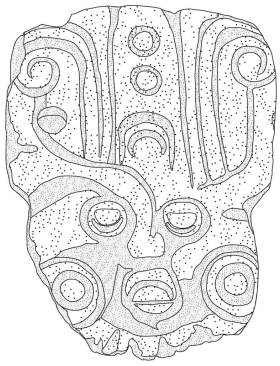
Investigations of the Belize River East Archaeology Project:
A Report of the 2018 and 2019 Field Seasons



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Preface and Acknowledgements

Eleanor Harrison-Buck

The Belize River East Archaeology (BREA) project was initiated in January 2011. In the last nine years of fieldwork, our investigations of the BREA study area—a 6000 km^2 region encompassing the lower half of the Belize Watershed—has proven to be an extraordinary research area rich with pre-Hispanic and Colonial history. This report details our field work (survey, mapping, excavation, analytical findings, and museum development work) from 2018 and 2019. We based in Crooked Tree village and held two short three-week field seasons during January 2018 and 2019. I am fortunate to have an amazing group of staff whose hard work made these field seasons so successful. Between 2018-2019, the following staff members joined BREA in the field—David Buck, Jessica Craig, Grace Dietz, Kelin Flanagan, Adam Keading, Satoru Murata, Lori Phillips, Ryan Rybka, Katie Shelhamer, and Astrid Runggaldier. Each of these staff members offered different areas of expertise—from survey and mapping to lab and excavation—and I am grateful for all their help.

I owe a large note of appreciation to the entire BREA staff for sharing their expertise and offering our students valuable training during a January field school held in 2019. During the January 2019 season, seven undergraduate students from the University of New Hampshire (UNH)— Julia King, Max Sweesy, Casey Flaherty, Courtney Santos, Dana Sher, Kate Varney, Alicia Watkinson—joined the BREA project as part of an "Archaeological Survey and Mapping in Belize" course. These students joined the project and were trained by BREA staff in survey and excavation techniques. All of the student participants offered an enormous contribution to the field project and we thank them for their enthusiasm and participation on the BREA project.

BREA staff did a superb job of training our undergraduate students in both field and lab techniques. Using our two Total Stations, Satoru Murata and Adam Kaeding produced a beautiful topographic map of Ek'tok and trained our trained our students well. Digitizing and map-making in GIS was greatly facilitated by the masterful work of Dr. Marieka Brouwer Burg, our GIS specialist on the BREA project who also helps us to organize all the digital files (GIS, photos, drawings, etc). UNH undergraduates Katie Titus and Max Sweesy helped to scan and digitize the notes and excavation drawings presented in this report. I am also grateful to Ms. Lori Phillips for serving as the lab director for BREA in January 2018 and 2019. During the summer of 2019, both she and Dr. Astrid Runggaldier came down to Belize and devoted six weeks to processing and recording artifacts in the lab. In addition, we got the chance to analyze some of the material culture, including the ceramics, fauna, and small finds from previous BREA excavations. I am grateful to them for the endless amounts of time they devoted to working on the artifacts, always with diligence and non-stop attention to detail.

I also want to thank the many interdisciplinary specialists who have joined the BREA project during the 2018-2019 seasons. Ms. Lori Phillips served as our faunal specialist and is

working on a long-term study of the BREA animal remains as part of her dissertation research. We are happy to have her on board and grateful for the assistance of her mentors Dr. Erin Thorton of Washington State University and Dr. Kitty Emery of the University of Florida. During the spring 2018 season, we were happy to have Mr. Mark Willis join the BREA project. He generously provided *pro bono* his skill and his time, carrying out photogrammetry work on a selection of artifacts on display at the Museum of Belize. Mark created beautiful 3-D replicas that are now on display in the Crooked Tree Museum. I am grateful for the endless amount of time he spent post-processing the data to create the 3-D replicas – they're beautiful! We are grateful to Dr. Gabriel Wrobel of Michigan State University for analyzing the human remains from the site of Chikin'Chi Ha'. Additionally, we welcomed to the project specialists Drs. Timothy Beach, Sheryl Luzadder-Beach, and Samantha Krause, who joined BREA during the summer of 2019 to initiate a long-term investigation of the wetland features.

