A-5 in a more or less chronological order. It reflects the evolution of our excavation strategy as the form and nature of the building became evident and new questions arose that we wanted to answer. Table 4.1 presents the local grid coordinates and absolute elevations for each suboperation.

The excavations of Structure A-5 (Figure 4.2) began with the opening of Suboperations (Subops) CC-11-A and CC-11-B to determine the width of the southern stairway. Subop CC-11-A was a 2-x-2-m unit placed on the apparent southwestern corner of the southern stairway. This suboperation was opened to expose the westernmost edge of the staircase on the south face of Structure A-5, as well as to expose the structure's articulation with the Main Plaza surface. After excavating a thick layer of collapse debris, no western limit of the stairway was uncovered, as the unit was situated too far south and probably too far west as well. While the stairway was not uncovered in Subop CC-11-A, two poorly preserved layers of the Main Plaza floor were uncovered.

Subop CC-11-B was located at the bottom of the south face of Structure A-5 on the east end. It was a 1-x-3-m unit oriented east to west. This suboperation was opened to expose the eastern edge of the southern stairway based on the visual survey of the mound. After examining the three-dimensional topography

Table 4.1. Local Coordinates and Absolute Elevations for Southwestern Corners of All Suboperations

Subop	Size (m)	North (m)	East (m)	Elevation above sea level (m)
CC-11-A	2 x 2	N 0998.92	E 1021.95	118.52
CC-11-B	1 x 3	N 1000.00	E 1048.93	118.55
CC-11-C	2 x 4	N 1007.00	E 1037.00	122.46
CC-11-D	2 x 4	N 1007.00	E 1035.00	122.59
CC-11-E	2 x 7	N 1000.01	E 1036.03	118.76
CC-11-F	2 x 2	N 1007.89	E 1029.02	122.81
CC-11-Fx	1 x 1	N 1006.97	E 1029.06	122.57
CC-11-G	2 x 2	N 1007.90	E 1022.98	122.73
CC-11-H	1 x 2	N 1011.49	E 1030.95	122.98
CC-11-I	4 x 4	N 1006.92	E 1035.00	122.18
CC-11-J	1 x 2	N 1018.05	E 1034.86	120.32
CC-11-K	1.5 x 6	N 1006.62	E 1018.89	121.97
CC-11-L	1 x 2	N 1006.93	E 1006.07	121.19
CC-11-N	1.5 x 2	N 1016.93	E 1033.44	120.74
CC-11-O	1.5 x 3	N 1000.06	E 1034.43	118.78
CC-11-P	1 x 5	N 1011.22	E 1008.78	122.84
CC-11-Q	1 x 3.5	N 1007.71	E 1012.96	122.77
CC-11-R	2.5 x 3	N 1007.02	E 1032.02	122.65

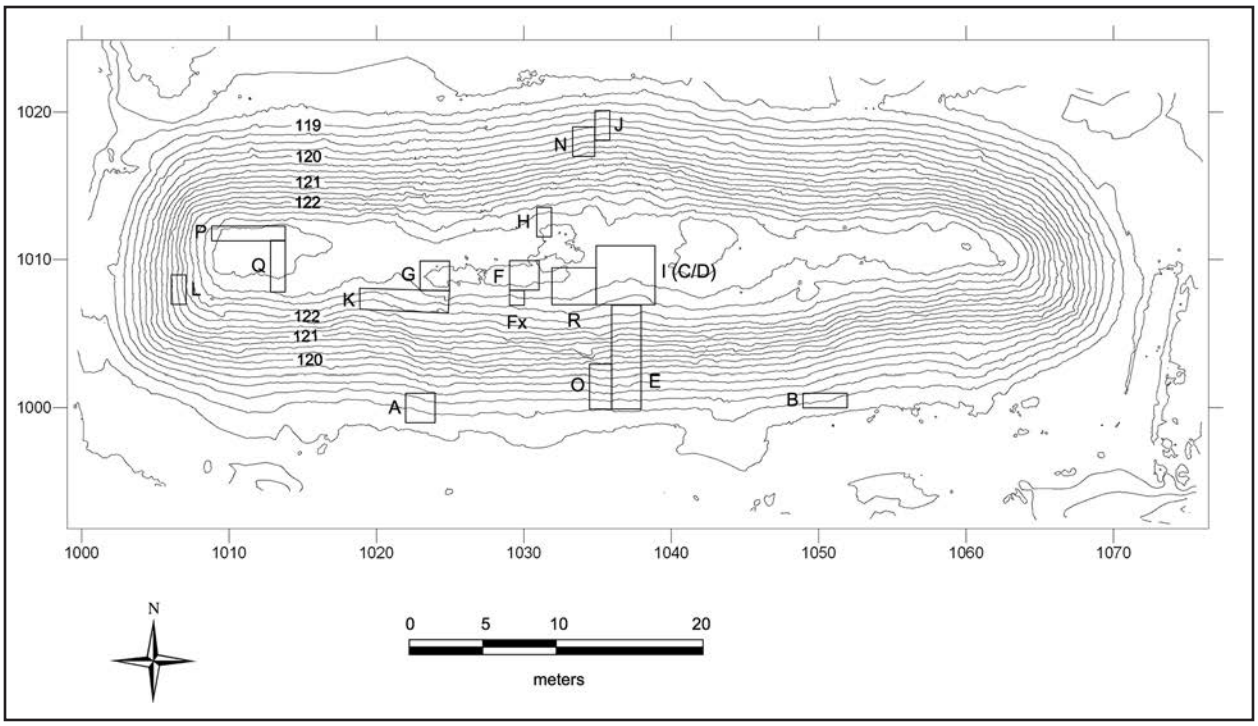

Figure 4.2. Topographic map of Structure A-5 showing the locations of excavated suboperations. Note that Subop CC-11-M was staked but never excavated; therefore, it does not appear on this map. Contour interval is 0.25 m.

maps generated by SFM (see Houk et al., this volume), it appeared we set our units too far south to catch the stairs. In addition to a layer of collapse debris, the plaster floor of the Main Plaza was also exposed.

Subop CC-11-C was opened to test the GPR data collected by Chet Walker at the beginning of the 2013 season. As directed by Walker, we set up this unit so that one of the GPR anomalies was located in the northeast portion of the unit. Originally, the suboperation measured 2 x 2 m, however, after a possible "wall" was uncovered during excavations of Subop CC-11-C-1, the unit was expanded 1 m to the north and 1 m to the south to form a 2-x-4-m unit oriented north to south. The "wall" turned out to be the top step (Lot CC-11-C-2) of the final construction phase of the southern stairway. After expansion of Subop CC-11-C another step (Lot CC-11-C-3) was also uncovered in the southern portion of the unit, and Subop CC-11-D was opened to the west as an expansion of Subop CC-11-C to more fully expose these stairs (CC-11-D-2 and CC-11-D-6). Subop CC-11-D was a 2-x-4-m unit oriented north to south and adjacent to the western wall of Subop CC-11-C. In addition to the two stairs, an earlier, well-preserved plaster floor was also exposed in the northern portion of the two units (Lots CC-11-C-5 and CC-11-D-5).

As the well-preserved floor (Lots CC-11-C-5 and CC-11-D-5) exposed in Subops CC-11-C and CC-11-D was excavated, the architecture became increasingly complex. To streamline lots and minimize confusion, the two units were combined into a 4-x-4-m unit, Subop CC-11-I. This new suboperation continued to be excavated to expose some problematic architecture that the Subops CC-11-C and CC-11-D excavations had uncovered. Excavations in Subop CC-11-I uncovered a complex arrangement of fill stabilizers and construction pens and possibly an earlier platform core face and stairside face (Figure 4.3).

Figure 4.3. Photograph of complex arrangement of construction pens and possible core faces, robbed of facing masonry, from earlier construction phases in Subop CC-11-I, facing north.

When the limits of the southern stairway were not uncovered in Subops CC-11-A and CC-11-B, the three-dimensional topographic map generated by Mark Willis was used to estimate the dimensions of the southern stairway, and Subop CC-11-E, a 2-x-7-m unit oriented north to south, was opened at the midline of the stairway to expose the architecture and connect it to the steps uncovered in Subops CC-11-C and CC-11-D. Ultimately, excavations in Subop CC-11-E exposed two phases of the stairway, the platform core faces that supported the stairs, and a buried room from an earlier phase of the building.

Excavations in the southern portion of Subop CC-11-E revealed an anomaly in the plaster surface running into the western wall of the unit. Subop CC-11-O was a 1.5-x-3-m unit oriented north to south that was opened along the western side of Subop CC-11-E to better expose the anomaly in the plaster surface. The anomaly turned out to be the door-jamb of a buried room.

Combined, Subops CC-11-E and CC-11-I provide an 11-m long profile of the southern and central sections of Structure A-5 (Figure 4.4). The door-jamb of the buried room (CC-11-E-19), the core faces of the penultimate stairway (CC-11-E-9 and CC-11-E-11), and one of the platform faces/construction pens (CC-11-I-4) are clearly visible. Less apparent are the final and penultimate stairways themselves. The estimated locations, based on surface indications, of the steps making up the final phase stairway are indicated on Figure 4.4.

Subop CC-11-F was also opened to test the GPR data collected by Chet Walker at the beginning of the 2013 season. The unit measured 2 x 2 m and was located on the top of Structure A-5,

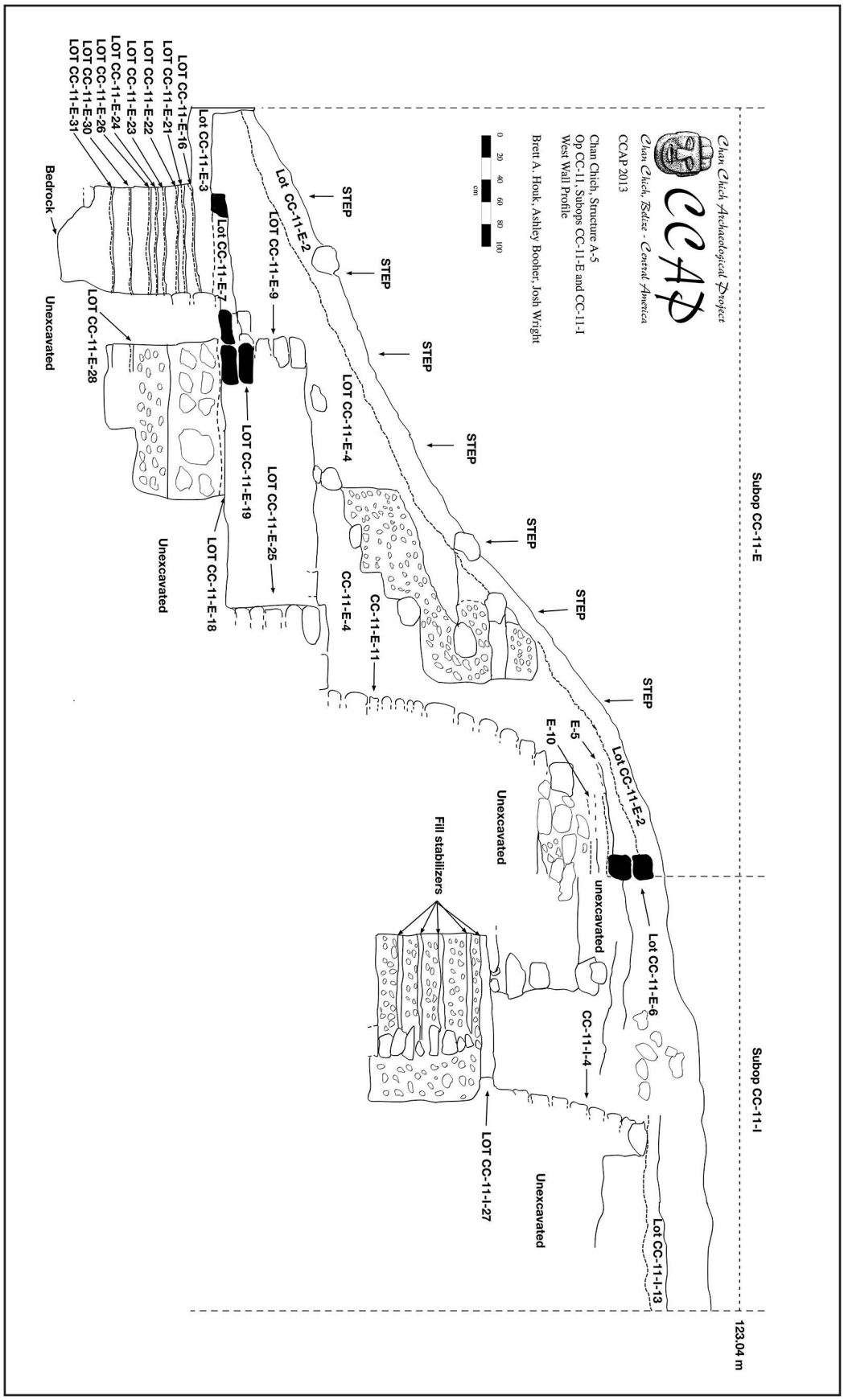

Figure 4.4. Western profile of Subops CC-11-E and CC-11-I.

west of the midline. A poorly preserved plaster floor was exposed in the northern portion of the unit just below the surface. Additionally, the northern face of a low, stone wall was uncovered in the southern portion of the unit. To expose the southern face of the wall, Subop CC-11-Fx, a 1-x-1-m extension, was opened adjacent to the southern wall of Subop CC-11-F. A lower, poorly preserved plaster floor was exposed to the south of the low wall in Subop CC-11-Fx. In addition to the wall (Lot CC-11-F-2) and plaster floor (Lot CC-11-F-3) uncovered in Subop CC-11-F, an earlier plaster floor capping a large construction episode was excavated (Lot CC-11-F-5). This surface was encountered 40 cm below the final, interior platform floor, and is related to the penultimate construction phase.

To explore more of this southern summit wall and look for interior cross walls, the project opened Subop CC-11-G, a 2-x-2-m unit, based on a visual survey of the structure's surface, which indicated a corner might be located in this area. However, this "corner" turned out to be an angular arrangement of collapse debris, and the low wall (Lot CC-11-G-2) continued farther to the west.

The width of the room on top of Structure A-5 was determined by opening Subop CC-11-H on the northern edge of the mound's summit across from Subop CC-11-F. This suboperation measured 1 x 2 m and was oriented north to south. Once the southern face of the northern wall was exposed, the width of the room was measured from southern wall (Lot CC-11-F-2) to northern wall (Lot CC-11-H-2) and Subop CC-11-H was subsequently closed. The architecture of the final phase is discussed in the following section.

The previously unidentified northern stairway was recognized once Structure A-5 had been cleared; it is visible on the mound and on the shaded relief map (Figure 4.5). Subop CC-11-J was opened at the approximate midline of the stairway with the intent of following one stair to

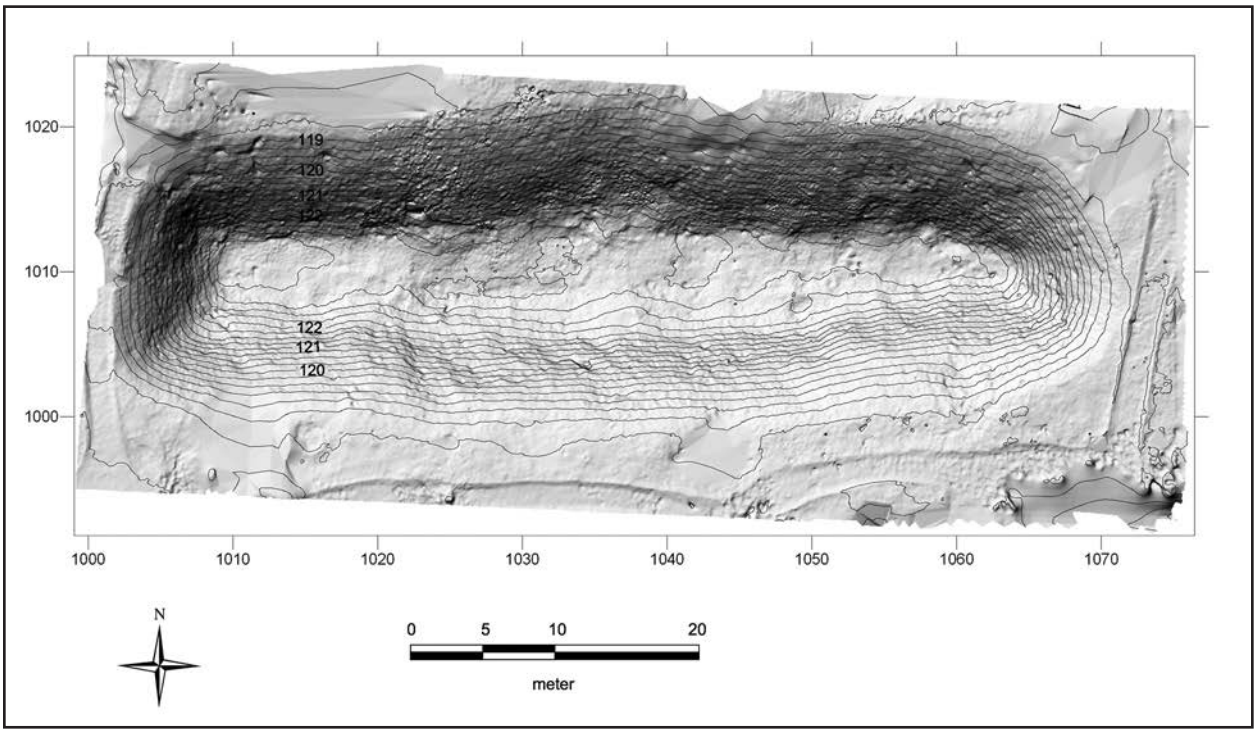

Figure 4.5. Shaded relief map with contours of Structure A-5. The northern stairway is visible along the centerline of the mound. Contour interval is 0.25 m.

the east and west limits of the stairway. Subop CC-11-J was a 1-x-2-m unit oriented north to south. Excavations exposed two construction phases of the northern stairway in this unit, as well as the surface of the newly identified North Plaza. The final phase of the stairs was poorly preserved, but the penultimate phase was easily recognizable. Once it was exposed in Subop CC-11-J, Subop CC-11-N was opened adjacent to the western side of Subop CC-11-J to follow the stairway to its western limit. This new unit measured 1.5 x 2 m and was oriented north to south. This unit also exposed two construction phases of the northern stairway, but did not encounter the western edge of the stair blocks.

Subop CC-11-K was initially opened as an informal unit to find the end of the low wall uncovered in Subops CC-11-F, CC-11-Fx, and CC-11-G. When formally established, this suboperation measured approximately 1.5 x 6 m and was oriented east to west. Excavations did not expose the end of the wall (Lot CC-11-K-2) and could not be extended farther west due to the placement of back dirt from nearby excavations.

When Subop CC-11-K did not uncover the western extent of the low wall on the top of Structure A-5, Subop CC-11-P was opened on the northern edge of the western side of the top of Structure A-5 to again try to expose the western extent of the wall. Subop CC-11-P was a 1-x-5-m unit oriented east to west The low wall (Lot CC-11-P-3) continued through the western wall of this unit, indicating that the actual end of the wall had probably collapsed down the western side of Structure A-5. Additionally, in the eastern portion of the unit a low, partition wall (Lot CC-11-P-4) running north to south was uncovered.

To expose the partition wall uncovered in the eastern portion of Subop CC-11-P, Subop CC-11-Q was opened to the south of the eastern edge of Subop CC-11-P. Subop CC-11-Q was a 1-x-3.5-m m unit oriented north to south. The partition wall stopped abruptly about halfway through the unit, and may be an internal dividing wall of some sort. The southern end of the unit did not encounter the southern wall of the structure, suggesting a possible entrance into the room was located near the western end of the building.

A visual survey of the mound indicated that the edges of the final phase substructure were rounded—we observed several cut stones with rounded phases on the surface. Subop CC-11-L was opened to locate the western end of the top tier of the substructure of Structure A-5 and verify the form of the architecture. Subop CC-11-L was a 1-x-2-m unit oriented north to south.

The final unit excavated during the 2013 excavations was Subop CC-11-R. This suboperation was opened to determine how the wall exposed in Subop CC-11-F/Fx transitioned into the stairs and platform exposed in Subop CC-11-D. Subop CC-11-R was a 2.5-x-3-m unit oriented east to west. We did not find a door jamb for the entrance into the final phase superstructure. Instead, the wall from Subops CC-11-F/Fx appears to transition into the penultimate stair (Lot CC-11-D-6) near the midline of the structure. Additionally, a cross-wall appears to extend to the north of where the wall changes to stair. Poor preservation, however, prevented definite interpretation.

Following the failed attempt to uncover the eastern limits of the southern stairway in CC-11-B, a second visual survey of the mound and inspection of the three-dimensional topographic map suggested that the eastern edge of the southern stairway might be located along local gridline E 1050. Subop CC-11-M was set up as a 1.5-x-2-m unit oriented east to west, but time restraints prevented the unit from being excavated.

SURFACE FINDS

Ten surface finds were collected from Structure A-5 outside of established units. To provenience these finds, the Operation Director established Subop CC-11-SF and assigned individual lot numbers to each artifact. The surface finds included two large pieces of ceramic, four ground stone fragments, and four lithic artifacts (Table 4.2; Figures 4.6–4.8). Three granite metate fragments found scattered across the mound proved to refit (see Figure 4.7).

INTERPRETATION OF THE ARCHITECTURE

At least three construction phases of Structure A-5 were uncovered during the 2013 season of the CCAP. Ceramic analysis of the final phase architecture dates to the Late Classic. The ceramic analysis from the penultimate and Sub-2 construction phases has not been completed, and therefore conclusions are uncertain.

Final Construction Phase

The 2013 excavations revealed the most information about the final construction phase of Structure A-5. The final construction phase features we uncovered include a northern and southern stairway, a long room located on the summit of the structure, and a substructure with rounded edges (Figures 4.9 and 4.10). According to ceramics analysis the final construction phase was constructed and occupied during the Late Classic period, although use apparently continued into the Terminal Classic period.

Northern Stairway

The northern stairway was unidentified prior to the clearing of Structure A-5 for the 2013 field season. Its presence is important because it marks the area to the north of Structure A-5 as a functioning plaza, now identified as the North Plaza. Visual survey of the northern face of the structure identified several alignments of rocks

Table 4.2. Surface Finds

Lot	Description	Notes
CC-11-SF-1	Ground granite metate fragment	Appears to have been used as part of the final, southern stairway.
CC-11-SF-2	Terminal Classic Ceramic sherd	Found near the bottom of the southern face of Structure A-5, near the eastern end of the structure.
CC-11-SF-3	Chert core	Found near the base of the southern face of Structure A-5 near the eastern end of the structure.
CC-11-SF-4	Biface made from and orange and white striped chert	Found on top of structure A-5 near the east end (see Figure 4.8).
CC-11-SF-5	Ground granite metate fragment	Found on the south face of the west end of structure A-5. This metate fragment fits onto CC-11-SF-1 CC-11-SF-10.
CC-11-SF-6	Large Late Classic rim sherd	Found on the north face of the west end.
CC-11-SF-7	Large fragment of a metate made from an unidentified material	Found on the north face of the structure at the east end. This fragment does not fit with the other metate fragments and is not made of the same material.
CC-11-SF-8	Chert biface	Found on the north face of the east end of structure A-5.
CC-11-SF-9	Chert biface	Found on the north face of the west end of the structure.
CC-11-SF-10	Ground granite metate fragment	Found on the southern face of the structure about halfway up and in the middle of the structure. Lots CC-11-SF-1, -5, and -10 are all fragments that fit together to form part of a ground granite metate (see Figure 4.7).

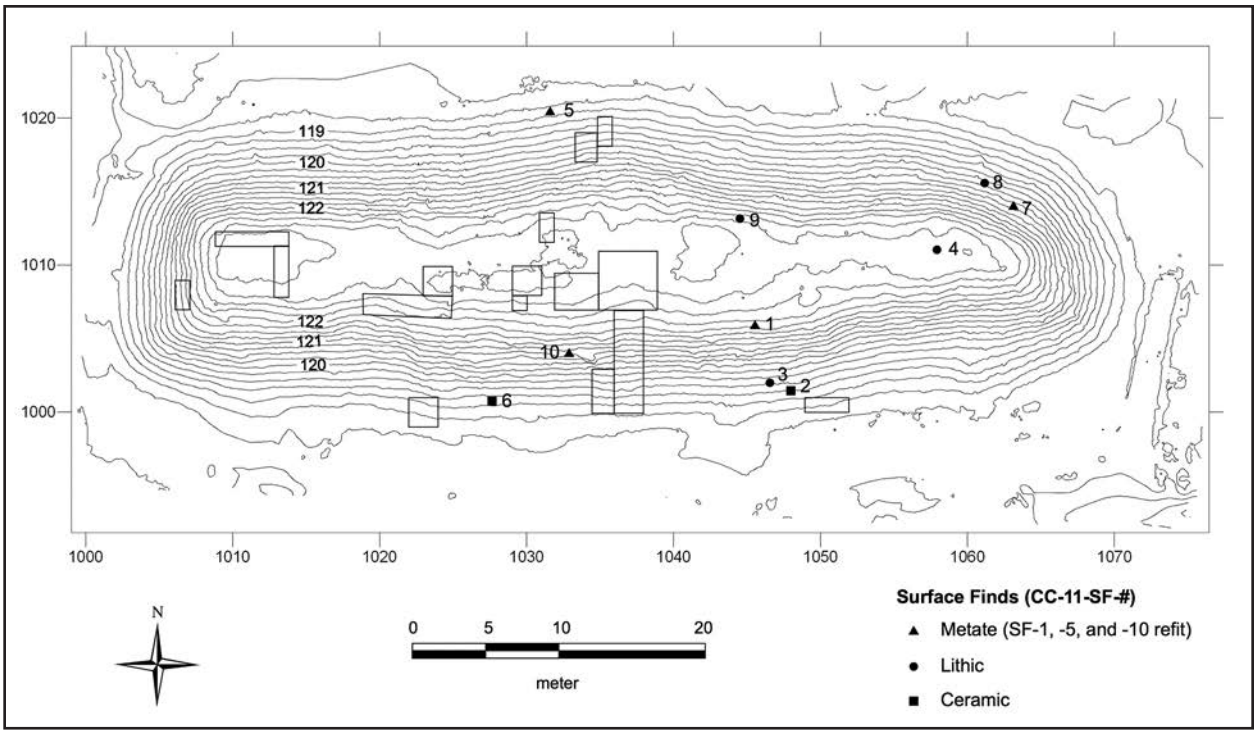

Figure 4.6. Contour map showing locations of surface finds outside of established units. Contour interval is 0.25 m.

that appeared to be a stairway. Additionally, the model created from the SfM mapping revealed a possible northern stairway as well. Excavation of Lots CC-11-J-1 and CC-11-N-1 revealed a very poorly preserved stairway beneath the topsoil (Lots CC-11-J-2 and CC-11-N-2).

Ceramic analysis of Lots CC-11-J-1 and CC-11-N-1 indicate that the final construction phase northern stairway was in use during the Late Classic. Ceramic analysis of the construction fill associated with this stairway (Lots CC-11-J-2, CC-11-J-3, and CC-11-N-2) indicates that the construction of the northern stairway also took place during the Late Classic. Artifact density recovered from this portion of the structure was relatively high, with an especially high concentration of lithic debitage and lithic tools. This is probably related to the proximity of a nearby lithic workshop located in the eastern part of the Northern Plaza (see Figure 4.1). Excavations did not reveal the limits of the stairway, but calculations based on the three-dimensional topographic map allow us to estimate the width at approximately 10–15 meters wide.

Southern Stairway

The stairway located on the southern face of Structure A-5 leads into the Main Plaza. A visual survey of the structure identified several alignments of rocks that appeared to be a wide stairway, including at least one vault stone that appeared to have been robbed from other structures to form the final phase stairway (Figure 4.11). A large fragment of ground granite metate (Lot CC-11-SF-1) also appeared to have been used as part of the stairway. Subops CC-11-A and CC-11-B were the first units opened in order to determine the western and eastern edge of the final construction phase of the main stairway. Excavations in these suboperations failed to identify the extent of the stairway, but the poorly preserved plaster floor of the Main Plaza was exposed in both units. Subop CC-11-E was opened on the

Figure 4.7. Informal lab photograph of refitting metate fragments found across Structure A-5. For scale, SF-1 is 27.0 cm long.

Figure 4.8. Photograph of biface, Lot CC-11-SF-4.

midline of Structure A-5 on the southern face to expose the stairway. Excavations of Lot CC-11-E-1 revealed an extremely poorly preserved stairway (Lot CC-11-E-2). Ceramic analysis indicates that the southern stairway was constructed and used during the Late Classic. Excavations did not uncover the eastern or western limits of the stairway. The second stair from the top was reused from the penultimate construction phase stairway, where it served as the top step.

The only extraordinary artifacts excavated from the top of the southern stairs were six sherds of a Postclassic *inscensario* excavated from the southwest corner of the unit. Placed approximately on the centerline of the structure, these sherds represent Postclassic monument

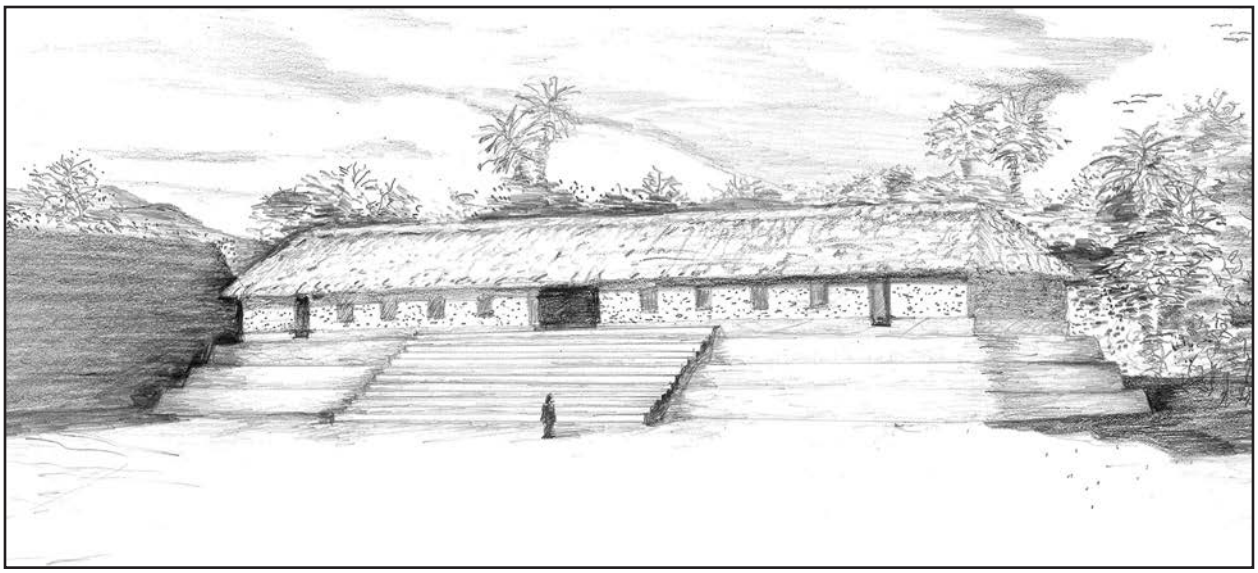

Figure 4.9. Architectural reconstruction drawing of Structure A-5 by Gary Smith. View is from the southeast.

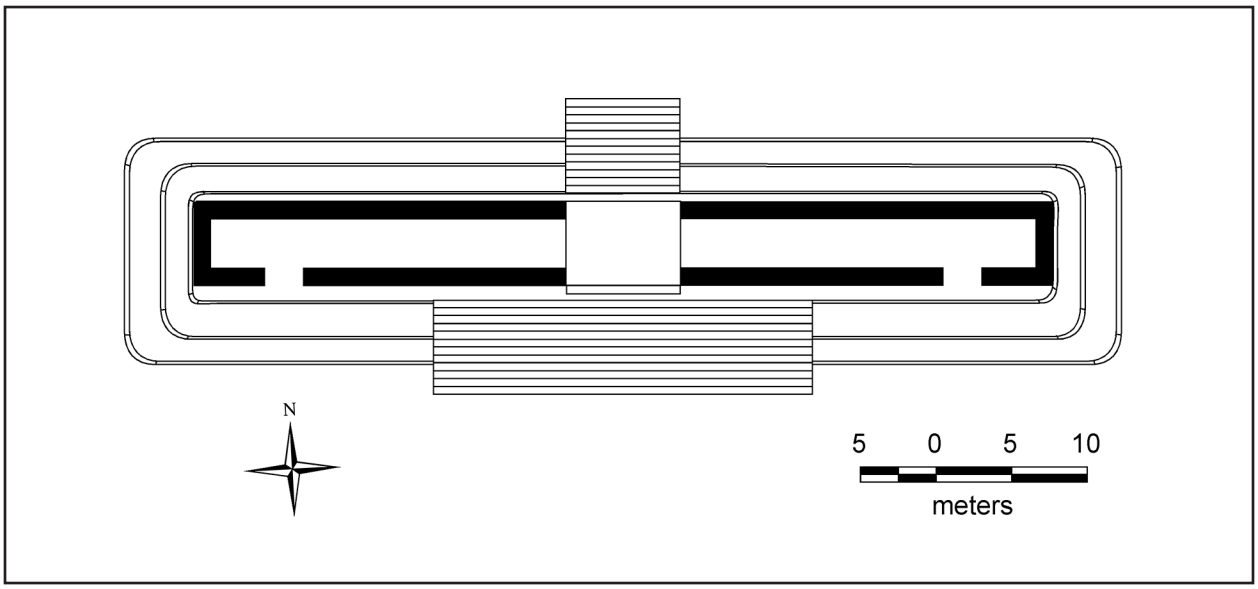

Figure 4.10. Architectural plan of Structure A-5 based on surface indications and excavation data.

veneration, a pattern previously documented at Chan Chich (e.g., Guderjan 1991), at nearby Kaxil Uinic (e.g., Houk et al. 2013), and numerous other sites in the region (e.g., Houk et al. 2008).

Substructure

A visual survey of Structure A-5 led the excavators to believe that the substructure of the final construction phase had rounded corners. Subop CC-11-L was opened, and the rounded corners of the substructure were confirmed. Ceramic analysis of Lots CC-11-L-1 and CC-11-L-2 indicate that the substructure was built and occupied during the Late Classic period. Additionally, excavations of Lot CC-11-L-2 uncovered a small chunk of red-painted plaster. The piece of plaster measured 6 cm long by 5 cm wide by 3 cm thick. One side of the piece of

Figure 4.11. Photograph of vault stone used in construction of the final phase of the southern stairway.

plaster was smooth and painted red, suggesting that either the substructure or superstructure might have been painted red. Our drawings and maps of Structure A-5, which are based on the surface configuration of the mound, depict a three-tiered substructure, but this is rather conjectural given the state of preservation and our limited exposures.

Superstructure

The initial visual survey of the summit of Structure A-5 as well as the results of the SfM mapping, suggested the presence of a long low-walled room. The final construction phase of the superstructure of Structure A-5 was revealed with excavations in Subops CC-11-C, CC-11-D, CC-11-F, CC-11-Fx (Figure 4.12), CC-11-H, CC-11-G, CC-11-K, CC-11-P, CC-11-Q, and CC-11-R. All of our excavation data come from the western half of the structure, but we assume symmetry and project that the building had long rooms on both ends of the structure formed by low masonry walls, approximately 1 m thick. These walls would have supported a perishable wall and roof. The western room measures 3.3 m wide from north to south. The east to west extent of the room was not determined and it appears that at least the western edge of the room may have collapsed down the western side of the structure. The eastern extent of the western room terminated near the midline of the structure where a cross wall (Lot CC-11-R-6) running north to south was uncovered.

Excavations in Lots CC-11-K-3 and CC-11-Fx-3 uncovered a lower platform surface on the southern side (exterior) of the southern wall (approximately 30 cm lower). This platform surface aligns with the penultimate stair and formed an exterior landing that provided access to the projected western doorway into the building.

Figure 4.12. Photograph of the southern superstructure wall in Subops CC-11-F (left) and -Fx. Facing east.

Penultimate Construction Phase

The excavated elements of the penultimate construction phase include a southern and northern stairway and platform surface. The apical platform of the penultimate construction was reused in the final construction phase as a lower platform surface outside the low wall. The apical step of the penultimate phase was also reused as the penultimate step in the final construction phase southern stairway.

Northern stairway

Further excavations in Subops CC-11-J and CC-11-N revealed an earlier stairway (Lots CC-11-J-4 and CC-11-N-3). This penultimate stairway was better preserved than the final phase stairway (Figure 4.13). Six stairs were uncovered with an average run between 20 and 30 cm. The exterior plaster was completely eroded, revealing unusual shaped, but not cut, stones and cobbles comprising the actually steps. At the base of the lowest step, excavators uncovered the poorly preserved plaster surface of the North Plaza in the northern portion of Subop CC-11-J. Ceramic analysis has not been completed and therefore this stairway has yet to be dated.

Southern stairway

Penetrating excavations in Subop CC-11-E also uncovered an earlier stairway on the southern face of Structure A-5. This stairway was very poorly preserved, most likely due to its dismantling prior to construction of the final phase architecture. However, two steps did manage to survive with faced stones intact: the bottom step and the penultimate step, which were each given their own lot numbers (CC-11-E-7 and CC-11-E-6). The plaster surface (CC-11-E-5) that extended from the base of the

Figure 4.13. Photograph of penultimate steps of the northern stairway, facing east.

well-preserved penultimate step (CC-11-E-6) simply petered out, ending where the stairway became poorly preserved.

The apical stair of this construction phase was reused as the penultimate stair in the final construction phase stairway. Ceramics analyses of the poorly preserved portion of the penultimate stairway (Lot CC-11-E-4) date its construction to the Late Classic. Curiously, the ceramic analyses of the well-preserved penultimate step and associated plaster surface (Lots CC-11-E-5and CC-11-E-12) date it to the Late Preclassic. Further excavations will be needed to determine if this is because it was actually part of an even earlier stair or due to the small ceramics sample size. An earlier stair run surface (Lot CC-11-E-10) was also uncovered beneath the well-preserved stair run (Lot CC-11-E-5) associated with the well-preserved penultimate stair. The ceramics from this lot have yet to be analyzed.

Excavations below the penultimate southern stairway revealed the core facings of the earlier, undated structure upon which the stairway was built. This earlier phase consisted of two platforms with southern facing core faces, both stripped of facing masonry (Lots CC-11-E-9 and CC-11-E-11). The bottom core face was 0.75 m high, and its platform extended 3.25 m north to the foot of the second platform. The second higher core face was 2 m high, though its articulation with the summit of the structure was unclear. Ceramic analysis for these lots has not been completed, and therefore these architectural elements have not been dated.

Superstructure

The penultimate stairway led up to a platform at the summit of Structure A-5 (Lots CC-11-D-5,

CC-11-C-5. The top step (onto the platform) of the penultimate stairway was later reused in the final construction phase of the southern stairway as the penultimate stair. From Lots CC-11-C-5/D-5 (the midline platform) there appears to be an approximately 30 cm high step up (Lot CC-11-F-5) onto another surface, creating a raised platform on the east and west sides of the primary axis at the summit of the structure. No architectural features besides the platform were found on top of the centerline for Structure A-5, suggesting that this may have been an open space for performances; however, it is also possible that the superstructure was disassembled prior to construction of the final phase construction.

No other plaster floors were excavated from Subop CC-11-F, despite extending excavations another 1.5 m lower. Further excavations will be needed to determine the interface between the two surfaces making up the summit of the penultimate construction phase (Lots CC-11-F-5 and CC-11-C/D-5).

Earlier Construction Phases

Superstructure and Southern Stairway

Penetrating excavations were conducted beneath the plaster floor that served as the top of penultimate construction phase (Lots CC-11-C-5/D-5/I-13). Subops CC-11-D and CC-11-C were combined into Subop CC-11-I beneath Lots CC-11-C-5 and CC-11-D-5. Excavations of Subop CC-11-I revealed a complex construction layout beneath the plaster surface. The wall-like alignments (Lots CC-11-I-2, CC-11-I-3, and CC-11-I-4) may be part of an earlier structure, or may be construction pens created during the construction of the penultimate construction phase (or some combination of the two). However, further excavations will be needed to determine if these are part of a platform core or construction pens (see Figure 4.3). Ceramic analysis for the lots directly beneath the plaster floor (Lots CC-11-C-5 and CC-11-D-5) has not been completed.

Beneath the bottom of Lot CC-11-I-4, a potential construction pen or platform core, there was a fill stabilizer layer (Lot CC-11-I-27) on which the wall ends. Beneath this surface and to the south of Lot CC-11-I-4 is an alignment of large rocks that was not excavated (Lot CC-11-I-30).

More excavations will be needed to determine if the alignments uncovered in Subop CC-11-I are construction pens or earlier architecture, specifically platform core faces. In Subop CC-11-I, Lot CC-11-I-4 (a wall) does not end at a plaster floor, but rather what appears to be a fill stabilizer. This supports the conclusion that at least some of the alignments are construction pens.

Buried Room (Subops CC-11-E, CC-11-O)

A buried room was uncovered in Subops CC-11-E and CC-11-O beneath the southern stairway (Figure 4.14). The room measured approximately 2 m from the northern face of the southern wall to the southern face of the northern wall. One layer of cut stones (Lot CC-11-O-5) and the door jamb (Lot CC-11-E-19) for the western side of the entrance to the room were preserved. The cut stones (Lot CC-11-O-5) created a 0.28 m high wall. The wall was two courses high in the western portion but only one course high at the door jamb. This wall sits on top of Lots CC-11-E-15/O-7, the plaster floor of the room. Most of the cut stones making up the wall were removed before they were individually measured, however two were stacked on top of one another and were left in situ. The top stone was 41 cm long, 15 cm high, and 15 cm deep. The only measurement we were able to collect for the lower stone was its depth at 17 cm. Lot CC-11-E-9 was constructed on top of the cut stones and filled in the entrance to the room. There was also a small step up into the room (Lot CC-11-E-15) that formed a

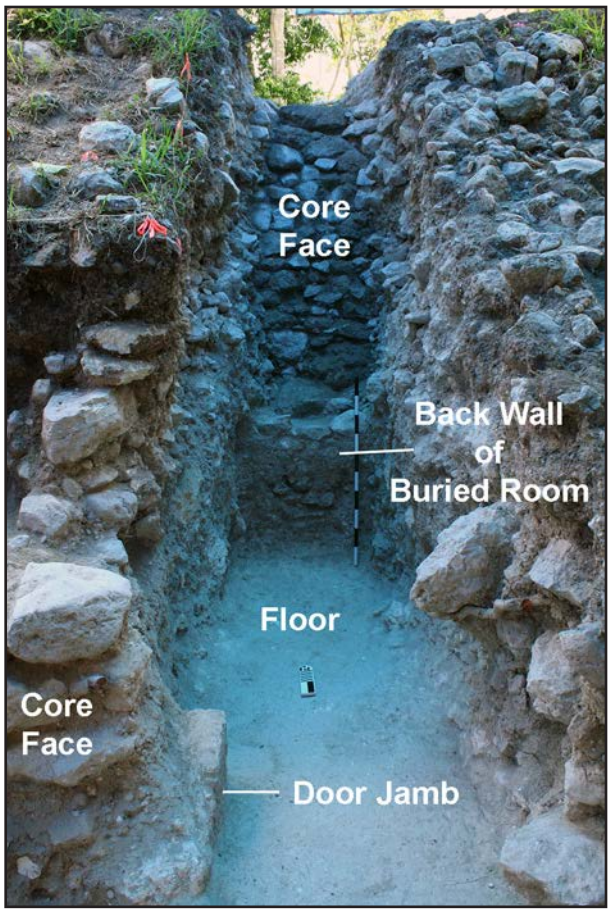

Figure 4.14. Photograph of the buried room in Subops CC-11-E and -O, facing north.

footer (Lot CC-11-O-7) at the base of the wall. The small step/footer was 0.13 m high. The cut stone wall (Lot CC-11-O-5) was reused as part of the Lot CC-11-E-9 platform core. The back wall of the room (Lot CC-11-E-25) was composed of small cut stones and roughly shaped stones. It was approximately eight courses high with the preserved height ranging from about 70 cm to 80 cm at the highest. The wall appears to be approximately 80 cm thick, however the fill to the north of the wall was not excavated so the wall may actually be thicker. The stones in the wall are not uniform in size or shape.

The plaster floor in the room appears to roll up onto the northern wall. Outside the room to the north, Lots CC-11-E-7 and CC-11-O-4 formed a step that led up to the footer (Lot CC-11-O-7) and step (Lot CC-11-E-15) into the room. Lots CC-11-E-7 and CC-11-O-4 appear to have been added on later as a longer step that apparently was at the same elevation as the floor in the room. It is unclear how/if the buried room is associated with the architecture uncovered in Subop CC-11-I. Ceramic analysis for these lots has not been completed, and further excavations are needed.

Two sub-units were opened in Subop CC-11-E to provide excavation windows through the buried architecture. The first was opened in the buried room, and the second was opened to the south of the doorway into the room.

Excavations in the subunit inside the buried room revealed three floors before coming down on a large cut stone (Lot CC-11-E-29). Further excavations are needed in order to determine if this large cut stone was part of in situ architecture or served as part of the fill beneath floor Lot CC-11-E-28. No ceramic analysis has been completed for these earlier floors, and therefore there is no general date.

The subunit located on the outside of the buried room uncovered eight additional plaster floors before bedrock was reached. No ceramic analysis has been completed for these floors.