During AY 2017-2018, I was awarded a Whiting Public Engagement Fellowship and spent the year developing the Crooked Tree Museum and Cultural Heritage Center. The museum presents the deep history of human-environment interaction through time which BREA has spent the last nine years documenting in the lower half of the Belize River Watershed. Dr. Sara Clarke-Vivier of Washington College was part of this project from the beginning, devoting countless hours to helping me develop the exhibition content and providing her expertise in museum education. I am truly grateful for her support and commitment to this project. I am also grateful to Ms. Lori Philips, Dr. Astrid Runggaldier, and Ms. Katie Shelhamer—an all-star team who joined us for the month of June to assist in the installation of the exhibition. This group worked around the clock in the days leading up to the June 30 Opening. I would also like to thank Mr. John Gillett, the Chairman of Crooked Tree village, and the entire village council who offered their support and time, bringing this idea of a permanent museum to fruition. I also wish to thank Mr. Mark Lee for his expertise in exhibition design and installation and Mr. Lorin Pollard for his graphic work on the panels. There are a whole host of people from Crooked Tree (too many to name) who deserve a great deal of thanks and recognition, including the builders, craftsman, teachers, elders, and numerous other community members who all offered incredibly valuable contributions. I am particularly grateful for Mr. George Moody of Mitchell and Moody, Associates who generously provided the architectural plans and oversight of the building renovation. The museum opened June 30, 2018 and was a wonderful event! To celebrate the year anniversary of the museum's opening, BREA hosted with the community a series of public programming events during the month of June in 2019. One of the major events included a teacher's workshop, which was facilitated by Dr. Sara Clarke-Vivier and co-sponsored by the Crooked Tree Museum and the Banquitas House of Culture in Orange Walk Town.

I am particularly grateful to the two youngest members of the BREA team—my daughters Eliza & Natalie—who joined us during our field seasons in 2018 and 2019 (despite missing a little bit of school). As usual, they climbed pyramids, helped wash artifacts, and, as always, provided much joy in our camp, making us laugh each day! Our work in Belize would not have gone so smoothly without the tireless efforts of our hosts at Tillett's Village Lodge. The

Tillett Family at the Tillett's Village Lodge welcomed us to their village and their home in Crooked Tree. Ms. Judy Tillett kept us well fed. We looked forward to her fabulous homecooked dinners each night and are grateful for their warm and friendly hospitality. We are truly grateful for all their efforts and for making us feel right at home.

Many local Belizeans offered assistance in our fieldwork. Help with excavation and reconnaissance was provided by Cardinal Baptiste, Charles Canton, Rodwell Conorquie, Miles Crawford, Richard Crawford, Roman Crawford, Ruben Crawford, James Flowers, Stanley Flowers, Jordan Swasey, Brady Tillett, Bruce Tillett, Dudley Tillett, and Jaaziniah Wade. Linda Codd and Judith Wade washed and cataloged artifacts in the BREA field lab and Marv Tillett helped us with excursions outside of Crooked Tree. We are grateful to all of these individuals and the many residents of Crooked Tree who warmly welcomed us during our stay in the village. We are especially grateful for the support of the Crooked Tree Village Chairman, Mr. John Gillett, and to the entire Village Council who welcomed us and permitted us to map and excavate sites in and around their community. Moreover, they partnered with us in the development of the Crooked Tree Museum and Cultural Heritage Center. We look forward to returning in the future!