CONCLUSION AND FUTURE DIRECTIONS

The 2013 CCAP excavations at Structure A-5 consisted of 18 suboperations and 128 lots (Table 4.3). The final form of Structure A-5, dating to the Late Classic, was fully investigated. The earlier construction phases, however, leave many questions. Additional investigations should address the nature of the complex architecture located in Subop CC-11-I. They should also determine the extent of the buried room below the southern stairway. The relationship of Structure A-5 to the North Plaza should also be investigated. Ceramic

and lithic assemblages should also be used to determine the function of Structure A-5. Finally, the completion of ceramic analysis and radiocarbon dating will allow more accurate dating of the construction phases.

Table 4.3. Lot Descriptions and Preliminary Ceramic Summaries

Subop	Lot	Lot Description	Ceramic Analysis	
			Sample Size	Age
CC-11-A	1	humus	21	Late Classic
	2	collapse debris	350	Late Classic
	3	plaster surface	not excavated	not excavated
CC-11-B	1	humus	8	Late Classic
	2	collapse debris	108	Late Classic; late Late Preclassic
	3	plaster surface	not excavated	not excavated
CC-11-C	1	humus	31	Late Classic; Late Preclassic
	2	step (top)	14	Late Classic; Late Preclassic admix
	3	step (penultimate)	unanalyzed	unanalyzed
	4	construction fill	39	Protoclassic; Late Preclassic
	5	plaster surface	84	Early-Late Classic; Late Preclassic trace
CC-11-D	1	humus	86	Late Classic; Late Preclassic trace
	2	step (top)	27	Late Classic
	3	collapse debris (on top of final construction phase penultimate step)	7	Late Classic
	4	construction fill	30	Late Classic admix; Late Preclassic
	5	plaster surface	63	Late Classic admix; Late Preclassic
	6	step (final construction phase penultimate step)	unanalyzed	unanalyzed
	7	step (third from top of final construction phase)	unanalyzed	unanalyzed
CC-11-E	1	humus	66	Late Classic
	1	humus	5	Terminal Classic
	2	poorly preserved stairway (final construction phase)	93	Late classic; Late Preclassic trace
	3	plaster surface (at base of southern stairway)	unanalyzed	unanalyzed
	4	stairway (penultimate) and associated fill	74	Late Classic; Late Preclassic trace

Table 4.3. Lot Descriptions and Preliminary Ceramic Summaries (continued)

Subop	Lot	Lot Description	Ceramic Analysis	
			Sample Size	Age
CC-11-E (cont.)	5	stair tred (extends south from riser CC-11-E-6)	7	undetermined
	6	stair riser (penultimate stair of penultimate construction phase)	unanalyzed	unanalyzed
	7	step (bottom step of penultimate stairway)	unanalyzed	unanalyzed
	8	plaster surface (part of run of CC-11-E-7)	unanalyzed	unanalyzed
	9	platform core face	unanalyzed	unanalyzed
	10	plaster surface (found beneath CC-11-E-5)	12	Late Preclassic
	11	platform core face	not excavated	not excavated
	12	plaster surface (equivalent of CC-11-E-5)	7	Late Preclassic
	13	step riser (penultimate stair for penultimate construction phase)	unanalyzed	unanalyzed
	14	plaster surface (equivalent of CC-11-E-5 and CC-11-E-12)	unanalyzed	unanalyzed
	15	step into room	unanalyzed	unanalyzed
	16	plaster surface (to the south and below CC-11-E-15)	unanalyzed	unanalyzed
	17	plaster surface (equivalent to CC-11-E-16)	unanalyzed	unanalyzed
	18	plaster surface (extends from top of CC-11-E-15 into room)	unanalyzed	unanalyzed
	19	door jamb	not excavated	not excavated
	20	large rock	0	n/a
	21	plaster surface (located in subunit outside of room beneath E-16)	unanalyzed	unanalyzed
	22	plaster surface (beneath E-21)	unanalyzed	unanalyzed
	23	plaster surface (beneath E-22)	unanalyzed	unanalyzed
	24	plaster surface (beneath E-23)	unanalyzed	unanalyzed
	25	wall (northern wall of buried room)	not excavated	not excavated
	26	plaster surface (beneath E-24)	unanalyzed	unanalyzed
	27	plaster surface (located in subunit within buried room beneath E-18)	unanalyzed	unanalyzed
	28	plaster surface (beneath E-27)	unanalyzed	unanalyzed
	29	large cut stone (beneath E-28)	0	n/a
	30	plaster floor (beneath E-26)	unanalyzed	unanalyzed
	31	plaster floor (beneath E-30)	unanalyzed	unanalyzed

Table 4.3. Lot Descriptions and Preliminary Ceramic Summaries (continued)

Subop	Lot	Lot Description	Ceramic Analysis	
			Sample Size	Age
CC-11-F	1	humus	58	Late Classic; Late Preclassic trace
	2	wall (southern wall of final phase superstructure)	12	Late Classic (?); Late Preclassic mix
	3	plaster surface (inside of superstructure)	30	Late Classic
	4	rock alignment	0	n/a
	5	plaster surface and associated fill	69	Late Classic (?) trace; Late Preclassic
CC-11-Fx	1	humus	7	Late Classic
	2	wall (southern wall of final phase superstructure)	not excavated	not excavated
	3	plaster surface (outside of superstructure and lower than inside surface)	not excavated	not excavated
CC-11-G	1	humus	31	Late Classic; Late Preclassic trace
	2	wall (southern wall of final phase superstructure)	not excavated	not excavated
	3	plaster surface (inside of superstructure)	not excavated	not excavated
CC-11-H	1	humus	63	Late Classic; Late Preclassic trace
	2	wall (northern wall of final phase superstructure)	not excavated	not excavated
	3	plaster surface (inside of superstructure)	not excavated	not excavated
CC-11-I	1	circular stack of rocks	4	Late Classic
	2	construction pen or platform core face	not excavated	not excavated
	3	construction pen or platform core face	not excavated	not excavated
	4	construction pen or platform core face	not excavated	not excavated
	5	fill stabilizer (beneath CC-11-D-5 and CC-11-I-14)	38	Late Preclassic
	6	construction fill (beneath CC-11-D-5)	unanalyzed	unanalyzed
	7	construction fill (beneath CC-11-C-5)	unanalyzed	unanalyzed
	8	construction fill (beneath I-13 and D-5)	unanalyzed	unanalyzed
	9	step (equivalent to D-6)	unanalyzed	unanalyzed

Table 4.3. Lot Descriptions and Preliminary Ceramic Summaries (continued)

Subop	Lot	Lot Description	Ceramic Analysis	
			Sample Size	Age
CC-11-I (cont.)	10	construction fill (beneath CC-11-I-9)	3	Late Preclassic
	11	fill stabilizer (beneath CC-11-I-10)	14	Protoclassic; Late Preclassic
	12	rock alignment (beneath I-11 and sits on top of I-14)	0	n/a
	13	plaster surface (equivalent of CC-11-C-5 and CC-11-D-5)	27	Late Classic (?); Late Preclassic and Middle Preclassic
	14	fill stabilizer (beneath CC-11-I-11 and CC-11-I-12, above I-5)	21	Protoclassic; Late Preclassic
	17	rock alignment (beneath CC-11-I-14)	0	n/a
	18	construction fill (beneath southern portion of CC-11-I-5)	unanalyzed	unanalyzed
	19	construction fill (beneath northern portion fo CC-11-I-5)	4	Late Preclassic
	20	fill stabilizer	unanalyzed	unanalyzed
	21	step (equivalent of CC-11-C-3 and CC-11-I-9)	16	Protoclassic
	22	construction fill (beneath I-21)	13	Early Classic (?)
	23	rock alignment (beneath I-22; equivalent to I-12)	not excavated	not excavated
	24	fill stabilizer (beneath I-22 and I-23)	not excavated	not excavated
	25	rock alignment (beneath I-7)	not excavated	not excavated
	26	construction fill (beneath I-1 and I-7)	not excavated	not excavated
	27	fill stabilizer (beneath I-17; equivalent to I-20)	unanalyzed	unanalyzed
	28	construction fill (beneath I-27 and I-20)	unanalyzed	unanalyzed
	29	construction fill (beneath I-28)	not excavated	not excavated
	30	rock alignment (beneath I-28, sits on top of I-29)	not excavated	not excavated
CC-11-J	1	humus	31	Late Classic
	2	stairway and associated construction fill (final construction phase)	74	Late Classic
	3	construction fill	159	Late Classic
	3	construction fill	127	Late Classic; Late Preclassic trace
	4	stairway (penultimate construction phase)	not excavated	not excavated
	5	plaster surface (North Plaza)	not excavated	not excavated

Table 4.3. Lot Descriptions and Preliminary Ceramic Summaries (continued)

Subop	Lot	Lot Description	Ceramic Analysis	
			Sample Size	Age
CC-11-K	1	humus	unanalyzed	unanalyzed
	2	wall (southern wall of final phase superstructure)	not excavated	not excavated
	3	plaster surface (lower surface south of superstructure)	not excavated	not excavated
CC-11-L	1	humus	9	Late Classic
	2	collapse debris	20	Late Classic; Late Preclassic admix
	3	platform face	not excavated	not excavated
CC-11-M	1	not excavated	not excavated	not excavated
CC-11-N	1	humus	10	Late Classic
	2	stairway (final construction phase)	unanalyzed	unanalyzed
	3	stairway (penultimate construction phase	unanalyzed	unanalyzed
CC-11-O	1	humus, collapse debris, poorly preserved stairway	unanalyzed	unanalyzed
	2	plaster surface (Main Plaza)	0	n/a
	3	plaster surface (beneath O-2; equivalent to E-17)	unanalyzed	unanalyzed
	4	step (equivalent to E-7)	unanalyzed	unanalyzed
	5	wall (facing stones making up southern wall of buried room)	not excavated	not excavated
	6	platform core face (equivalent to E-9)	not excavated	not excavated
	7	step (footer for the wall CC-11-O-5 that transitions into step CC-11-E-15 into room)	not excavated	not excavated
CC-11-P	1	humus	unanalyzed	unanalyzed
	2	plaster surface (inside superstructure)	not excavated	not excavated
	3	wall (north wall of final phase superstructure)	not excavated	not excavated
	4	partition wall	not excavated	non excavated
CC-11-Q	1	humus	unanalyzed	unanalyzed
	2	partition wall	not excavated	not excavated
	3	plaster surface (inside final phase superstructure)	not excavated	not excavated

Table 4.3. Lot Descriptions and Preliminary Ceramic Summaries (continued)

Subop	Lot	Lot Description	Ceramic Analysis	
			Sample Size	Age
CC-11-R	1	humus	unanalyzed	unanalyzed
	2	poorly preserved surface	not excavated	not excavated
	3	step (penultimate step of final construction phase southern stairway; equivalent to D-6)	not excavated	not excavated
	4	step (top step of final construction phase southern stairway; equivalent to D-2)	not excavated	not excavated
	5	wall	not excavated	not excavated
	6	partition wall	not excavated	not excavated
	7	plaster surface (inside of final phase superstructure	not excavated	not excavated

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Preliminary Results of the 2013 Gallon Jug and Laguna Seca Survey and Reconnaissance

David Sandrock

BACKGROUND

As part of the Chan Chich Archaeological Project (CCAP), the Belize Estates Archaeological Survey Team (BEAST) conducted survey on Gallon Jug Ranch and the Laguna Seca parcel of Yalbac Ranch (Figure 5.1) during the summer 2013 field season. Both of these properties are former holdings of the Belize Estates Land and Produce Company, hence the project's name. Gallon Jug Agribusiness (GJA) had managed the 135,000-acre Gallon Jug property since the mid 1980s, using the property for agriculture (cattle, coffee) and timber harvesting. In 2013, Bowen and Bowen, Ltd., the corporation that owns GJA, sold over 100,000 acres of the property to Yalbac Ranch, the neighboring

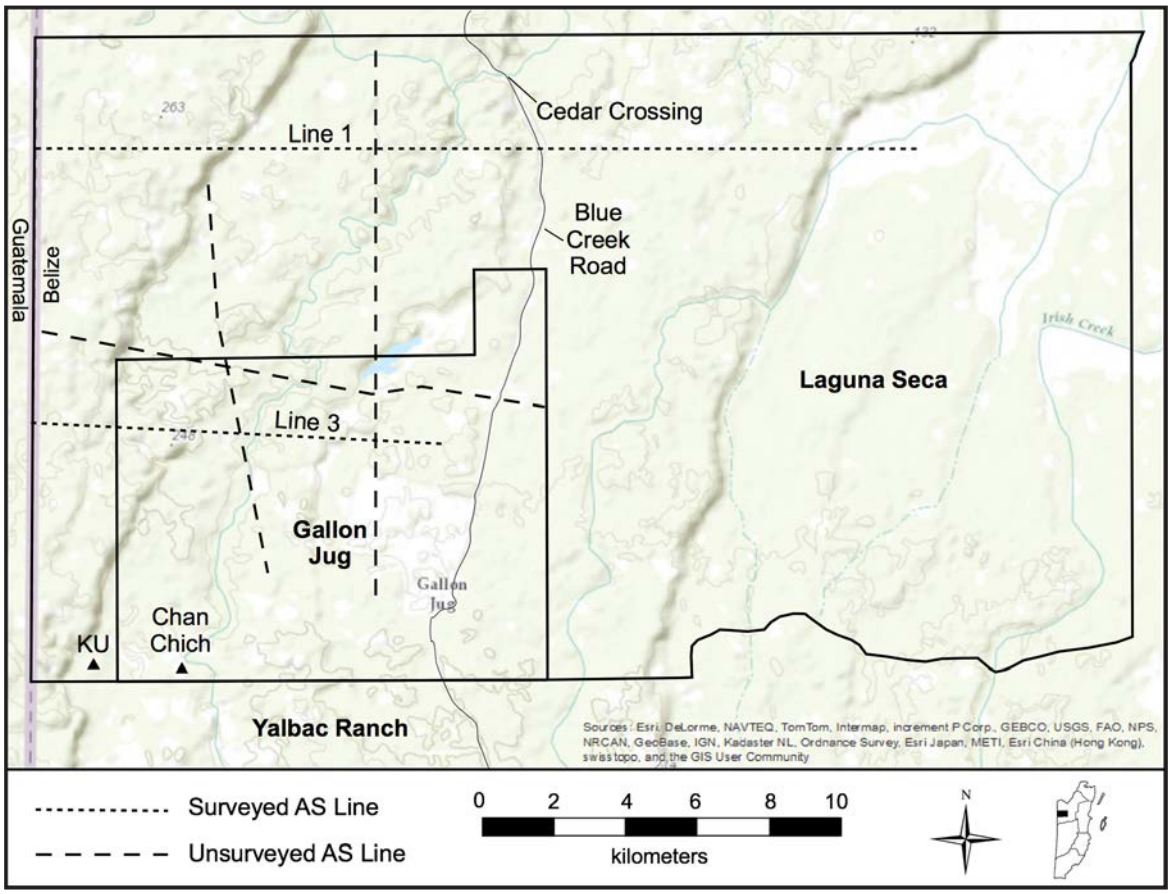

Figure 5.1. Map of BEAST survey area and cut seismic lines.

Sandrock, David
2013 Preliminary Results of the 2013 Gallon Jug and Laguna Seca Survey and Reconnaissance. In *The 2013 Season of the Chan Chich Archaeological Project*, edited by Brett A. Houk, pp. 63–80. Papers of the Chan Chich Archaeological Project, Number 7. Department of Sociology, Anthropology, and Social Work, Texas Tech University, Lubbock.

property to the south. The acreage that was conveyed in the sale is now known as Laguna Seca.

Much of the survey area is forested, but all weather roads and logging roads provide access to some areas. The main road on the property runs north-south, connecting Gallon Jug to the Programme for Belize's Rio Bravo Conservation and Management Area to the north and Yalbac Ranch to the south. Because the first major town along this road to the north is the Mennonite community of Blue Creek, we refer to this as the Blue Creek road. The Blue Creek road, as well as most of the other all-weather roads in the area, are constructed of crushed limestone caliche and are approximately 8 m wide. Most of the additional roads on the property were originally cut by logging operations and are typically two-track dirt (mostly mud when it rains) roads approximately 5 m wide.

PREVIOUS INVESTIGATIONS

Few archaeological survey projects have been conducted on the property. The Rio Bravo Archaeological Project (RBAP) first investigated the area in 1988 and 1990 (Guderjan et al. 1991) and included Jason Yaeger's (1991) pedestrian survey of 500 acres of plowed fields adjacent to the Gallon Jug airstrip. The Rio Bravo Archaeological Project recorded sites on what is today Gallon Jug and Laguna Seca, as well as properties to the north and south. Hubert Robichaux and Brett Houk carried out more recent work with the CCAP in the mid 1990s (Houk 1996), and Robichaux subsequently investigated Punta de Cacao in the early 2000s (Robichaux 2002, 2005; Pruett 2003). In 2012, Houk (2012a) renewed the CCAP, working at Chan Chich and Kaxil Uinic.

METHODOLOGY

The main goal of BEAST is to update the inventory of sites on the property, a task originally undertaken by RBAP (Guderjan et al. 1991). To complete this task, BEAST surveys along pre-cut seismic lines, revisits sites previously recorded by other projects, and conducts targeted survey after consulting local informants.

American Seismic cut six seismic survey lines, originally intended for oil exploration, in 2012; these lines cross the property in both north-south and east-west directions (see Figure 5.1). Due to their east-west alignment, BEAST selected Line 1 and Line 3 for pedestrian survey during the 2013 field season. The transects cross several different environmental and topographical settings, including the La Lucha, Rio Bravo, and Booth's Escarpments.

Line 1 is the longest transect cut by American Seismic on the property, measuring 26 km in length. The eastern edge of the line is located at its intersection with the Booth's River, with marsh land extending from the river to the west to the Booth's River Escarpment. As one moves west on the line, the vegetation changes from marsh to transitional forest at the escarpment, then to upland forest, followed by a large section of sawgrass-infested upland *bajo*, before transitioning back to upland forest extending into Guatemala. This line bears directly east-west (270-90 degrees) and ends at the Guatemalan border.

Line 3 is 12 km long, and like Line 1, reaches its western terminus at the Guatemalan border. It traverses similar environmental conditions to the paralleling span of Line 1, transitioning east to west from primarily transitional forest to upland forest but without a section of upland *bajo*. Line 3 is cut on a bearing of 281-111 degrees.

Using existing logging roads and a trusty, well-loved four-wheel drive Toyota HiLux nicknamed La Dinosauria to gain access, BEAST conducted pedestrian survey on over

40 km of cut line in addition to other areas of targeted survey. Using the cut lines as baselines, the survey coverage spanned out to the extent of visual range to the north and south. Range of visibility on the transects varied based on vegetation, but survey crews encountered a range between 10 and 30 meters in each direction. On average, the visible survey corridors were approximately 25 meters wide, close to the expected 14-meter visibility to either side of a line described by Robichaux and Houk (1996). BEAST recorded all structures within the transect, in addition to any other structures visible from mapped mounds, regardless of their visibility from the transect.

After identifying a structure, crews used a GPS receiver to record its location, established likely boundaries for the structure, and mapped the structure using a 50-m fiberglass tape and Suunto KB-20 compass. Due to technological difficulties, we were forced to abandon the Trimble Junos originally intended for use on survey, instead utilizing a Garmin eTrex 10 as a replacement. Although much cheaper than the Junos, the eTrex 10 provided 3 m to 5 m accuracy even in dense canopy. Crews mapped associated structures individually and then in association, using the tape and compass to establish their positional relationships. We followed the standard system of depicting mounds as rectified or prismatic shapes (Hutson 2012).

Every structure was assigned an STR- number, and every site was recorded with its own BE- designation (for Belize Estates). BE- designations were assigned to any location considered by BEAST to be a site. Our criteria for such a selection involves: the total number of structures present (four or more), height of tallest structure (at least 4 m in total height, including the substructure), and relative isolation of the structure group (not within 1 km of another recorded site). Note that we also assigned BE numbers to named sites recorded by Guderjan et al. (1991) whether or not they met the above criteria. We did not assign BE numbers to sites that Guderjan et al. (1991) recorded but did not name as most of those were small groups not meeting our BE threshold. In post-field processing, the maps were converted into scaled drawings using iDraw by Indeco, Inc. running on an Apple iPad 2.

Crews recorded notes on the surrounding environment for all areas, focusing on vegetation types, associated water sources, and stark elevation changes. Vegetation was classified using the methodology outlined by Brokaw and Mallory (1993) for the Programme for Belize property to the north. This usage of terminology is consistent with previous CCAP research (e.g., Houk, Robichaux, and Durst 1996).

Although the primary target for this survey was the seismic lines, BEAST conducted three separate investigations in addition to the linear survey. Planned revisits of sites previously mapped by members of the RBAP during the 1988 and 1990 field seasons (see Guderjan et al. 1991) took place to examine sites' conditions, re-map the sites if necessary, and record a more accurate UTM location for each site. BEAST targeted the sites of Gallon Jug, Laguna Verde, and Laguna Seca for revisit during this field season.

Simultaneously, BEAST consulted locals who had been working in the area to find additional unrecorded sites. The sites of Montaña Chamaco and Sylvester Camp were relocated and recorded thanks to the invaluable help of a retired logger, and crews recorded La Luchita based on informant information collected in 2012.

BEAST also investigated an area 2.6 kilometers to the west of Chan Chich. Based on the existence of *sacbeob* extending east and west from Chan Chich, it was hypothesized that

another satellite center could exist, similar to Kaxil Uinic, which is roughly the same distance to the east. Taking Kaxil Uinic's location 2.6 kilometers east of the site core of Chan Chich as a marker, BEAST attempted to locate the hypothesized site on the opposing side of Chan Chich Creek.

FINDINGS

During the 2013 field season, BEAST recorded four new BE sites and recorded a total of 184 structures, not including individual structures from the four previously recorded sites that were revisited. In this report, findings have been segmented, with each of the lines, targeted investigations, and newly recorded sites all receiving their own sections. The chapter includes an updated site inventory with descriptions of previously recorded sites and the results of revisits to four of those sites (Figure 5.2).

American Seismic Line 1

Of the 99 structures recorded on Line 1 (Figure 5.3), 51 of them were situated in a 1.6 km long stretch beginning a kilometer east of the Gallon Jug-Blue Creek road on Line 1 (Figure 5.4). These structures comprise a sizable and dense settlement area with structures of varying size and form. Because BEAST did not encounter a similar mound density anywhere else in the surveyed areas, we conclude that the structures are part of a larger, as yet undiscovered Maya site, the core of which is hypothesized to be

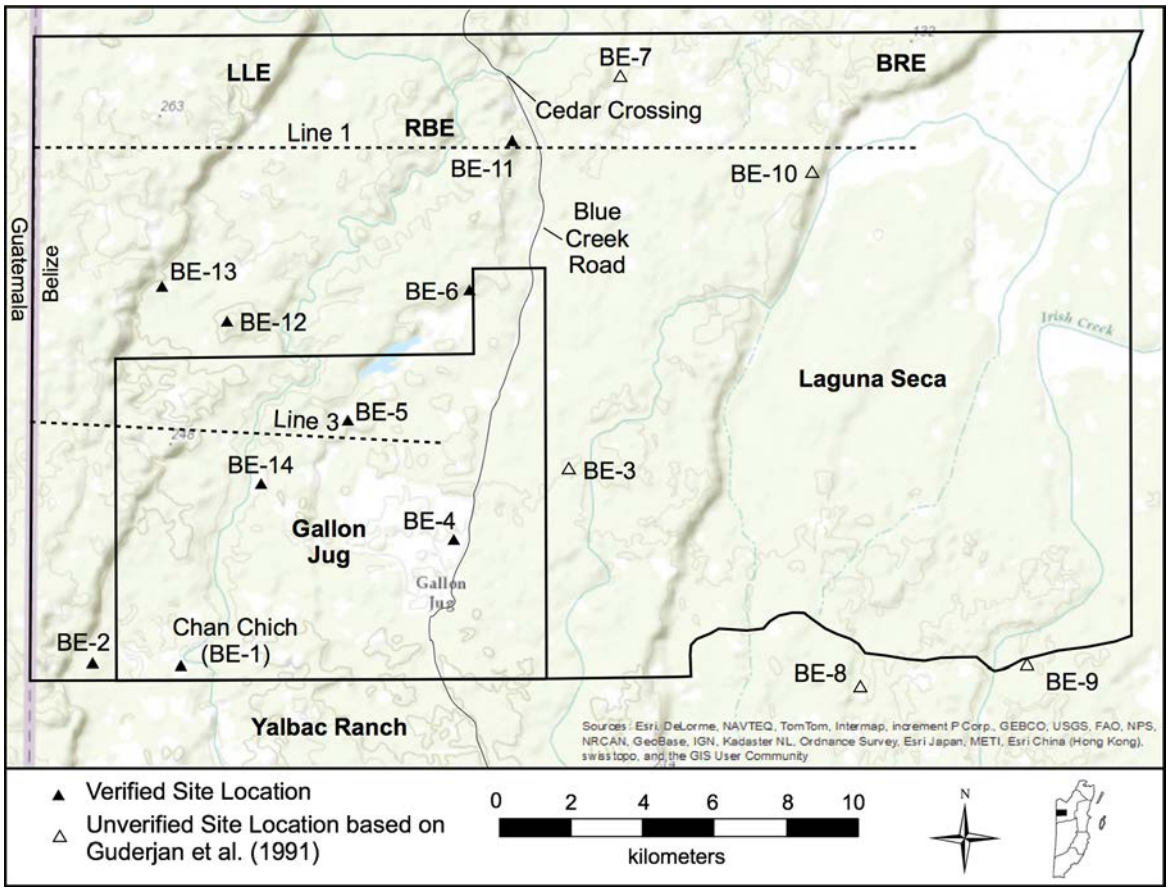

Figure 5.2. Map of designated BE sites in and near the BEAST survey area. From east to west the three escarpments on the property are the Booth's River Escarpment (BRE), Río Bravo Escarpment (RBE), and La Lucha Escarpment (LLE).

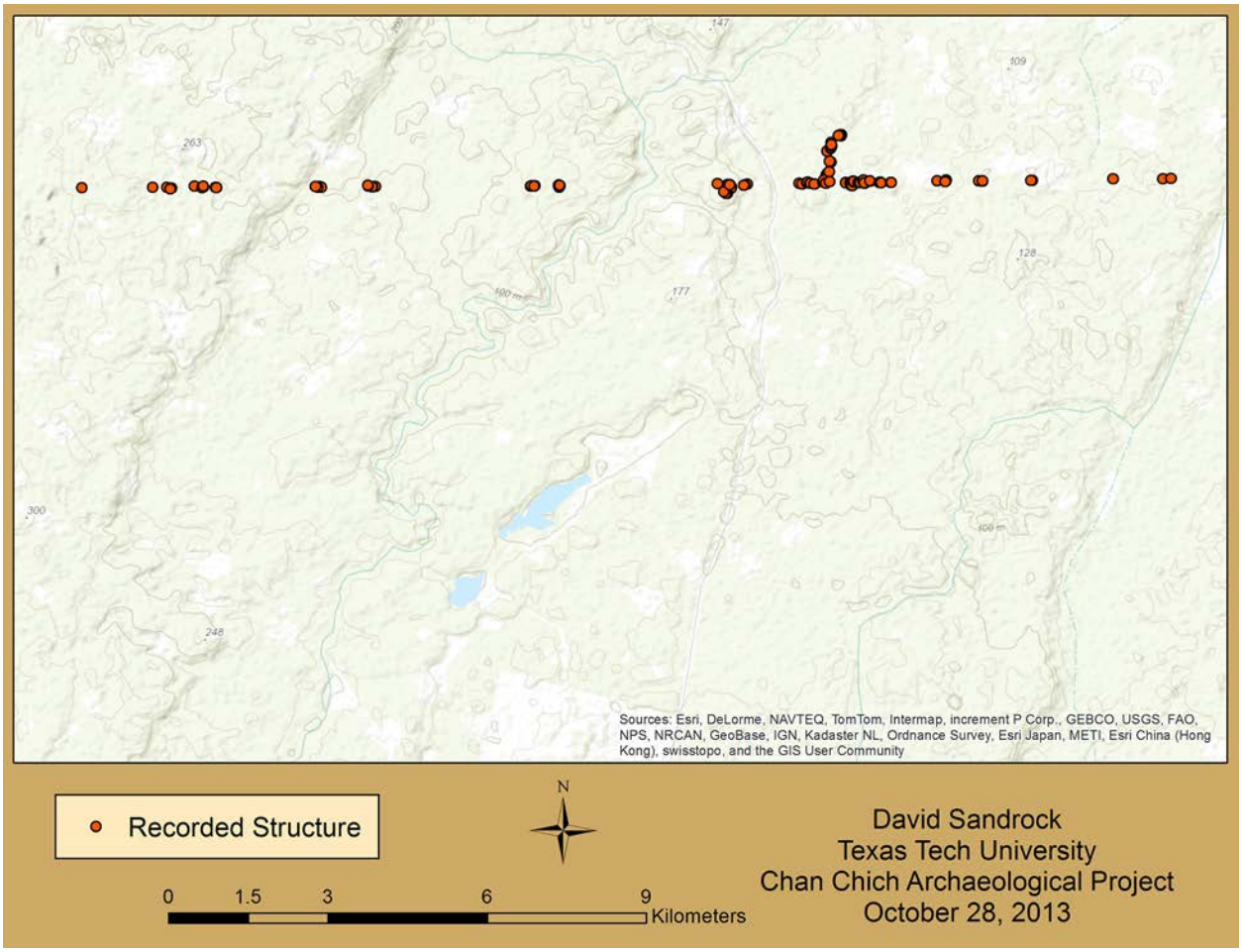

Figure 5.3. Locations of recorded structures on Line 1.

nearby. Although the suspected location of the proposed site core was targeted north of the settlement area, this search turned up 25 more relatively standard structures, and no site core has been found to be in association with the area. Alternatively, it is possible the structures are part of Quam Hill's settlement zone.

In addition to the structures mentioned above, BEAST recorded Ix Naab Witx (BE-11) on Line 1. The site is described below in updated site inventory.

American Seismic Line 2

BEAST mapped 45 structures along Line 2 (Figure 5.5), including a small area of dense settlement just over 1 km from the Belize-Guatemala border. In this area, 10 structures of varying size and shape (but all under 0.5 m tall) are clustered together in a 15-x-20-m section of flat upland forest. Despite the large number of structures discovered along the line, no groups warranted assigning a BE number.

Targeted Investigations

The investigation to look for the hypothesized settlement 2.6 kilometers west of Chan Chich was unfruitful and arduous. In 2010, Hurricane Richard ravaged the area, knocking down many trees, which in turn created massive organic barriers perfect for slowing down the pace of survey. A total area of over 2.5 square kilometers was searched, and no site was identified.

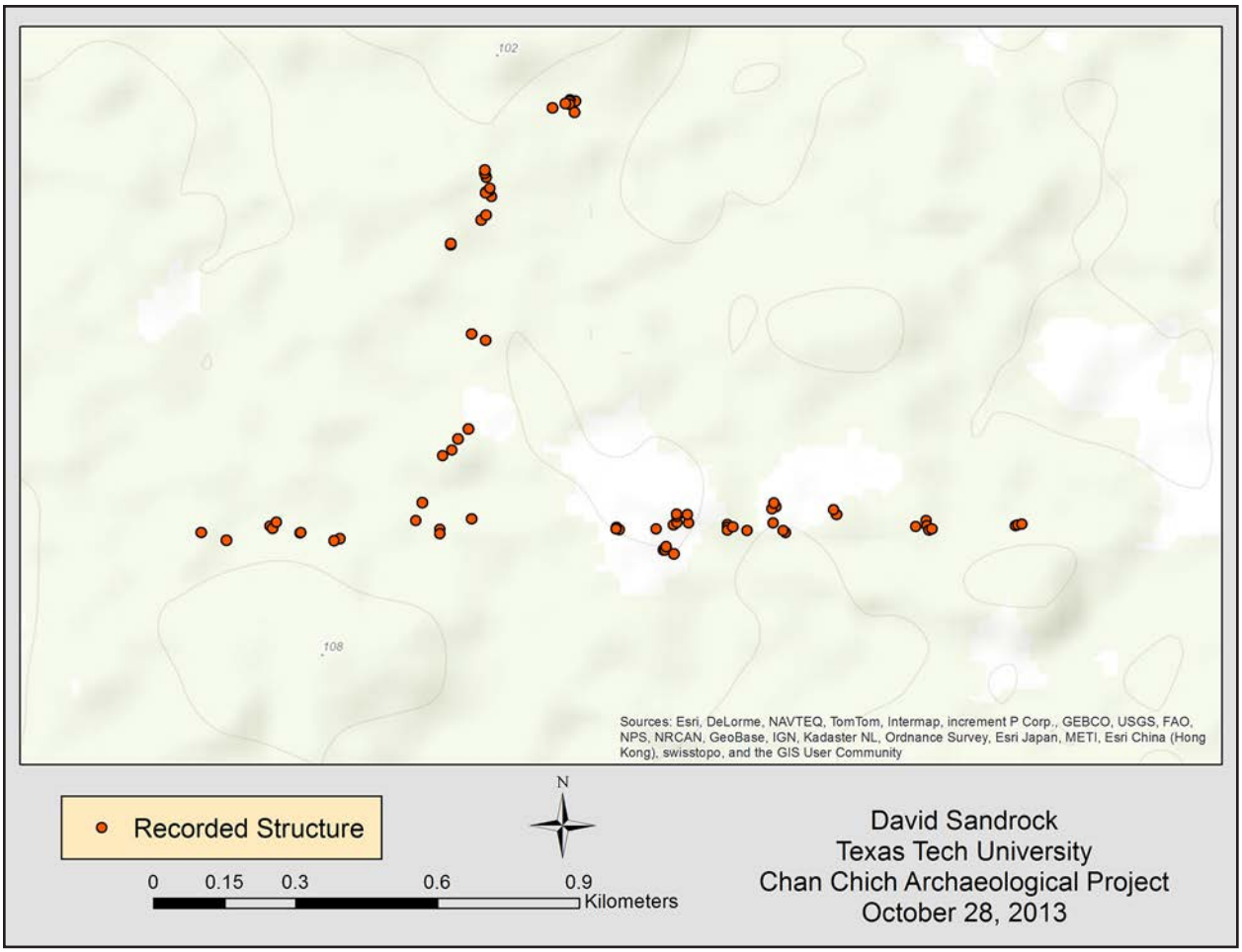

Figure 5.4. Map of recorded structures in dense settlement area on Line 1. The westernmost structure is approximately 1 km east of the Blue Creek road.

BEAST conducted consultation with locals in order to find previously unrecorded sites. These consultations led us to find the sites of Montaña Chamaco and Sylvester Camp. The site of La Luchita had been previously identified by Houk, but had only a single GPS point marking its location. All three targeted sites were recorded and mapped during this field season and assigned BE numbers.

UPDATED SITE INVENTORY FOR GALLON JUG AND LAGUNA SECA

This section includes an updated inventory of previously recorded and newly discovered sites on Gallon Jug and Laguna Seca organized by BE number. In all, investigators have recorded 15 BE-designated sites in the project area (Table 5.1).

Chan Chich (BE-1)

The Chan Chich ruins are located on the west bank of Chan Chich Creek, a tributary of the Rio Bravo (Houk 2012a). Situated in primarily dense tropical forest, the site is approximately 4 km east of the Belize-Guatemala border. The UTM coordinates of the Main Plaza's primary datum are Zone 16, N 19 40 412.846, E 2 75 875.557, and the datum's elevation is 118.722 m above sea level (Houk 2012a).

During the 1987, 1988, and 1990 field seasons of the Rio Bravo Archaeological Project, Thomas

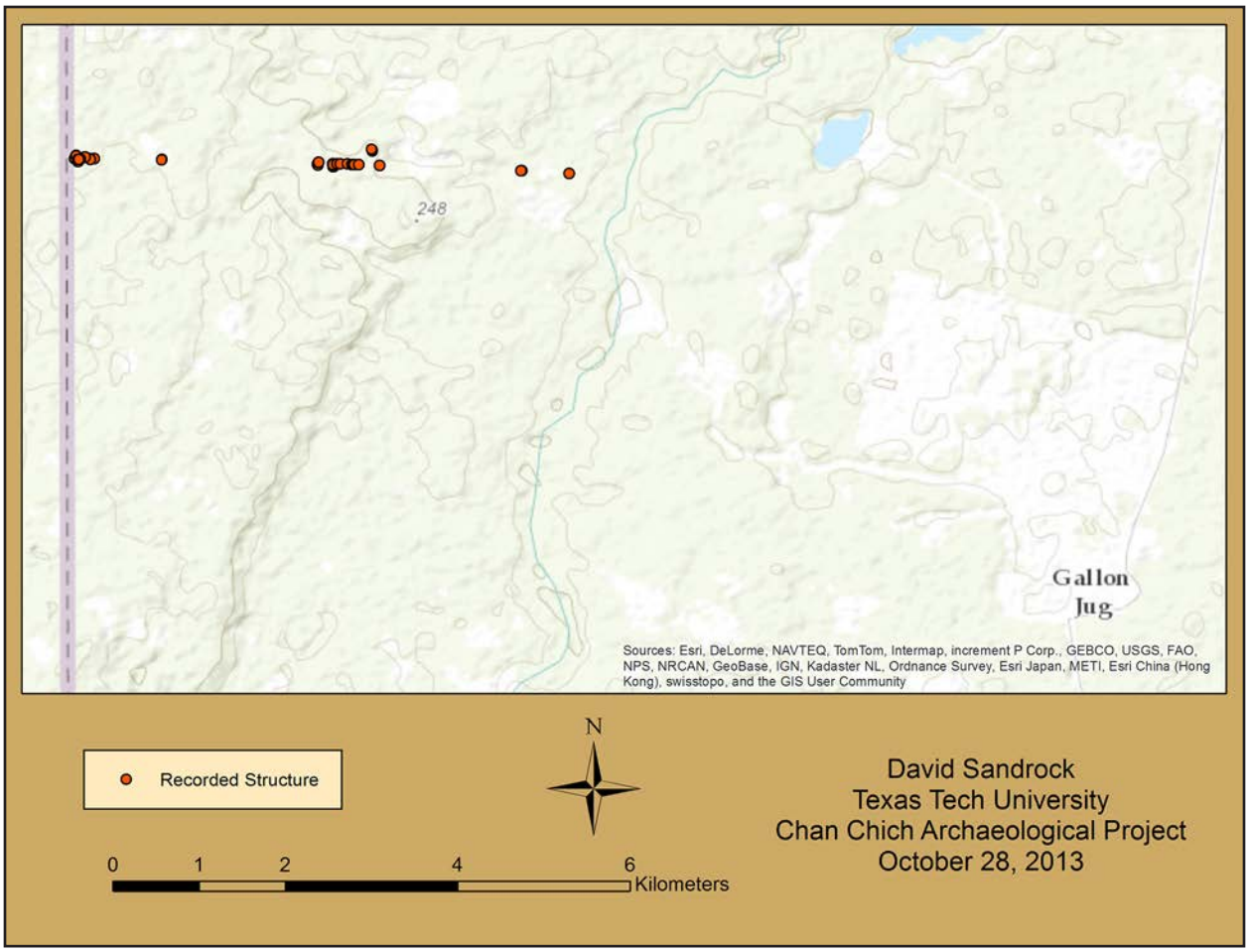

Figure 5.5. Locations of recorded structures on Line 2.

Guderjan (1991) and his teams conducted mapping of Chan Chich's site core. Work resumed at the site in 1995 with a Programme for Belize Archaeological Project team led by Dr. Fred Valdez, Jr. (Houk, Valdez, et al. 1996), followed by the CCAP in 1996 (Houk, Robichaux, and Durst 1996). This latter project produced a map of 1.54-km^2 block surrounding Chan Chich, recording 253 structures (Houk, Robichaux, and Durst 1996).

The main architectural features of the site are the Main and Upper Plazas (A-1 and A-2, respectively). The site of Chan Chich is organized into four groups of structures, the largest being Group A. This group includes two large plazas, several smaller courtyards, and 37 structures. Group A is constructed on a natural hill, with other groups spread on the smaller hills that surround the site. This primary structure group is dominated by Plaza A-1, the second largest plaza in the region, which covers 13,080 m^2. The site possesses one uncarved stela, Stela 1, located near Structure A-2 in the southwest corner of Plaza A-1 (Houk, Robichaux, and Durst 1996).

Kaxil Uinic (BE-2)

Kaxil Uinic, also known as E'Kenha, is located approximately 2.6 km west of Chan Chich (Houk 2012a). The La Lucha Escarpment is about 900 m west of the ruins, and the site is situated on a small rise west of the *bajo* separating it from Chan Chich (Harris and Sisneros 2012). According to Harris' (2013)

Table 5.1. Inventory of BE Sites in and Near Project Area

BE Number	Site Name
1	Chan Chich
2	Kaxil Uinic (E'kenha)
3	Punta de Cacao
4	Gallon Jug
5	Laguna Verde
6	Laguna Seca
7	Quam (Qualm) Hill
8	Wamil
9	Sierra de Agua
10	Gongora Ruin
11	Ix Naab Witz
12	La Luchita
13	Montaña Chamaco
14	Sylvester Village

thesis, the UTM coordinates of the ruins are Zone 16, N 19 40 538, E 2 73 381. The name Kaxil Uinic references both the prehistoric site and the historic Maya village located 0.5 km away (Houk 2012b). This description focuses on the prehistoric site.

As Houk (2012b) discussed in the 2012 CCAP report, the site of Kaxil Uinic is first mentioned in a journal entry from Maler's (1910) 1895 expeditions through the Petén. Thompson (1939, 1963) later discusses the site, but carried out neither excavations nor mapping. RBAP recorded and mapped the site as E'kenha in the early 1990s (Guderjan et al. 1991), but excavations did not take place until the 2012 field season of CCAP (Harris and Sisneros 2012). Ceramics recovered during these excavations date to between Mamom and Tepeu 3 ceramic phases indicating Middle Preclassic to Terminal Classic occupation at the site (Harris and Sisneros 2012).

RBAP's original maps (Guderjan et al. 1991) contain 12 structures, and Harris and Sisneros (2012) recorded an additional two structures, bringing the total to 14. Kaxil Uinic is somewhat unusual, in that it is one of the only sites in the area to contain a carved (albeit heavily damaged) stela (Harris and Sisneros 2012). Guderjan et al. (1991) first recorded this monument and an associated plain altar in front of Structure 3, the tallest and largest structure at the site.

Punta de Cacao (BE-3)

The site of Punta de Cacao was mapped during the 2001, 2002, and 2003 field seasons of Punta de Cacao Archaeological Project (PDCAP). Punta de Cacao represents the second largest known site on the property, behind only Chan Chich in size. The site was named by Barry Bowen and is just a 25-minute drive from Chan Chich Lodge and 5.5 km from Gallon Jug headquarters (Robichaux 2002).

Punta de Cacao contains 522 structures in total, including the site core and the surrounding 3.33 km^2 area mapped by PDCAP (Robichaux 2005). Excavations in the area have dated the site occupation from Middle Preclassic to Terminal Classic (Robichaux 2005). According to Robichaux (2005), the Plaza A and Plaza B Complexes represent the central precinct of Punta de Cacao, with a ball court located approximately halfway between the two. Plaza A is marked by three large range structures in the periphery and three large pyramid-shaped structures (Robichaux 2005). The Plaza B Complex is located 200 m northeast of Plaza A and represents a more elevated, more enclosed, and less accessible structure group than Plaza A (Robichaux 2005). The most prominent structure is Str. A-45, a pyramid-shaped structure surrounded on three sides by compact courtyards (Robichaux 2005). In addition to these complexes, PDCAP recorded other various residential groups in the area (Robichaux 2005).

Gallon Jug (BE-4)

The site of Gallon Jug is located just north of Gallon Jug's primary cleared parcel, approximately 1 km west of the Blue Creek road (Guderjan et al. 1991) The passing of time has been fairly kind to most of the site, save for some tree falls to the west and east of the site, which seem to have affected little more than the ease of access to structures. The main plaza remains mostly cleared, and the impressive 15-m tall main temple still towers over the surrounding area, relatively unharmed by biological forces. A year-round stream flows just a few hundred meters north of the main plaza (Guderjan et al. 1991).

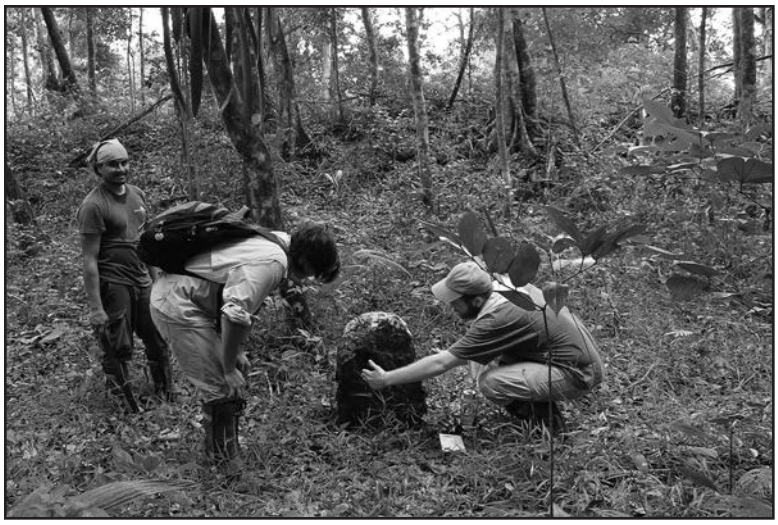

Figure 5.6. The stela (?) at Gallon Jug.

The site plan of Gallon Jug exhibits a generally east-west alignment. This site comprises 21 individual structures among several smaller courtyard groups that surround a larger hilltop plaza (Guderjan et al. 1991). A 15-m tall temple marks the easternmost end of the plaza (Guderjan et al. 1991). A single stela is present (Figure 5.6), located near the center of the northern range structure in the main plaza. The stela is diminutive, measuring approximately 45 cm high by 25 cm wide and 10 cm thick.

Yaeger (1991) conducted settlement pattern studies in the cleared fields to the south, and six 1-x-1-m test excavations date the site to between Late Preclassic and Late Classic. As with Laguna Seca, BEAST recorded the location of the site with a GPS unit and modified the site map to better reflect the structures' summits.

Laguna Verde (BE-5)

Like Laguna Seca, the site of Laguna Verde was first recorded by RBAP in 1988 (Guderjan et al. 1991). Located on the west side of Laguna Verde, part of a small chain of lakes and *bajos* covering 80 acres near Gallon Jug, the site of Laguna Verde contains between 10 and 20 mounds as well as many smaller associated house mounds (Guderjan et al. 1991).

Guderjan and Driver mapped two primary courtyard groups in 1988 (Guderjan et al. 1991). This site core comprises a small courtyard associated with a 2-m tall temple mound. On a hilltop to the west, another small courtyard was built in a similar fashion.

The environmental setting is difficult to classify, because this area and the areas flanking the road leading to it have been totally cleared and mowed for visitors to the lagoon. After BEAST's revisit, the site map was found to be accurate, and was left unmodified.

Laguna Seca (BE-6)

Guderjan et al. (1991) first recorded the site of Laguna Seca in 1988. The ruins are on a peninsula jutting into the lagoon for which it was named, approximately 10 km north of the town of Gallon Jug and 1 km west of the Blue Creek road.

The main plaza comprises four range structures flanking the edges, the tallest of which is nearly 8 m (Guderjan et al. 1991). Four structures sit on a ridge running north-south, overlooking the lagoon (Guderjan et al. 1991). Several courtyards surround the main plaza in all directions, including two similarly arranged U-shaped complexes to the north and west (Guderjan et al. 1991). Laguna Seca is constructed on a generally north-south axis, a decision influenced by the shape and direction of the peninsula upon which the site is situated.

At the time of the BEAST revisit in 2013, the site was in fantastic shape. Trails designated for walking and horseback riding (mostly for guests at Chan Chich Lodge) lead up to and traverse the site, and these paths are regularly raked and cleared. BEAST crews recorded the location of the site a GPS unit, and modified the site map to better reflect the mounds' shapes.

Quam Hill (BE-7)

Quam (or Qualm) Hill is located on a flattened hilltop between Rio Bravo and Booth's River, and contains two main plazas as well as another smaller plaza (Guderjan et al. 1991). At least five structures over 10 m tall are located at the site, including a 15 m tall temple mound (Guderjan et al. 1991). The site also contains a ball court. Ceramics found in construction fill date the site to between Protoclassic and Early Classic (Guderjan et al. 1991). In 2006, a team from the Programme for Belize Archaeological Project revisited the site, reporting a previously undiscovered altar in one plaza and a stela in another (Cackler et al. 2007). Guderjan et al. (1991) list the UTM location of this site as N 19 57.3, E 290.1. Cackler et al. (2007:117, 123) report the site is located 3 km due east of Cedar Crossing (the point at which the Blue Creek road crosses the Rio Bravo) and 4.5 km south of the large site of Dos Hombres. Although they give an updated GPS location for the site, the coordinates are not UTMs; it is unclear which coordinate format the numbers represent.

Cackler et al. (2007:124) also report discovering a historic artifact scatter immediately east of Cedar Crossing on the east bank of the river. They suggest the 150-x-60-m scatter likely represents the location of Quam Hill (or Quam), "the seasonal headquarters of the British Honduras Company during the mid 1800s" (Cackler et al. 2007:124). Quam is historically important as the site of a "Chichina" Maya raid led by Marcus Canul in 1865 (Bristowe and Wright 1888:27–28).

Wamil (BE-8)

Originally recorded by Hal Ball, the site of Wamil is an area of dense settlement spanning across a logging road between the Gallon Jug-Hillbank train to San Jose (Guderjan et al. 1991). Guderjan et al. (1991) list the site's UTM location as N 19 39.9, E 2 94.9, which places it south of Laguna Seca on Yalbac Ranch proper. BEAST did not attempt to revisit Wamil.

Sierra de Agua (BE-9)

Sierra de Agua has never been formally mapped, but according to Guderjan et al. (1991), Institute of Archaeology records mention this site, a small site center near the Gallon Jug-Hillbank train (Guderjan et al. 1991). Guderjan et al. (1991) list the site's UTM location as N 19 40.6, E 2 99.5 (1991), which places the site just south of Laguna Seca.

Gongora Ruin (BE-10)

Gongora Ruin is located overlooking the Rio Bravo from the escarpment above, and contains a small plaza and an associated courtyard (Guderjan et al. 1991). The largest structure rises 12 m above the plaza's surface, and the site contains a single uncarved stela (Guderjan et al. 1991). The site is infamous

because a looter from the nearby village of San Felipe died when a trench collapsed on him in the late 1980s or early 1990s (Houk, personal communication, 2013). Guderjan et al. (1991) list the UTM location of the site as N 1954.3, E 293.5.

Ix Naab Witz (BE-11)

Ix Naab Witz (or Lady Waterlily Hill) is a site located on a 100-m tall hill, approximately 1.5 km east of the Rio Bravo and 1 km west of the Blue Creek road. The UTM coordinates of the primary marking point are Zone 16, N 19 55 187, E 2 85 0854. BEAST located this site during investigations on Line 1, and the northern edge of this site borders the southern side of the line's cut transect. The site is situated in a stand of upland forest, and the surrounding areas below the hill slope are primarily transitional forest vegetation. The site core comprises 15 structures around two main plazas, with a connected courtyard to the north and a plazuela group to the southwest. The arrangement of plazas and courtyards gives Ix Naab Witz a distinct north-south alignment. (Figure 5.7)

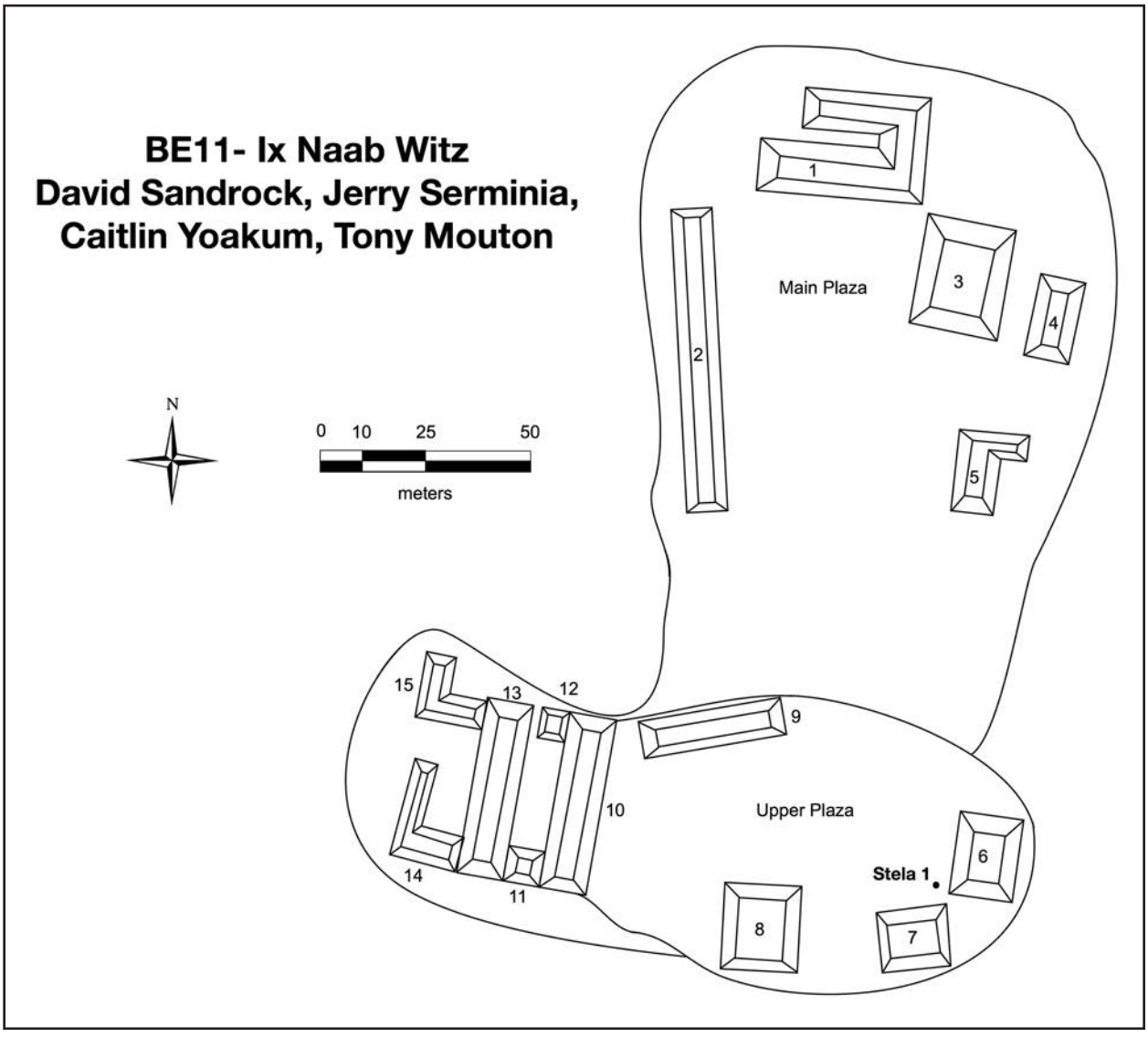

Figure 5.7. Tape and compass map of Ix Naab Witz.

The backs of the perimeter structures abut the natural hill slope surrounding the site, and the hill extends 15 m down from the main plaza to the east and west. The upper plaza area is situated on a hill another 20 m above the main lower plaza, and its southern slopes drop to 35 m below plaza level. The main plaza runs north-south and is approximately 110 m by 46 m. Structure 1, a 2.5-m tall U-shaped courtyard marks the far northern end of the plaza, and the west side is flanked by Structure 2, a 72-m long, 4-m tall range structure. Structure 3 is the tallest building in the main plaza, reaching 6 m above the plaza surface.

The upper plaza to the south runs east-west, and measures 76 m by 32 m. An area immediately to the southwest of the upper plaza was a likely quarry area, evidenced by multiple layers of cuts into the exposed bedrock. BEAST crews documented a 1.05-m tall stela located at the southeast corner of the upper plaza near the corners of Structures 6 and 7. This uncarved stela is 35 cm thick, 60 cm wide at the base, and 40 cm wide at the top (Figure 5.8). BEAST did not find any structures resembling a ball court in either plaza.

Figure 5.8. Photograph of uncarved stela at Ix Naab Witz.

The site appears to be entirely unlooted. Due to the large but manageable size of the site and relative ease of access, BE-11 is an ideal candidate for more sustained investigations and more accurate instrument mapping.

La Luchita (BE-12)

La Luchita is a hilltop site first visited by Brett A. Houk in 2012. The UTM coordinates of the primary marking point are Zone 16, N 19 5 011, E 2 77 178 (Figure 5.9). It comprises 10 structures forming one primary plaza area that is bisected by a logging road. BEAST crews determined that an "altar" originally observed by Houk is most likely a natural piece of bedrock dislodged when the logging road was cut through the site. The site and surrounding areas are primarily upland forest vegetation, and the plaza is approximately 150 meters west of a seasonal stream that flows across the bottom of the hill upon which the site is built.

Most of the structures on the western side of the site are connected via a large, narrow platform. La Luchita was built on a generally east-west alignment. The two tallest structures (3 and 6) and have been looted heavily, as evidenced by a large looters' trench on both structures' west sides. The longest structure is the easternmost range structure edging the plaza, which measures 62 meters in length. Structure 6, the tallest at the site (approximately 7 m high), was built separate from the surrounding structures in the western portion of the main plaza, and its position and size indicate that it is a possible temple mound. The northernmost L-shaped

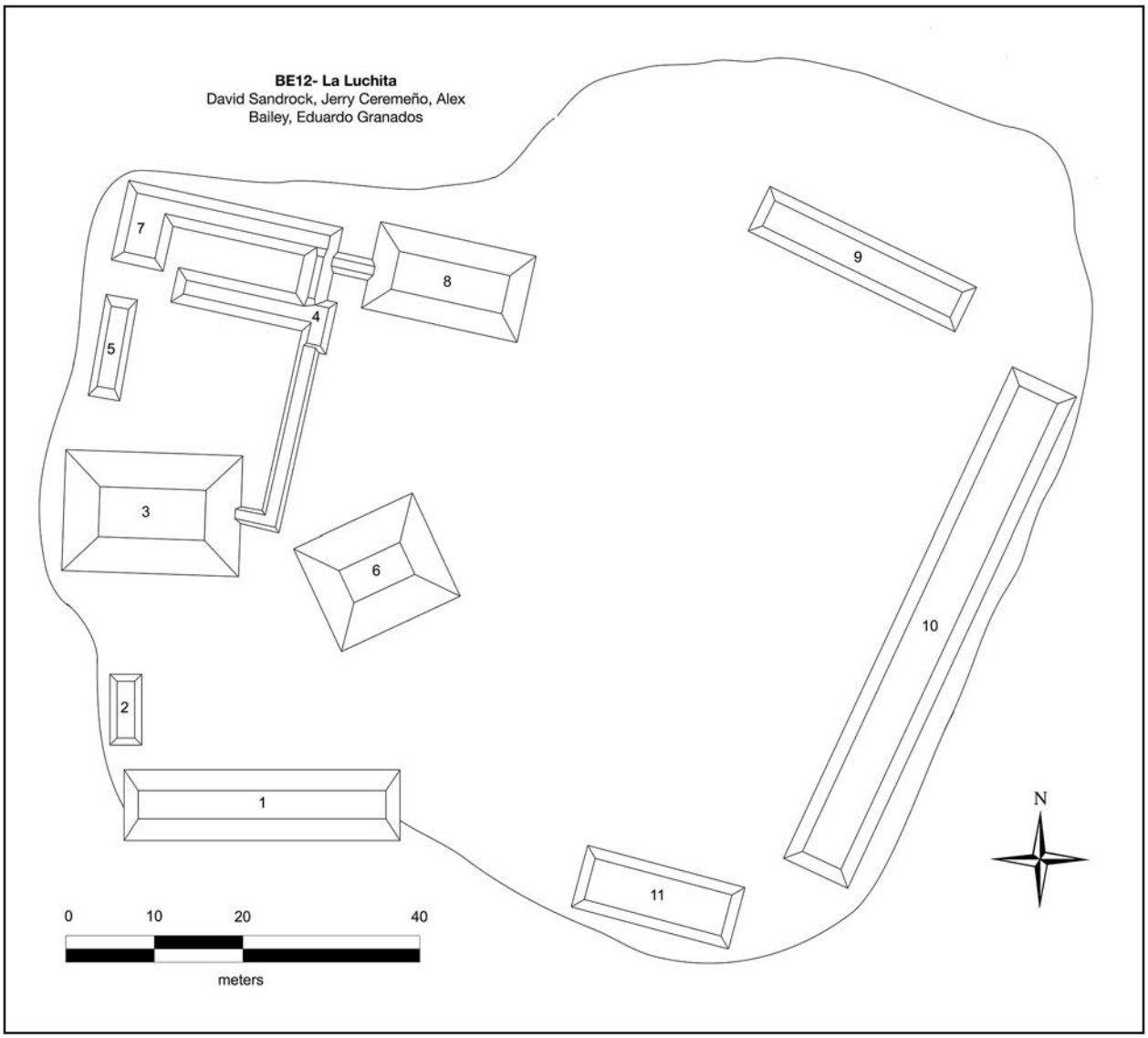

Figure 5.9. Tape and compass map of La Luchita.

structures (Structures 4 and 7) on the west end of the site comprise a small plazuela with a possible entrance in the southwest corner. Structures 3, 4, 5 and 12 comprise a less-restricted plazuela, with multiple entrances on the west side and a short wall (Structure 12) marking the eastern edge of the plazuela.

Montaña Chamaco (BE-13)

Montaña Chamaco is a site found with the help of a local logger, after whom this site is named. Due to time constraints and the relative difficulty in reaching the site, an extensive mapping project was not feasible. This site is located on a large modified hilltop approximately 15 m tall, and just north of a swampy area. The UTM coordinates of the primary marking point are Zone 16, N 19 51 187, E 2 75 043. A possible abandoned chiclero camp was located nearby, as evidenced by a small collection of bottles found approximately 50 m west of the swamp. Additionally, Montaña Chamaco is located approximately 1.3 km east of the La Lucha escarpment. The vegetation in the area surrounding Montaña Chamaco is primarily dense transitional forest.

The site core comprises 14 structures located around a single plaza built on a modified hilltop; the structures are seemingly not aligned with regards to a north-south or east-west alignment (Figure 5.10). The largest structure (Structure 6) is located in the central plaza, and extends approximately 9 m above the plaza floor. Most of the perimeter structures' backs abutted the edge of the hilltop, with the exception of a small, seemingly-natural shelf on the least-sloping west side of the site, to the west of Structures 4, 5, and 6. This area would easily lend itself to being a primary entrance to the site. The site has been looted, but only one looters' trench was found.

A pair of rectangular structures (13 and 14) to the east accounts for the only associated structures found outside the main plaza area. Additionally, BEAST recorded several small structures and chultuns during the hike from our entry point to the site.

Sylvester Camp (BE-14)

The site of Sylvester Camp is located on the eastern edge of the modern village of Sylvester, which is essentially a company town of Gallon Jug Agro-Industries. Sylvester Camp is located on top of a small hill less than 1 km west of the Rio Bravo. The UTM coordinates of the primary

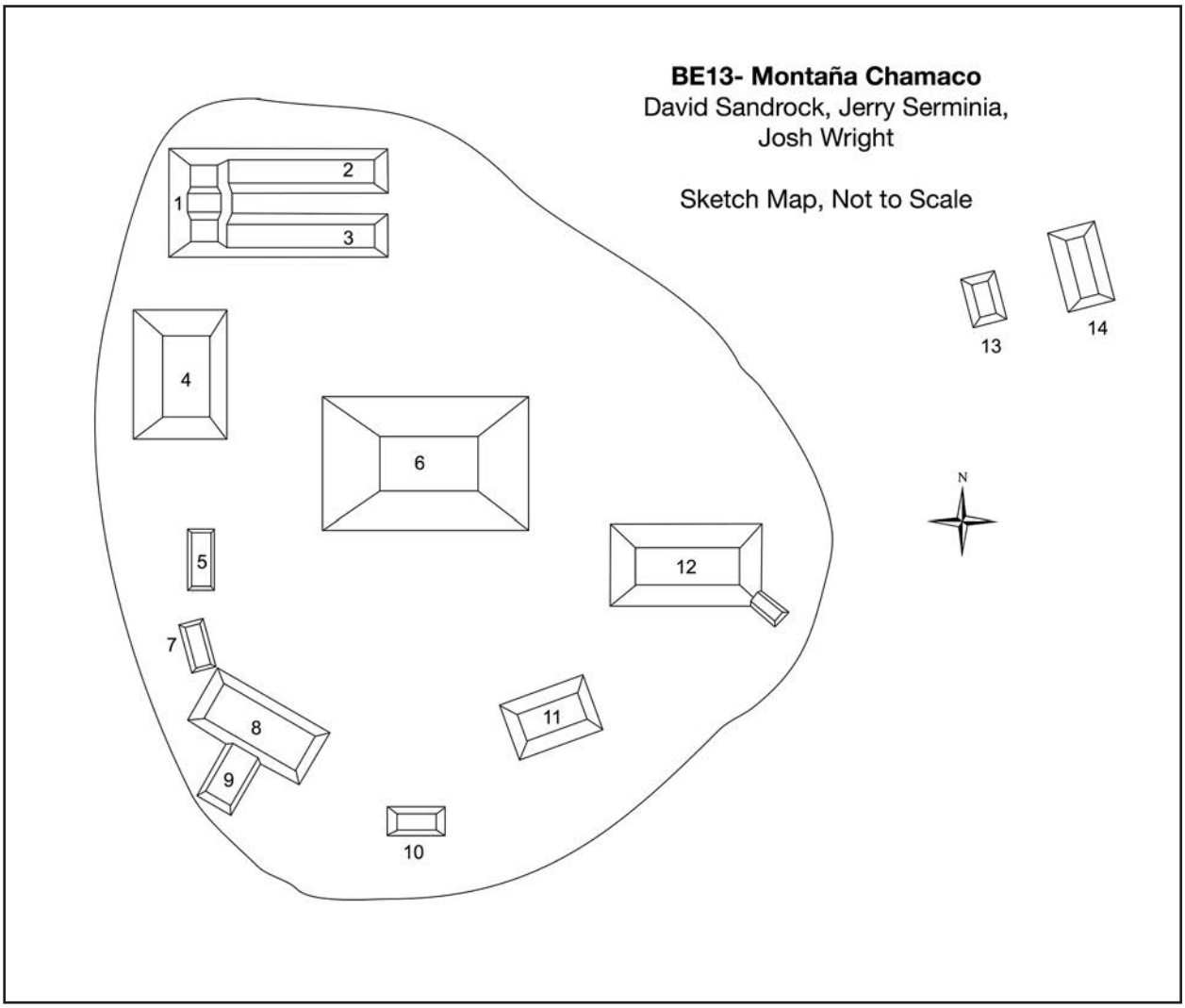

Figure 5.10. Sketch map of Montaña Chamaco.

marking point are Zone 16, N 19 45 510, E 2 78 128. The site comprises a single elevated platform supporting four smaller buildings, making up a small courtyard (Figure 5.11). The tallest mound (Structure 1) is approximately 2.5 m in height above the courtyard surface and 4 m from the bottom of the substructure. According to residents of the village, smaller structures are likely located in the forest to the east, but BEAST did not survey the area.

The site area was mostly cleared, and the local school is located in the same clearing, immediately north of the site. The primary surrounding vegetation type of the nearest uncleared area was transitional forest.

El Infierno

Recorded after a visit from the Archaeological Commissioner of Belize in 1970, the site of El Infierno reportedly is located approximately 1 km east of the Belize-Guatemala border (Guderjan et al. 1991). Little is known about this site, and all information regarding it comes from its record in the Institute of Archaeology files (Guderjan et al. 1991). The exact location of the site is unknown, but the site likely contains a pair of large pyramids. Given the uncertainty of its location, it could be part of Chochkitam in Guatemala (Guderjan et al. 1991). BEAST attempted to find El Infierno with the help of local informants, but was unable to relocate the site.

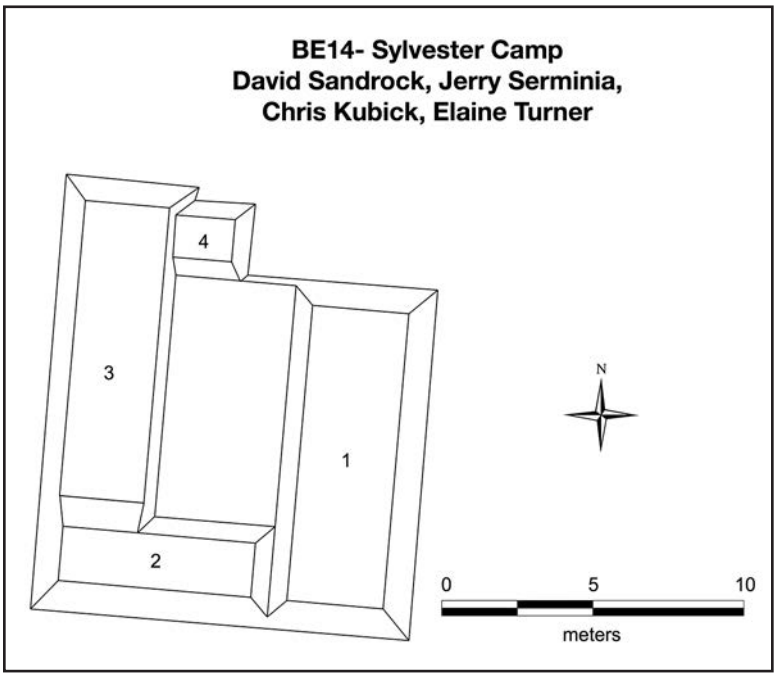

Figure 5.11. Tape and compass map of Sylvester Camp.

CONCLUSIONS

Robichaux (2002) claimed that despite the lack of a systematic archaeological survey of the entire property, it is evident that many more ancient Maya sites are scattered throughout the property, but most of them remain undiscovered to this day, hidden amongst the jungle vegetation. Having recorded four new sites and nearly 200 mounds over a relatively small portion of the property, the results of BEAST's first season certainly mesh well with Robichaux's observation.

Thanks to the rapid rate of survey allowed by these pre-cut transects, BEAST was able to cover a substantial portion of the available survey area during the 2013 field season. In all, the team surveyed over 40 km of transects. During this survey, a great deal of previously unrecorded Maya settlement was mapped across various settings. In addition to revisiting and rectifying maps of four previously recorded sites, BEAST recorded four new sites and a total of 184 structures.

PROPOSED FUTURE RESEARCH

With the completion of Lines 1 and 3, BEAST will continue survey in the 2014 field season, making use of other seismic lines available to us. Further analysis and field research will help to shape the research

goals of the season. Targeted areas for the 2014 season include more of the existing seismic lines, additional lines cut in 2013 and 2014 by American Seismic, as well as targeted survey attempting to locate the site core (or cores) associated with the areas of dense settlement on the eastern portion of Line 1. Additionally, BEAST will attempt to relocate and record more sites listed in RBAP's site inventory, including El Infierno.

Acknowledgments: BEAST was assisted greatly by Jerry Serminia, our local guide. Without Jerry, BEAST and the students brave enough to join in on survey would have been at the mercy of a Californian and his GPS to navigate them safely through the bush. Additionally, the members of BEAST will be forever grateful of the rest of the Chan Chich Lodge staff. Everyone at Chan Chich made us feel welcome every day we resided in our beautiful accommodations. These amazing folks assisted us in every way, including providing chainsaws, a trio of world-class meals every day, a place to watch the FIFA Confederations Cup, and cold Belikin after hard days of survey work.

BEAST also owes a great deal of gratitude to Leroy Lee and American Seismic. The work carried out by American Seismic granted us with a somewhat unique opportunity for rapid survey coverage, and the financial assistance provided by Mr. Lee ensured that this project could be undertaken successfully. Without Leroy, there is no BEAST, and we cannot thank him enough for this opportunity.

Alan Jeal and the employees of Gallon Jug Agribusiness were tremendously helpful, providing us with tender care for La Dinosauria and GPS information on potential sites. Many thanks also go to Jeff Roberson of Yalbac Ranch, who provided us with a high-quality GEOPDF map of the property, showing the logging roads used extensively by BEAST.

Finally, BEAST appreciates all of the students that were brave enough to come along on survey. These students were great sports in the field, never faltering when we dragged them perilously through dense and painfully abrasive vegetation and up steep, muddy hillsides.

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The 2013 Chan Chich Archaeological Project Lab Manual

Carolyn Nettleton

INTRODUCTION

This chapter is intended to function as a manual summarizing the laboratory methods used by the Chan Chich Archaeological Project (CCAP) to process, catalog, and analyze materials received from excavations in the field. It is designed to be a reference document for students and staff.

In 2012 CCAP pioneered the use of a project-wide electronic database system using FileMaker Pro (Houk 2012). The electronic database and forms therein closely resemble the hardcopy paper forms previously utilized by the La Milpa Core Project between 2007 and 2011 and CCAP for five seasons between 1996 and 2001. For more information about the LMCP provenience recording system, consult the *La Milpa Core Project Field Manual* (Houk and Zaro 2011).

In the FileMaker system, instead of filling lot and suboperation forms in the field, data are entered directly into the database on iPads, which are distributed to the various operations each season. In total, five iPads were distributed to staff; two iPads were in use each day on the Upper Plaza, two on Structure A-5, and one on survey. The lab crew used a sixth iPad to facilitate data entry and compliment data entry on the lab desktop. As is discussed at the end of this chapter, it is necessary to import the data from each field iPad into the lab computer, merge the new data with the old to create an updated master database, and then export the new database back to the field iPads. This syncing process is handled by the lab director.

MOVEMENT OF ARTIFACTS AND SAMPLES THROUGH THE LAB

The first priority of the lab director and of anyone working in the lab must always be to carefully maintain the provenience and condition of each artifact. The procedures outlined below are designed to maintain artifact provenience from the moment an artifact enters the lab until it has been processed.

Artifact Typology & Categories

Not all artifact types have the same experience in lab (Figure 6.1). Artifact tracks diverge based on typology. For ease of reference, there are essentially four differing categories of artifact; these categories correspond to those most commonly dealt with in the 2013 season of the CCAP: ceramics, lithics, faunal, and special samples.

Reception of Lot Bags from the Field

All artifacts enter the lab in a bag with other artifacts of the same category found in the same lot. At the end of the field day (and occasionally throughout it), lot bags (from closed lots only) are delivered from the field to the lab, and placed in a designated trunk for incoming lot bags.

Nettleton, Carolyn
2013 The 2013 Chan Chich Archaeological Project Lab Manual. In *The 2013 Season of the Chan Chich Archaeological Project*, edited by Brett A. Houk, pp. 81–92. Papers of the Chan Chich Archaeological Project, Number 7. Department of Sociology, Anthropology, and Social Work, Texas Tech University, Lubbock.

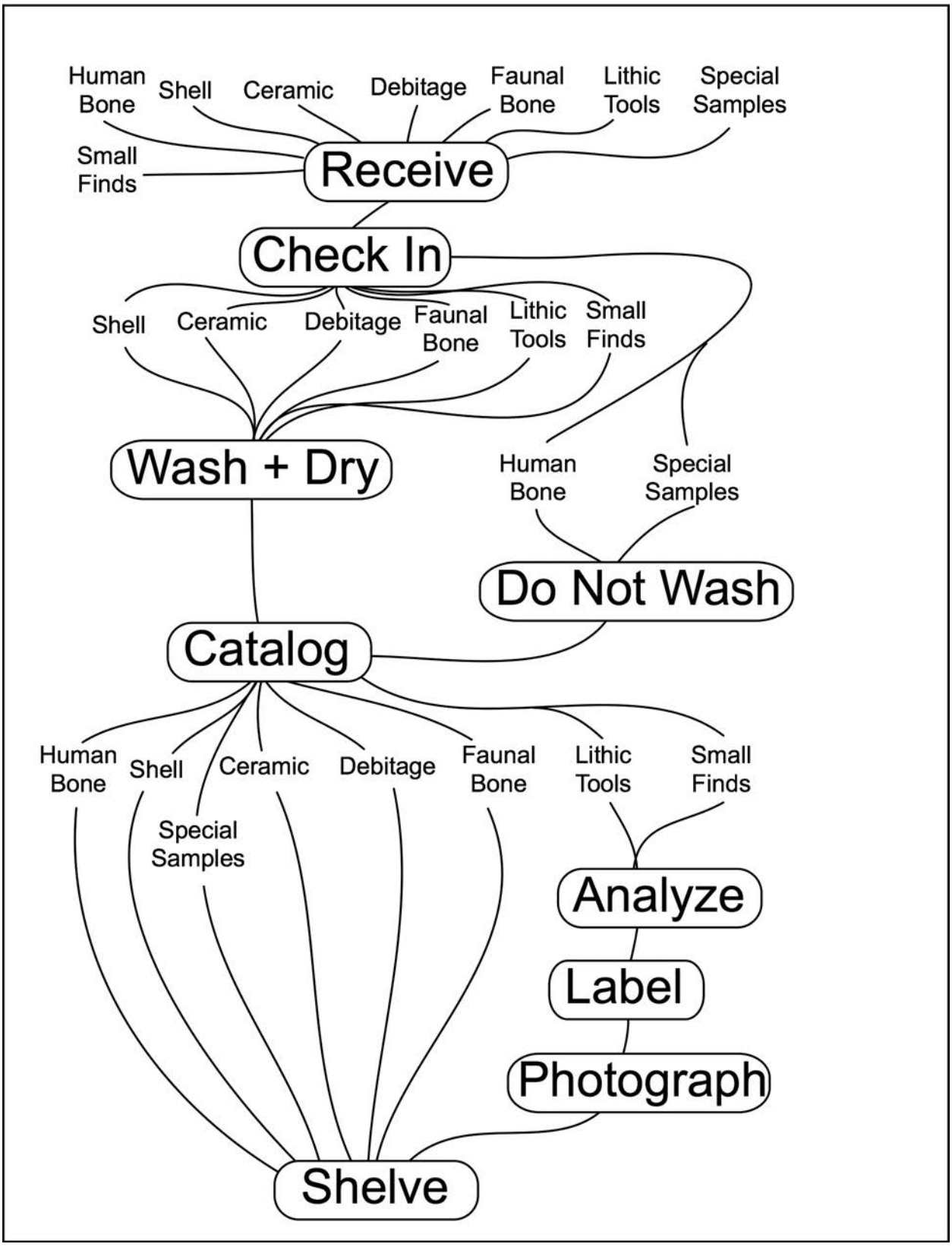


Figure 6.1. Carolyn Nettleton's lab flow chart.

Check-in: Lot to Lab Form

All lot bags must first be checked in to the lab. To do this, follow these steps:

1. OPEN the latest version of the master database (if any iPads are accessing the database over Wi-Fi, it should have been opened at the outset of the day so that those field iPads can record observations directly into the master).

2. OPEN the "Lot to Lab Bag Check-In" form. Under the "Layout" drop-down menu on the upper left hand area of the screen, choose "Lab Forms" and then "Lot to Lot Bag Check-In" (Figure 6.2).

3. CREATE a new form by clicking the "New Record" icon at the top of the screen.

4. SORT your incoming lab bags by lot so that it is apparent if you have more than one lab bag containing the same category of artifact, or different types of artifacts coming in from the same lot.

5. SELECT the Lot # from the drop-down menu. Information for the following boxes should be automatically filled into the form: date the lot was closed, materials to be checked in, and how many bags there are of each material. If this information is not automatically filled into the form, there are three possible reasons: you have entered the wrong lot #; for some reason the lot form

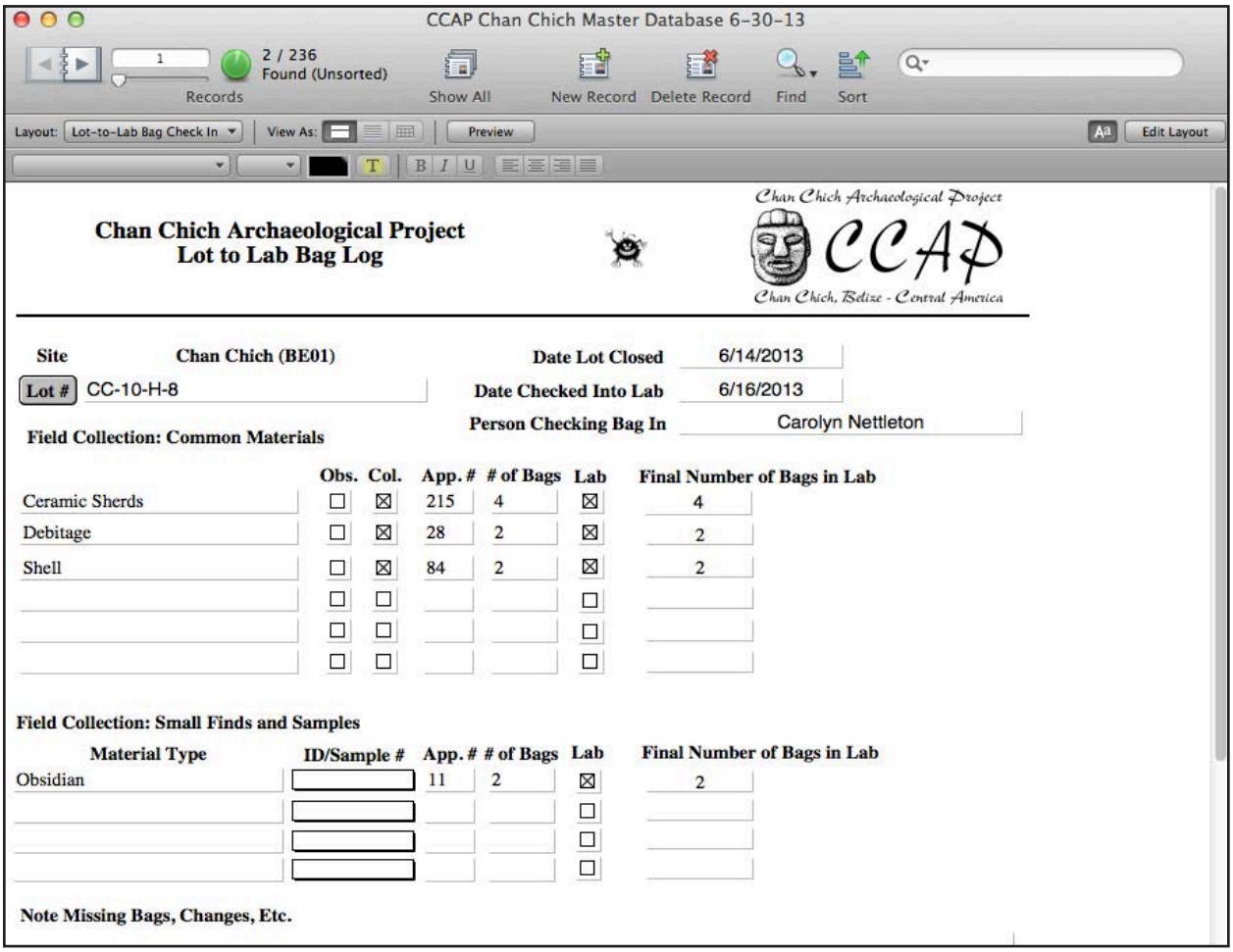


Figure 6.2. Screen capture of Lot to Lab Bag Log form used to check in field bags in the lab.

has not been filled out in the field; or the lot form was filled out in the field, but the iPad has not been synced with the main database on the lab computer since before that form was filled. DO NOT create a missing Lot form in the master database. It will cause syncing issues. A lot form should always be created on a field iPad.

6. CLICK the check box under the "lab" column for every corresponding lot bag that you have received; an "X" will mark that you have received that material and will also automatically populate that information on the lot form, as well.

7. ENTER the number of bags for each material that you have received from a lot. This should be the same number that the excavators indicated they sent to the lab. If it is not, you should double check, and then radio the appropriate operation director to sort out the missing or extra bags.

8. REPEAT for each of the lot bags that you have received.

Lot bags that have been checked in get moved to another designated trunk for artifacts ready to be processed. If you have any lot bags from the incoming trunk that cannot be checked in, keep them there until the database has been updated trunk. If you have very few things to wash/process and are looking for an alternative, write down the lot number and artifact category in your field notes, and then transfer the lot bag to the trunk with artifacts awaiting processing. This temporarily side steps the check-in process, but you will have to complete the check in form as usual before you can catalog and analyze the artifacts.

Processing Checked-In Artifacts

Once artifacts have been checked in to the lab, they are ready to be processed. It is fine to wash lithics, ceramics, shell, and faunal bone, unless the excavators have indicated that an artifact should not be washed for some special analysis. Do not wash or touch (with your bare hands) samples of charcoal or human bone.

Washing

The first step in processing lithic, ceramic, and shell artifacts is washing (Figure 6.3). Using water and toothbrushes, dirt is carefully cleaned from the artifacts without compromising the integrity of the artifact.

Drying

Artifacts that have been washed are arranged on drying racks together with items of the same provenience and artifact category, and the lot bag provenience tag. For example, all lithics from Lot CC-10-A-1 should be on one rack together with a tag labeled CC-10-A-1. If a single lot yields enough artifacts for two trays, then a second tag should be placed with the second tray to eliminate any confusion.

Figure 6.3. Erica Gallis washing artifacts on the veranda of the 2013 lab.

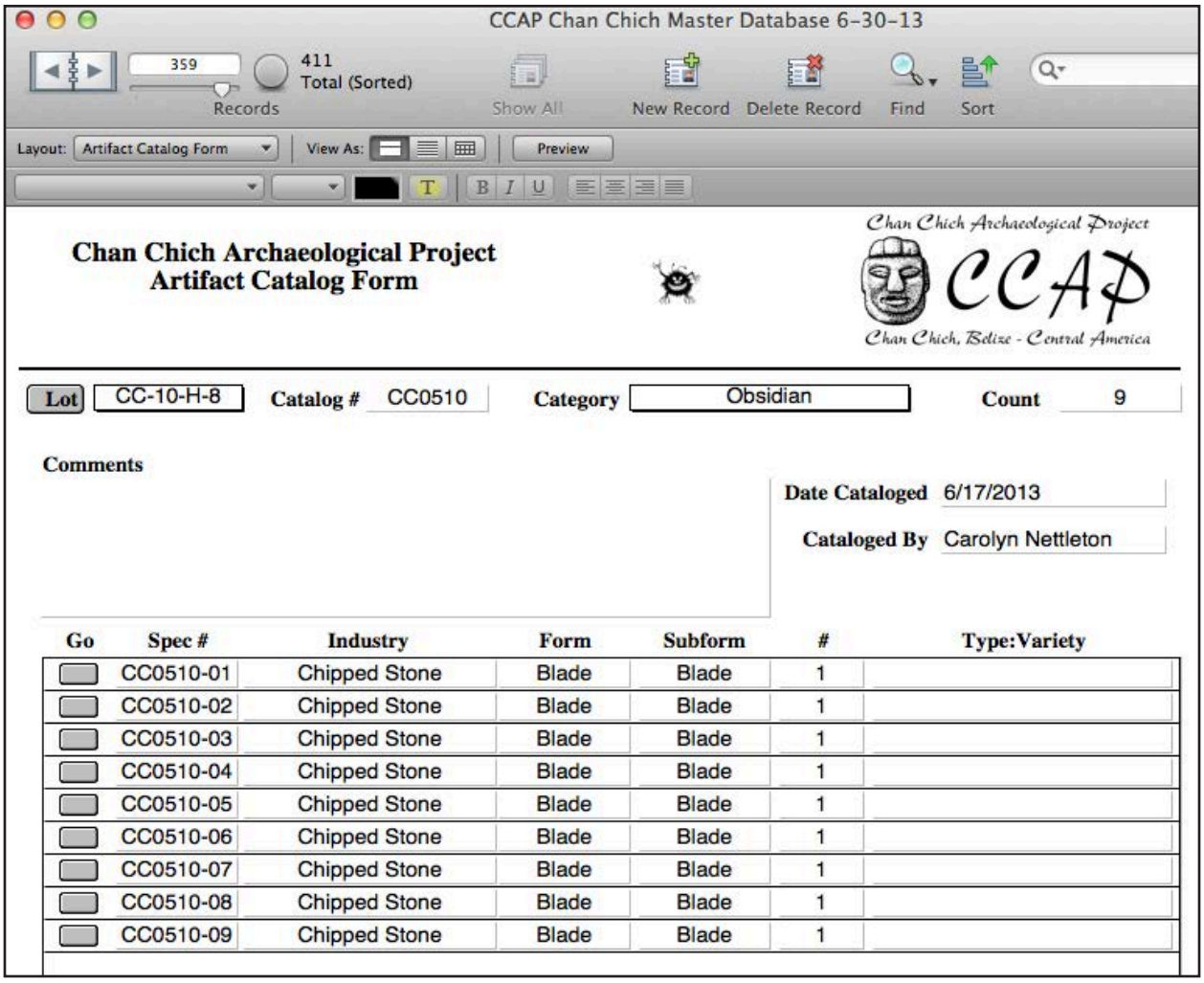
If possible, place trays in the sun to expedite drying. Keep in mind that bone takes a long time to dry. Do not re-bag artifacts until they are completely dry.

Cataloguing: Artifact Catalog Form

Dry artifacts can be catalogued. This process assigns a unique number to each group of like artifacts (i.e., have the same artifact category) that have been received and washed by the lab and have the same provenience; for example, the lithic tools from Lot CC-10-B-5 all receive the same catalog number.

Using either the lab computer or a lab iPad, open the master database. Under the "Layout" drop down menu, choose "Catalog Form" from the list of lab forms. From amongst the icons along the top margin of the page, choose "New Record" (Figure 6.4). This will generate a new catalog form with an original and automatically generated catalog number that is numerically in sequence (if the previous form was assigned catalog number CC0510, then the next catalog form would be given the number CC0511, and so on).

Enter provenience information into the form following the layout prompts. Lot number and artifact category can be chosen from drop-down menus, while the number of artifacts and the date of cataloguing must be entered manually. If the integrity of any artifacts was altered during the washing or drying process (i.e., paint removed, artifact broken, or artifact lost),



Go	Spec #	Industry	Form	Subform	#	Type:Variety
	CC0510-01	Chipped Stone	Blade	Blade	1	
	CC0510-02	Chipped Stone	Blade	Blade	1	
	CC0510-03	Chipped Stone	Blade	Blade	1	
	CC0510-04	Chipped Stone	Blade	Blade	1	
	CC0510-05	Chipped Stone	Blade	Blade	1	
	CC0510-06	Chipped Stone	Blade	Blade	1	
	CC0510-07	Chipped Stone	Blade	Blade	1	
	CC0510-08	Chipped Stone	Blade	Blade	1	
	CC0510-09	Chipped Stone	Blade	Blade	1	

Figure 6.4. Screenshot of Artifact Catalog Form.

make a note of this information on the Catalog Form in the "Comments" box. The date that the lot was closed should be automatically filled in when a lot is chosen from the drop down menu; if it was not entered on the field lot form, then it will be missing from the catalog form. You may be able to enter the date that the lot was closed if that information has been recorded on the lot bag tag.

To complete the cataloguing process, transcribe the catalog #, provenience (operation, suboperation, lot), date of cataloguing, and number of artifacts onto a catalog tag (Figure 6.5). Then, all of the artifacts and the catalog tag go into the same plastic ziplock bag. It is advisable to seal the catalog tag in a smaller bag before enclosing it with the artifacts to prevent any residual moisture in the artifacts from eventually making the tag illegible. Towards the same end, it is also advisable to inscribe information on the catalog tag in pen, rather than in pencil.

Shelving System

Once catalogued artifacts are bagged with their catalog tag, they can be shelved with other catalogued artifacts to await further analysis. In 2013, the lab had a large enough shelving unit to store catalogued artifacts on one side of the shelving unit and analyzed artifacts on the other side. Artifacts were organized by provenience (separate shelves for Structure A-5 and for the Upper Plaza), and boxed by category (lithic, debitage, obsidian, ceramic, shell, bone, or sample).

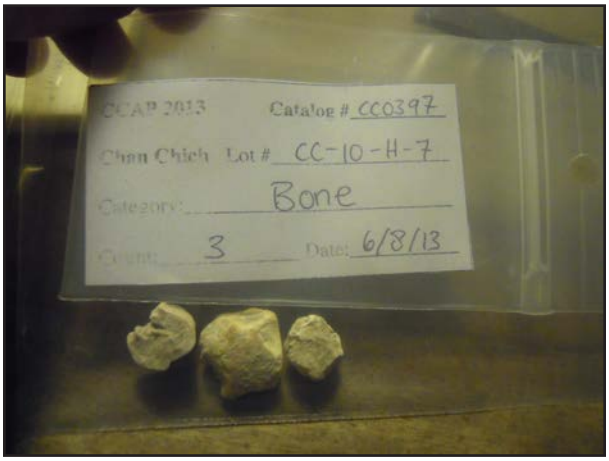


Figure 6.5. Example of completed Catalog tag. Note the tag is stored in its own smaller plastic bag within the artifact bag.

Analysis: Artifact Analysis Form (Lithics)

In 2013, the lab director and students analyzed lithic tools. Dr. Fred Valdez, Jr., the project ceramicist, analyzed the ceramics, and Norbert Stanchly examined the faunal material. All collected radiocarbon samples from the 2012 and 2013 season were exported to Texas Tech University, pending analysis. This year, graduate students Rose Leach and Krystle Kelley conducted preliminary analysis on human bone found in the Upper Plaza.

This process for analyzing lithic material records the weight, dimensions, tool form, and subform, raw material type and quality, and any other relevant observations (for example, if artifact is burned, weighs less than a gram, was altered during analysis, or appears to have a relationship with another artifact). A new artifact form can be created by choosing "Artifact Analysis Form" under the "Layout" drop down menu in the upper left hand corner of the Master Database. Once the artifact catalog number has been entered into the form, the project database will automatically fill in the artifact provenience information and artifact category. A unique artifact spec number must be entered manually. If you are analyzing the first lithic tool from the group catalogued under CC0309, then the artifact spec number should be CC0309-01; the next tool analyzed from CC0309 should be given the artifact spec number CC0309-02, and so on. The rest of the artifact form can be filled by following the form prompts.

Handling Charcoal Samples

Charcoal samples will ultimately receive analysis outside of the CCAP lab in Belize; however, they are processed minimally by the lab director and by students in preparation for exportation. To maintain the integrity of the carbon sample, gloves must be worn, and the sample must never come in contact with any surfaces or objects that have not been sterilized. If a trowel is used to separate the sample from a cluster of soil, then the trowel must be sterilized between processing samples.

Charcoal samples received in lab are checked in, catalogued, and then repackaged into a sterile bag along with their provenience information, and shelved. When cataloguing a charcoal sample, the sample should be weighed. Before weighing a charcoal sample, attempt to isolate the charcoal as best you can from the soil that will inevitably be surrounding it upon receipt from the field. Wearing gloves and using a sterile trowel, separate charcoal from dirt on the tinfoil in which it was delivered to the lab. Dispose of the dirt, and weigh the sample. Often, samples weigh less than a gram; this can be recorded as <1g, if the lab scale is not calibrated to measure less than a gram. Record the sample weight on a sample tag, along with the catalog number and provenience information. The sample number should have been assigned to the sample upon excavation and recorded in the field lot form; the long form of the sample number should be transcribed on the sample tag, including the lot number. For example, if the sample number is S25, and the lot number is CC-10-B-5, then the full sample number to be transcribed on the sample tag, should be CC-10-B-5-S25. Catalogued samples can be shelved to await further analysis or exportation.

Labeling (Lithics)

Analyzed lithic tools and, in certain cases, debitage are eligible to be labeled. The artifact spec number assigned in the analysis process should be inscribed on the artifact in writing that is neat and tiny, using an acid-free ink such as Berol, Autoseal Ink, Staedtler, or Artline. The spec number should be written in an unobtrusive spot that will not hinder future analysis. Once the ink has had 5–10 minutes to dry, seal it with a layer of Acryloid B-72 solution using a nail polish brush. Depending on the relative humidity and the accuracy of the solution, the Acryloid B-72 will then need a half-hour to a few hours to dry before labeled artifacts can be bagged and reshelved.

How to Mix Acryloid B-72 (20%)

The formula for a 20% solution is as follows: multiply the desired volume (mL) of solution by 0.2 to get the amount of Acryloid pellets in grams needed for the mixture. On the container to be filled, calibrate and mark the desired volume of solution; place the pellets in the container first, and then top up to the desired volume with acetone. A funnel may be necessary. Keep in mind that while acetone is not corrosive, it is highly flammable and toxic, so spills are undesirable. The simplest quantity to mix is 100 mL; for this volume of solution, mix 20 g of Acryloid B-72 pellets with enough acetone to reach the 100 mL mark on a calibrated container. Allow the mixture to sit until the liquid is clear. No mixing required.

Photographs for the Artifact Analysis Form (Lithics)

Labeled and exceptional artifacts are eligible to be photographed. The project iPads were used this season as they take excellent quality photographs. Be sure to set up black felt and a photographic scale and to position a lamp to enhance the quality of the artifact photo. Position the artifact so that the spec number is legible. To insert a photo into the artifact analysis form, click on the box that reads

"insert photo" on the artifact's unique analysis form; this will open up the iPad camera, and once the artifact photograph has been taken, it will be entered directly into the artifact analysis form.

A TYPICAL DAY IN THE LAB

Task Sequencing and Management

The sequencing of lab tasks is directly correlated with the amount that can be processed in a day. This season we found that it was useful to begin most days by checking in artifacts received at the end of the previous field day, and then to spend the morning washing newly checked in artifacts and any artifacts that had been checked in the previous day and not yet been washed. It was then possible for some artifacts to be dry by the early afternoon, which was often spent cataloguing, shelving, and analyzing (unless there was a great volume of artifacts to be washed). The end of the field day was an ideal time to execute iPad syncing and any necessary database troubleshooting.

Field School Students

In the case of the CCAP, lab work is a learning opportunity. It is the responsibility of the lab director to ensure that all students are familiarized with the CCAP database as well as the lab procedures outlined in this chapter. This season, interested students were also tutored in the identification of different lithic tool and debitage types using reference images (Figure 6.6).

Syncing the iPad Database

Due to Wi-Fi/bandwidth constraints, none of the iPads outside of the lab were able to run directly off the host database on the lab desktop computer. Because of this, the iPads in use on the Upper Plaza, Structure A-5, and on survey had to be regularly synced with the lab (every couple of days) in order for the lab to process artifacts from new lots and suboperations.

Figure 6.6. Artifacts waiting for analysis by field school students in the 2013 lab.

Importing the Field Databases from the iPads

Syncing is a multi-step process that involves reconciling the various versions of the database from the field with the master database in the lab (see Houk 2012). After much trial and error, the following steps were refined to download information from five field iPads into the lab desktop master database, and then export the new master to each iPad (without erasing or over-writing any existing files on their working versions of the database).

1. Open iTunes.
2. Connect any iPad to the computer using iPad USB cord.

3. The iPad should appear in your iTunes window in the left hand sidebar under "devices", with a battery symbol next to it indicating that it is charging. Click on it.

4. Across the top of the iTunes window, select the "Apps" tab.

5. Select "FileMaker Pro" from the dropdown menu that appears to the left.

6. Existing FileMaker Pro files on the iPad should appear in a list to the right of the page. Select the one that has been in use and updated most recently. To the bottom right of the page, a "SAVE" button should become available. Click it.

7. Save the file to the desktop.

8. Rename the file by changing the date to indicate the date it was saved to the computer, and add "Field to Lab" at the end of the name. This is an important step that differentiates the field version from new lab version that will be created after the syncing.

9. Move the file to desired location on the computer hard drive, or Dropbox. We found it helpful to segregate files from the two main excavation operations, i.e. by creating a folder for the Upper Plaza Databases and a folder for the Structure A-5 Databases.

10. Eject the iPad.

11. Repeat Steps 2–8 with the remaining iPads.

Merging the Field and Lab Databases

When all of the iPad databases have been saved to the lab desktop, begin importing individual forms from each database into the Master Database on the lab desktop, by the following steps.

1. Open the most current Master Database. Go to File>Save a copy as... And save a new copy in the desired location (we saved to Dropbox), changing the title by replacing the old date with the current date. Delete "copy" from the title.

2. Close the Master Database that you had open. Open the new Master Database with the current date and position it to the left of the screen. In this way, the previous version of the database is preserved in case of an error.

3. Open the newly saved "Field to Lab" Database from one of the iPads and position it to the right of the screen.

4. Choose the "Lot form" layout in the "Field to Lab" Database.

5. Click the "Find" icon.

6. To avoid accidentally erasing forms completed by on different iPad, which is essentially another version of the database, select the appropriate person's name in the "iPad" field, which is located in the header of each form. Although the iPads were numbered in 2013, the iPad field includes the name of the person to whom the iPad was assigned.

7. When the correct name is highlighted, click "perform find". This will ensure that you only import forms on which this person has entered data, to prevent writing over files from other iPads.

8. Click the "Sort" icon.

9. Choose "Lot" from the list on the left. See Figure 6.7.

10. Press the "Move" button in the middle of the window.

11. Click the "Sort" button at the bottom right hand corner of the window.

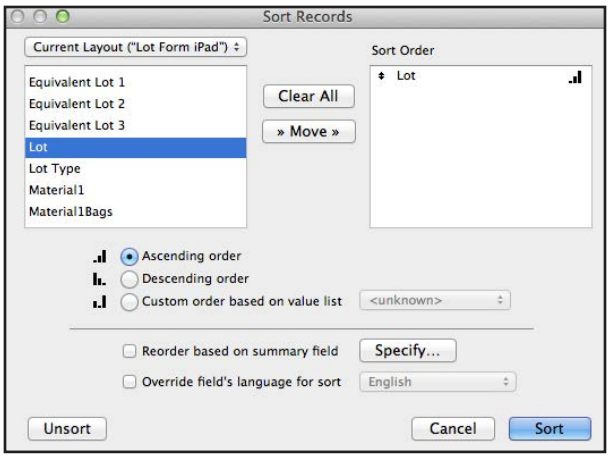


Figure 6.7. Screenshot of the sort menu.

12. Your lot forms are now sorted by lot, including only the forms modified on the iPad that you are about to import into the Master.

13. Choose the "Lot form" layout in the Master Database.

14. Sort by Lot in the same manner as you did for the Field to Lab Database. This step is absolutely critical.

15. Go to File>Import Records>File...

16. Choose the Field to Lab Database file that you currently have open on the right side of the screen from wherever you saved it.

17. Click "Open."

18. Notice the list in the middle of the window. Ensure that a two-way arrow links the form that you are importing (i.e., Lot <-> Lot).

19. Under "Import Action" to the bottom left of the window, select "Update Matching Records in Found Set," and ensure that the box next to "Don't import first record (contains field names)" is checked.

20. Click "Import."

21. There should be no errors. Click "ok" either way. If there are errors, there is no known way to ascertain what those errors are, so hope that there are no errors. If you forget to sort by lot in both copies of the database, there will be errors.

22. In the Master Database, click the "Show All" icon across the top. You have now imported and updated all Lot forms from the first iPad you chose to sync.

23. Import all other forms that have been modified on this iPad since the last sync in a similar fashion as you did for the lot forms. IT IS IMPORTANT TO NOTE that you should always sort the records by the same variable as the layout form that is open. When you open the lot layout, you sort by lot, and import lot forms and updates. When you open the subop definition form layout, you sort by subop, and import subop definition forms and updates. When you open the burial form layout, you sort by burial #, and import burial forms and updates, etc. And REMEMBER to "Find" only the forms modified on the iPad being imported before "Sort"ing the records in the Field to Lab Database.

24. Once all new forms and updated forms have been imported from the first iPad, close the "Field to Lab" database on the right side of your screen.

25. Open the "Field to Lab" database for the next iPad that you wish to import. Position it to the right hand side of the screen, for continuity. Repeat the steps until you have imported all new and updated forms from all five iPads.

Exporting New Field Databases to the iPads

You now have a completely current Master Database on the desktop computer. The next part of the process is to send it back to the field iPads.

1. Connect whichever iPad you would like to start with to the lab desktop computer using the iPad USB cable.
2. Open iTunes.
3. The iPad should appear in your iTunes window in the left hand sidebar under "devices", with a battery symbol next to it indicating that it is charging. Click on it.
4. Across the top of the window, select the "Apps" button.
5. Select "FileMaker Pro" from the dropdown menu that appears to the left.
6. Existing FileMaker Pro files on the iPad should appear in a list to the right of the page. Select the one that has been in use and updated most recently. Change the name by adding "OLD" to the end of it. If there is another database file with "OLD" listed at the end of the name, delete it.
7. Towards the bottom right hand corner of the window, there should be an "Add" button. Click it.
8. Select the new Master Database file with today's date.
9. Once it has been added to the list, change the name by replacing "Master Database" with "iPad#" and adding the operation numerber (i.e., CCAP Database 6-20-13 CC-10 iPad 3.fp7).
10. Click "Sync" at the bottom right hand corner of the screen.
11. Eject the iPad.
12. Connect the next iPad and repeat the steps until all five iPads have the new database files.

Although the process is cumbersome, in 2013 we refined the above 48 steps to a 20-minute process. It is advisable to have two people doing the sync for quality control. Note, if there are also photo logs to import, or plan/profile maps to scan, sync time will be increased.

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Houk, Brett A., and Gregory Zaro
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A Research Proposal for the Back Plaza at Chan Chich

Edgar Vazquez

INTRODUCTION

Future research at the Back Plaza proposes to assess the function of the courtyard and its associated structures at the ancient Maya site of Chan Chich in the Three Rivers region of northwestern Belize (Figure 7.1). Future research will analyze the form, function, and chronology of the courtyard and its associated structures. It will also provide a greater understanding of the function of the Back Plaza, perhaps more appropriately referred to as Courtyard A-3, in association with the rest of the site. Due to the secluded nature of Courtyard A-3 in relation to the adjacent Upper Plaza, it is possible that Courtyard A-3 functioned as a preparation area for various rituals that occurred in Plaza A-2 or served as a residential area for servants or attendants who participated in the daily activities of the Upper Plaza. This research proposal for the Back Plaza outlines the methods that will be used to address the research topic.

BACKGROUND AND PREVIOUS INVESTIGATIONS

Other than mapping, no work has been conducted in the Back Plaza. However, the Chan Chich Archaeological Project (CCAP) has conducted five seasons of research in the adjacent Upper Plaza. Archeological excavations at the site did not take place until the late 1990s (Houk 2012). The 1997 season of excavation in the Upper Plaza uncovered a Middle Preclassic midden and a Terminal Preclassic royal tomb with various artifacts (Houk et al. 2010). The tomb, designated Tomb 2, contained human remains, jade artifacts, ceramic vessels, a serpent-shaped wooden object, and a jade helmet bib pendant (Robichaux 1999). The following field seasons in 1998 and 1999 focused on expanding the Tomb 2 excavations and conducted excavations at Structure A-13 and Structure A-1 (Robichaux 2000). The CCAP suspended operations after the 2001 season, and a hiatus of several years ensued.

The Upper Plaza was not excavated again until 2012, when the CCAP resumed. The main goal of the CCAP Upper Plaza research in 2012 was gathering preliminary data on the construction history of the plaza itself (Kelley et al. 2012). During the 2013 season of the CCAP, units working in the Upper Plaza built on the 2012 results to clarify further the plaza's construction history (Kelley et al., this volume). Although extensive fieldwork has been conducted in the Upper Plaza, no one has excavated in the Back Plaza.

DESCRIPTION OF CHAN CHICH AND THE BACK PLAZA

The main site core of Chan Chich is situated on a north-south axis. The North Plaza, Structure A-5, the Main Plaza, Structure A-1, the Upper Plaza, Structure A-15, and the Back Plaza form the architectural spine of the site, extending in a 350-meter long block of contiguous

Vazquez, Edgar
2013 A Research Proposal for the Back Plaza at Chan Chich. In *The 2013 Season of the Chan Chich Archaeological Project*, edited by Brett A. Houk, pp. 93–100. Papers of the Chan Chich Archaeological Project, Number 7. Department of Sociology, Anthropology, and Social Work, Texas Tech University, Lubbock.

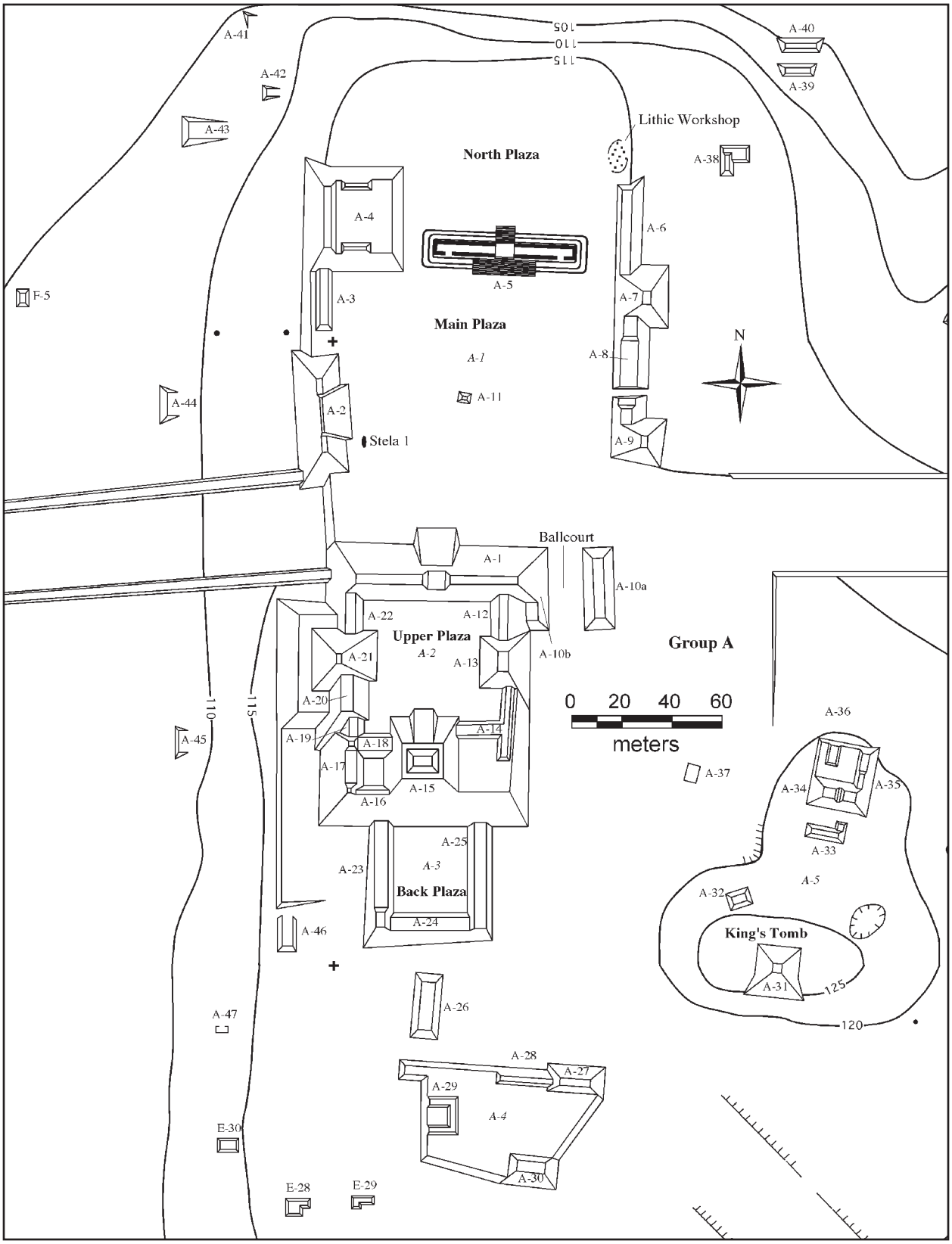

Figure 7.7. Map of the Chan Chich site core, courtesy of Brett A. Houk and CCAP.

monumental architecture from north to south. The Main and Upper Plazas (A-1 and A-2) are the core architectural features of the site (Houk et al. 1996). Chan Chich is organized into four groups of structures (Houk et al. 1996). Group A, the largest group, includes the three large plazas previously mentioned, several smaller courtyards, and a total of 37 structures (Houk et al 1996). Group A is constructed on a natural hill, while other groups are spread on smaller surrounding hills around the site's epicenter (Houk et al. 1996). Courtyard A-3, the Back Plaza, lacks the public space and accessibility seen in the Main Plaza and North Plaza because it is tucked away behind the Upper Plaza. However, Courtyard A-3 is part of the contiguous group of monumental architecture, and, therefore, arguably related to it in function.

Courtyard A-3 is directly behind (south of) Structure A-15 and below the Upper Plaza (Guderjan 1991). The southern side of the Upper Plaza's platform forms the northern side of Courtyard A-3, and three structures enclose the other sides of the group. Structures A-23, A-24, and A-25 are range buildings or substructures that surround the courtyard on the west, south, and east sides (Guderjan 1991). The courtyard itself measures approximately 29 m north-south by 34 m east-west (from the bases of the surrounding structures). Structure A-23 on the west side of Courtyard A-3 is approximately 49 m long. While Structure A-24 on the south side of the courtyard is approximately 51 m long and Structure A-25 on the east side is approximately 42 m long. These mounds are approximately two to three m high and 10 m wide. The vegetation of Courtyard A-3 mostly consists of palm trees approximately 2-3 m tall. These palm trees fill the floor space in Courtyard A-3.

Courtyard A-3 and its surrounding structures are approximately 10 m north of Structure A-26. Courtyard A-4 and its surrounding buildings, Structures A-27, A-28, A-29, and A-30, are approximately 45 m south of Courtyard A-3. There is no direct existing visible connection between Courtyards A-3 and A-4. However, the proximity and lack of other surrounding structures makes it probable that there were interactions between the occupants of the two groups.

RESEARCH DESIGN

To understand the form, function, and chronology of Courtyard A-3, one must first understand the functionality of plazas and courtyards. Plazas are integral parts of Maya cities and serve various functions. Plazas are open spaces, artificially leveled and paved which generally conforms to the natural ground level and tend to be rectangular in shape (Andrews 1975). The open space of plazas is an essential component of Maya cities (Andrews 1975). The function of a plaza usually determines its size and reflects the power of a city center. A Maya plaza is usually a large open ceremonial center in which large numbers of people could observe ritualistic activities. Plazas also served as cultural centers for the various sites in which they were situated. Plazas are considered public space due to their openness and accessibility to large portions of the public, while supporting some type of public function (Keller 2006). Public spaces are areas in which activities are easily visible to large portions of the community and are not restricted to a limited number of people. Public spaces supported the majority of city centers' activities from ritual, dance, sacrifice, procession, and market trade (Keller 2006), and were essential for community life (Andrews 1975). The Maya congregated, danced, prayed, offered sacrifice, exchanged various goods, and celebrated in public spaces like plazas (Keller 2006). Plazas also became vital functions of some sites in collecting rainwater, which was drained into reservoirs (Andrews 1975).

Courtyards served as important sites for economic, social, and ceremonial activities (Johnston and Gonlin 1998). Unlike plazas, courtyards served a wider range of functions. Courtyards are leveled and paved open spaces that are solely defined by the buildings or walls which surround them (Andrews 1975). Courtyards vary considerably in size but are smaller than plazas and well defined (Andrews 1975). There are multiple types of courtyards: elite courtyards, residential courtyards, domestic courtyards, and royal residential courtyards. Courtyards can serve as both public and private spaces, depending on building associations and level of accessibility. Courtyards cannot be thought of as separate from the structures that define them, and a courtyard's defining characteristics lie in the specific relationships with the surrounding building elements (Andrews 1975). There would have likely been a differentiation in activities being carried out between the more public and restricted sides of structures, owing to the large degree of architectural investment in defining these spaces (Robertson et al. 2006). The lack of entrances and accessibility into Courtyard A-3 reveals its private functions.

Although there are no other courtyards or plazas that are exactly like Courtyard A-3 at Chan Chich, there are others that share similar characteristics at other sites. By analyzing the similarities to courtyards at Minanha and Xunantunich from which we have excavation data, a closer understanding of the function of Courtyard A-3 may become more evident.

Minanha, a small center on the Vaca Plateau, contains two restricted access courtyard groups, Group L and Group M (Figure 7.2). Like Courtyard A-3, Groups M and L are attached to and directly behind monumental architecture. Groups M and L are attached to the North Acropolis (St-Hilaire 2011). Group L most likely served versatile supportive functions for the North Acropolis, ranging

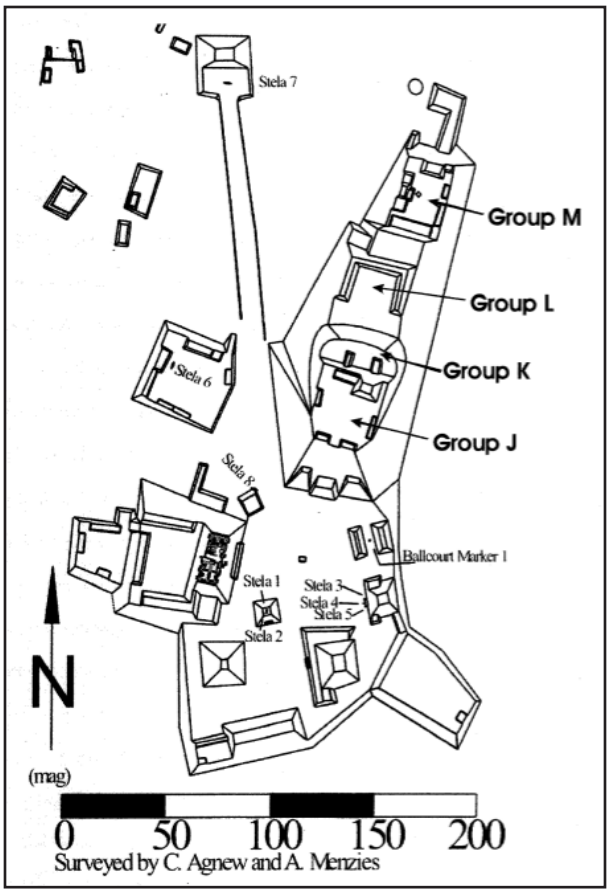

Figure 7.2. Map of Minanha with Groups L and M indicated in the acropolis (after Paauw 2007:Figure 5).

from administrative to ritual to domestic (St-Hilaire 2011). These functions are not mutually exclusive. Group M provides another possible function similar to Courtyard A-3. Domestic activities, such as food preparation could have taken place in a centralized kitchen located in the courtyard of Group M (St-Hilaire 2011). Ceramic assemblages from both groups suggest domestic and ceremonial activities. In Group L and Group M, the ceramic assemblages consisted of utilitarian, serving, and ceremonial vessels.

Group C at Xunantunich is also similar to Courtyard A-3 at Chan Chich, since both are behind monumental architecture (Figure 7.3). Like Courtyard A-3 at Chan Chich, Group C at Xunantunich is at the end of a long block

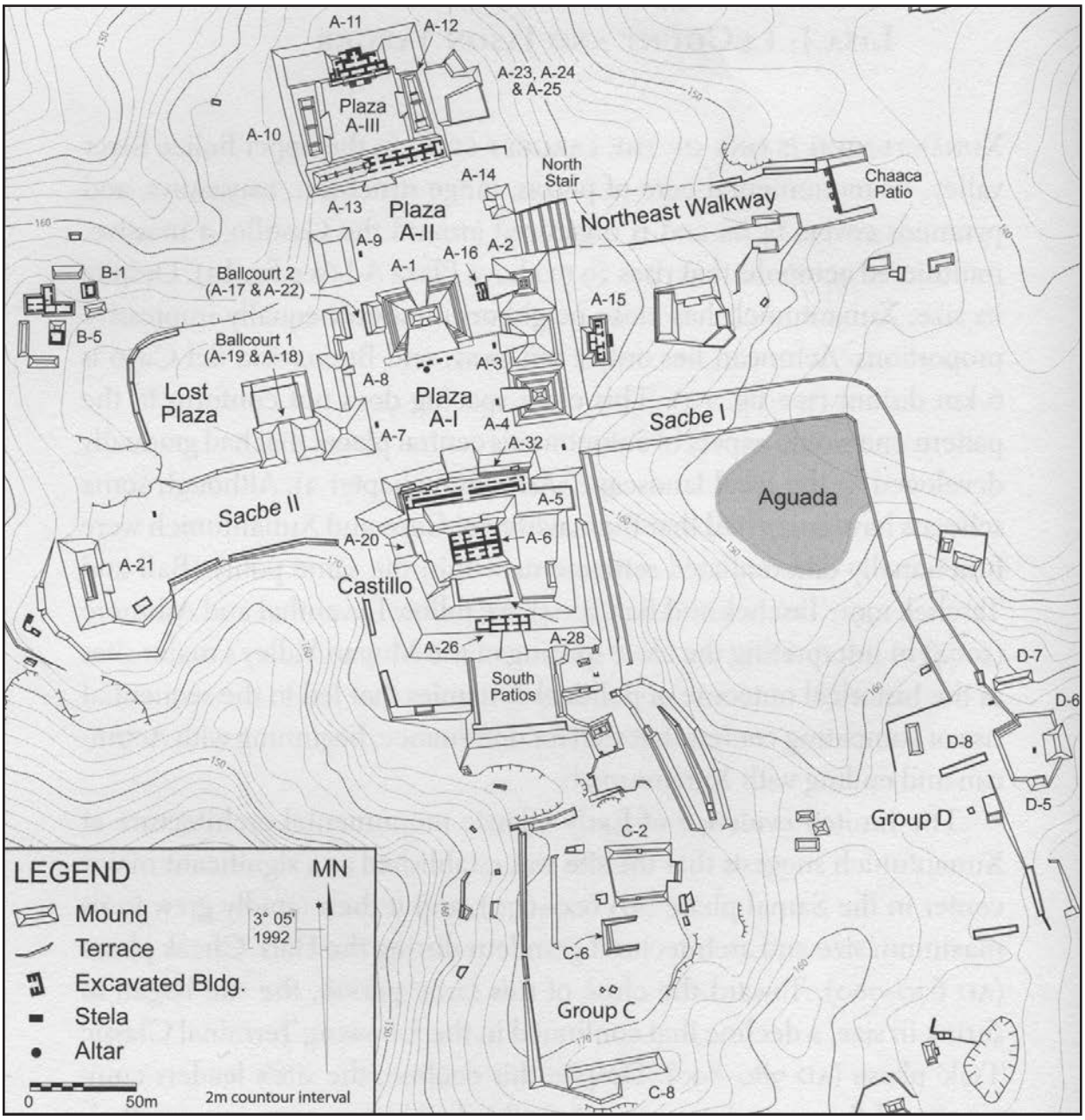

Figure. 3 Map of Xunantunich site core (after LeCount and Yaeger 2010:Figure I.1).

of continuous monumental architecture from north to south. Group C at Xunantunich is behind El Castillo. Group C at Xunantunich is connected by a wide stairway that provides direct access to El Castillo (Jameson 2010). Although Group C was separated from El Castillo, the connection of the stairway reveals the importance of association between the two. Group C might have been a staging and preparation area for various ritual activities on the Castillo (Jameson 2010). This relationship can be applied to that of Courtyard A-3 and Structure A-15.

Research Questions

The following research questions are designed to assess the form, function, and chronology of Courtyard A-3.

- How many construction episodes are present at Courtyard A-3 and what are their ages?
- During which time period was Courtyard A-3 used the most?
- What are the various ages of the surrounding structures and their construction phases?
- How many construction episodes are present at each of the surrounding structures?
- During what construction episode of each structure is there the largest amount of construction?
- What is the architectural layout of each of the surrounding structures?
- Are middens present behind any of the structures?
- Are there any visible relationships between Courtyard A-3 and Courtyard A-4 and its surrounding structures?
- How is Courtyard A-3 related to the rest of the site and specifically the Upper Plaza?

Methodology

The proposed excavations would take place over one 28-day field school session. Based on other field schools, during this time frame it should be possible to excavate approximately 20–30 m^2 excavation area to 1–1.5 m deep (approximately 20–45 m^3). Research methods will include units in the middle of Courtyard A-3 and on Structures A-23, A-24, and A-25, and shovel testing. Structural excavations will begin with centerline units, and subsequent excavations will be added at the discretion of the site director and depend on the quality and condition of the architecture found. Artifacts found will be processed accordingly to proper lab methods. These lab methods will be based on methods used during CCAP 2012 and 2013 (see Nettleton, this volume).

Courtyard Test Pit

A 2-x-2-m test pit in the center of Courtyard A-3 will be excavated to bedrock. This will provide chronological information for the courtyard, including the number and ages of construction phases.

Structure Excavations

Centerline units on Structures A-23, A-24, and A-25 will expose the final phase of architecture. Initial units will measure 2 x 4 m, but contiguous units may be necessary to reach from the base of each structure to the top. Excavations will terminate at the final phase of intact architecture. On one of the structures, the initial centerline unit we will be excavated to bedrock at the base of the structure to look for a cache, which will provide dateable material. Based on the initial excavations, the architectural excavations may be expanded to expose additional architectural features. At the discretion of the CCAP project director, one or more units may penetrate the final architectural phase to collect additional construction sequence data.

Shovel Testing

Shovel testing will be another methodology that will be used. Shovel tests will be excavated behind the structures to find potential middens. Shovel tests will be placed at 5-m intervals behind the three structures to create a grid extending from the base of the mounds to 10 m out from the base. If a midden is found, 1-x-1-m units will be opened to sample the midden. Middens may provide important information on the function of Courtyard A-3.

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The Chan Chich Archaeological Project: 1996 to 2013 Project Lists

Compiled by Brett A. Houk

Archaeological projects generate an annoying number of lists. This chapter includes lists of sites, operations, tombs, burials, and stone monuments recorded by the Chan Chich Archaeological Project (CCAP) since its inception in 1996 and is meant to serve as a reference document for future seasons.

SITES

Table 7.1 lists Maya sites on and near the Gallon Jug property with Belize Estates (BE) designations. As noted by Sandrock (this volume), the Belize Estates Archaeological Survey Team assigned BE numbers to previously named sites and to newly discovered sites with four or more structures, the tallest of which must be at least 4 m high including structure and substructure or basal platform, that are not within 1 km of another recorded site BE site.

Table 7.1. Recorded BE Sites

BE #	Site Name	Original Source	UTM N	UTM E
1	Chan Chich	Guderjan (1991)	N 19 40 412	E 2 75 875
2	Kaxil Uinic (E'kenha)	Guderjan et al. (1991)	N 19 40 538	E 2 73 381
3	Punta de Cacao	Guderjan et al. (1991)	~N 19 46 100	~E 2 86 700
4	Gallon Jug	Guderjan et al. (1991)	~N 19 43 900	~E 2 83 450
5	Laguna Verde	Guderjan et al. (1991)	~N 19 47 250	~E 2 80 500
6	Laguna Seca	Guderjan et al. (1991)	~N 19 50 850	~E 2 84 000
7	Quam (Qualm) Hill	Guderjan et al. (1991)	~N 19 57 300	~E 2 87 500
8	Wamil	Guderjan et al. (1991)	~N 19 39 900	~E 2 94 900
9	Sierra de Agua	Guderjan et al. (1991)	~N 19 40 600	~E 2 99 500
10	Gongora Ruin	Guderjan et al. (1991)	~N 19 54 300	~E 2 93 500
11	Ix Naab Witz	Sandrock (this volume)	N 19 55 187	E 2 85 854
12	La Luchita	Sandrock (this volume)	N 19 50 011	E 2 77 178
13	Montaña Chamaco	Sandrock (this volume)	N 19 51 187	E 2 75 043
14	Sylvester Camp	Sandrock (this volume)	N 19 45 510	E 2 78 128

Houk, Brett A. (compiler)
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In addition to prehistoric sites, a number of historic sites are present in and near the BEAST survey area. Table 7.2 includes a list of those visited by the CCAP or BEAST or reported by other researchers.

Table 7.2. Known and Reported Historic Sites

Name	Location	Description	Source(s)
Kaxil Uinic Village	Approximately 500 m south of BE-2 on Yalbac Ranch.	In 2012, the CCAP relocated the remains of the historic Maya village and chicle camp known as Kaxil Uinic and its associated aguada. The Belize Estates Co. closed the village in 1931.	Houk (2012); Thompson (1963)
Quam Hill Village	Immediately east of Cedar Crossing on the east bank of the Río Bravo.	A 150-x-60-m scatter of historic artifacts that likely represents the location of Quam Hill (or Quam), which was "the seasonal headquarters of the British Honduras Company during the mid 1800s" (Cackler et al. 2007:124). Quam is historically important as the site of a "Chichina" Maya raid led by Marcus Canul in 1865 (Bristowe and Wright 1888:27–28).	Bristowe and Wright (1888:27–28); Cackler et al. (2007:124)
El Infierno logging camp	Reportedly 1 km east of Guatemala border, northwest of Gallon Jug	This site is mentioned in reference to the location of the Maya site of El Infierno, which is described as "behind" the logging camp; no other details provided.	Guderjan et al. (1991:61)
Unnamed	Approximately 75 m southwest of BE-13, 50 m west of a swamp	A possible abandoned chiclero camp was located nearby, as evidenced by a small collection of bottles.	Sandrock (this volume)

CHAN CHICH CONTROL POINTS

Table 7.3 lists the UTM coordinates for important mapping control points at Chan Chich. Most of the points described are marked with metal surveyor spikes or large nails. Elevations are given for the top of the spike or nail. All points are OPUS corrected.

Table 7.3. Chan Chich Control Point UTM Coordinates

Point	Description	Northing	Easting	Elev (m)
Main Site Datum (2012)	Spike in asphalt near pavement's edge between bar and Structure A-1	1940412.85	275875.56	118.72
Structure A-1 Central Datum	Spike in central landing, summit of Structure A-1	1940390.29	275877.30	129.49
Structure A-1 East Datum	Eastern summit of mound	1940385.65	275895.98	131.76
Structure A-1 West Datum	Western summit of mound	1940395.39	275847.77	131.27
Structurea A-4 Datum	Western summit of mound	1940535.23	275863.09	126.02
Structure A-5 Central Datum	N1010 E1030 in local A-5 grid	1940519.90	275904.50	123.01

Table 7.3. Chan Chich Control Point UTM Coordinates (continued)

Point	Description	Northing	Easting	Elev (m)
Structure A-5 West Datum	Western summit of mound	1940523.61	275891.81	122.95
Structure A-8 Datum	Summit of mound	1940494.17	275964.4	126.30
Structure A-9 Datum	Summit of mound	1940434.43	275958.13	126.41
Upper Plaza West Datum	East of Structure A-21	1940358.03	275857.15	125.99
Upper Plaza Southeast Datum	In southeast corner of plaza	1940337.89	275891.17	126.11

OPERATIONS

To date, the CCAP has only conducted excavations at Chan Chich and Kaxil Uinic. Operations numbers are assigned sequentially by site, preceded by a site abbreviation. Thus, the first operation at Chan Chich is designated CC-1. Table 7.4 lists the operations that have been assigned through the 2013 season.

Table 7.4. List of Operations at Chan Chich and Kaxil Uinic

Op	Season	Definitions	Subops	Source(s)
CC-1	1997	Excavations on the northern stairs of Structure A-1	A–C	Houk (1998)
CC-2	1997	Excavations at the Upper Plaza	A–J	Robichaux (1998)
CC-2	1998	Excavations at the Upper Plaza, including landing of Structure A-1	K–W	Robichaux et al. (2000)
CC-2	1999	Excavations at the Upper Plaza including summits of Structures A-1 and A-13	X–AK	Robichaux (2000)
CC-3	1997	Excavations at the ball court	A–E	Ford (1998)
CC-4	1997	Test pits in Group C	A–C	Meadows (1988)
CC-4	1998	Test pit in Plaza C-2	D	Ford and Rush (2000)
CC-5	1998	Excavations at Courtyard C-1	A–L	Ford and Rush (2000)
CC-6	1998	Excavations at Group H	A–F	Meadows and Hartnett (2000)
CC-7	1999	Excavations at Structure C-6	A–E	Harrison (2000)
CC-8	1999	Excavations at Structure A-11	A–B	Houk (2000)
CC-9	2001	Excavations at Plaza C-2	A–M	Unpublished field notes
CC-10	2012	Excavations at the Upper Plaza	A–F	Kelley et al. (2012)
CC-10	2013	Excavations at the Upper Plaza	G–T (plus Ix)	Kelley et al. (this volume)
CC-11	2013	Excavations at Structure A-5	A–O, N–R (plus Fx)	Herndon et al. (this volume)
KU-1	2012	All excavations at Kaxil Uinic in 2012	A–H	Harris and Sisneros (2012)

SPECIAL DEPOSITS

Over the course of seven seasons of research, the CCAP has excavated one tomb and 10 burials, but no caches. Table 7.5 lists the burials thus far recorded, and Table 7.6 lists the tombs documented at the site, including a looted tomb first recorded by Guderjan (1991).

Table 7.5. List of Burials

Burial #	Season	Provenience	Context	Source(s)
1	1997	CC-4-A-3	Primary burial in Late Preclassic fill, Courtyard C-1	Meadows (1998)
2	1997	CC-2-J-6	Tomb 2, Terminal Preclassic burial in Upper Plaza	Houk et al. (2010)
3 (4, 6)	1998	CC-5-C-3, -H-2	Secondary scatter of human bone associated with surface deposit of artifacts on steps of Structure C-2; Terminal Classic (?). Burials 3, 4, and 6 combined by Frank and Julie Saul into Burial 3.	Ford and Rush (2000)
5	1998	CC-6-C-9	Late Classic (?) primary burial beneath Courtyard H-3	Meadows and Hartnett (2000)
7	1998	CC-4-D	Secondary scatter of human bone associated with surface deposit of artifacts on steps to Structure C-6; Terminal Classic (?)	Ford and Rush (2000)
8	1999	CC-7-B	Primary Terminal Classic burial beneath bench in Structure C-6	Harrison (2000)
9	2001	CC-9-G-7	Primary burial of a child in Structure C-12 patio; Late Classic (?)	Unpublished field notes
10	2012–2013	CC-10-A-8 (extends into CC-10-G)	Primary (?) subfloor burial, poorly preserved; early Late Preclassic	Kelley et al. (this volume)

Table 7.6. List of Tombs

Tomb #	Season	Provenience	Location	Source(s)
1	--	Structure C-31	Looted tomb referred to as the King's Tomb; Late Classic (?)	Guderjan (1991)
2	1997–1999	Upper Plaza, CC-2-J-6	Tomb 2, Terminal Preclassic tomb in Upper Plaza	Houk et al. (2010); Robichaux (1998, 2000); Robichaux et al. (2000)

STONE MONUMENTS

Table 7.7 lists the stone monuments recorded within the CCAP and BEAST project areas. To date, no monuments with legible texts or dates have been found in the area. The only monument with evidence of carving is Stela 1 at Kaxil Uinic (see Harris and Sisneros 2012; Thompson 1939).

Table 7.7. Recorded Stone Monuments in CCAP/BEAST Project Area

BE #	Site	Monument	Location	Description	Source(s)
1	Chan Chich	Stela 1	Main Plaza, base of Structure A-2	Uncarved and burned stela	Guderjan (1991:43)
2	Kaxil Uinic	Stela 1	Main plaza, base of Structure 3	Broken in two pieces, heavily eroded stela with evidence of carving, illegible; 1.95 m tall, 80 cm wide, 55 cm thick	Guderjan et al. (1991); Harris and Sisneros (2012:52); Thompson (1939)
		Altar 1	Main plaza, base of Structure 3	Round, limestone altar (ca. 130 cm diameter; 30 cm thick), uncarved	Guderjan et al. (1991); Harris and Sisneros (2012:56–56); Thompson (1939)
3	Punta de Cacao	Stela 1	Plaza A, near base of Structure A-5	Uncarved stela	Robichaux (2004:200)
		Possible stela or altar	Plaza A, in front of Structure A-5	Large, uncarved block of stone, 82 x 82 x 40 cm, broken into two parts.	Hartnett (2005)
4	Gallon Jug	Stela 1	Main plaza	Very small stela that may not actually be a monument, only 45 cm high	Sandrock (this volume)
7	Quam Hill	Stela 1	Northeastern corner of Plaza A	Uncarved stela, laying flat; 1.8 m long, 0.6 m wide, and 0.4 m thick	Cackler et al. (2007:121)
		Altar 1	Plaza B	Broken in half, plain altar measuring 1.5 m in diameter and 1 m thick	Cackler et al. (2007:123)
10	Gongora Ruin	Stela 1	In plaza in front of Structure 1	Small, uncarved stela	Guderjan et al. (1991:81)
11	Ix Naab Witz	Stela 1	Upper plaza near southwestern corner of Structure 6	Small, uncarved stela, 1.05 m tall, 40–60 cm wide, 35 cm thick	Sandrock (this volume)

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