The museum and our BREA research conducted during the 2018-2019 seasons would not have been possible without the generous support of the Whiting Foundation and the Alphawood Foundation. I am deeply grateful for the continued support of Alphawood who has provided BREA funding through 2020. In addition, the University of New Hampshire (UNH) sponsored the BREA archaeological field school, which provided additional support for the project. Many individuals from UNH deserve a large note of thanks for their help in facilitating the logistics and finances of this research project, namely Carol Main, Trisha Jennison, Angela Prescott-Bell, and many others in the Purchasing Department and Office of Financial Affairs at UNH. I also appreciated all the efforts and hard work of Jim Parson, who formerly served as the Director of the COLA Center for Study Abroad and managed a slew of wonderful programs sponsored through UNH, including this one. I am especially grateful to Carolyn Stolzenburg who provided continuous administrative support before, during, and after the three field seasons in 2016 and 2017. I also wish to thank Dr. Meghan Howey, the Chair of the Anthropology Department and a valued colleague and friend. She has supported the project over the years in various ways, including letting me borrow her Top Con Total Station every season – thank you! My permit for the BREA study area was granted by the Belizean Institute of Archaeology as part of the National Institute of Culture and History. I am grateful to the Institute staff, including Melissa Badillo, Delsia Marsden, Antonio Beardall, and especially the Director of the Institute, Dr. John Morris, for all his guidance, encouragement, and continued support for my BREA project.

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Investigations of the
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Edited by Eleanor Harrison-Buck

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Chapter 1

Introduction to the BREA 2018-2019 Seasons: Investigations in the Lower Reaches of the Belize River Watershed

Eleanor Harrison-Buck

The Belize River East Archaeology (BREA) study area encompasses the watershed of the eastern half of the Belize River Watershed, between Belmopan and Belize City, and represents an area measuring roughly 6,000 sq. km (**Figure 1.1**). This report of the BREA project documents our most recent archaeological investigations from three different field seasons that were conducted in the course of roughly a year and a half, between January 2018 and July 2019. The four field seasons reported on here include a three-week January 2018 season, which extended from January 1-23. Our work during the summer season in 2018 was primarily focused on the development of a community archaeology museum in Crooked Tree Village, which we have reported on elsewhere (see Harrison-Buck et al. 2019; Harrison-Buck and Clarke-Vivier 2020). The Crooked Tree Museum and Cultural Heritage Center opened in June 2018 and offers the public a visual record of the BREA project investigations, documenting the deep history of the lower Belize River Watershed from Preceramic to Colonial times. BREA held another short three-week field season from January 1-21, 2019 and a fourth and final six-week summer season from May 25 to July 7, 2019, which combined both field and lab work. While each of these field seasons was relatively brief, they were all incredibly productive. Since 2015, the BREA project has devoted most of our time to investigating the easternmost part of the Belize River Watershed, which comprises a low-lying coastal zone with numerous small creeks and tributaries along with sizeable tracts of perennial wetlands and lagoons (**Figures 1.1** and **1.2**). This report details the results of our survey, mapping, excavations, and analytical studies that were undertaken in this area between 2018-2019.

Background to the Research

Over the course of nine years (2011-2019), our investigations of the BREA study area have identified a dense occupation and a long history of settlement in the middle and lower Belize River Watershed (**Figure 1.2**), extending from Preceramic to Colonial times, ca. 8000 BC-AD 1950 (Brouwer Burg, Harrison-Buck, Rung 2014; Brouwer Burg, Harrison-Buck, and Runggaldier 2015; Brouwer Burg, Runggaldier, and Harrison-Buck 2016; Harrison-Buck, ed. 2011, 2013, 2015a, 2015b, 2018; Harrison-Buck, Brouwer Burg et al. 2015, 2016; Harrison-Buck, Clarke-Vivier, Kaeding, and Phillips 2019; Harrison-Buck, Craig, and Murata 2017; Harrison-Buck, Kaeding, and Murata 2013; Harrison-Buck, Murata, and Kaeding 2012;

Harrison-Buck, Willis, Murata, and Brouwer Burg 2020; Harrison-Buck, Willis, Murata and Craig 2018; Harrison-Buck, Willis, Walker 2016; Runggaldier et al. 2013).

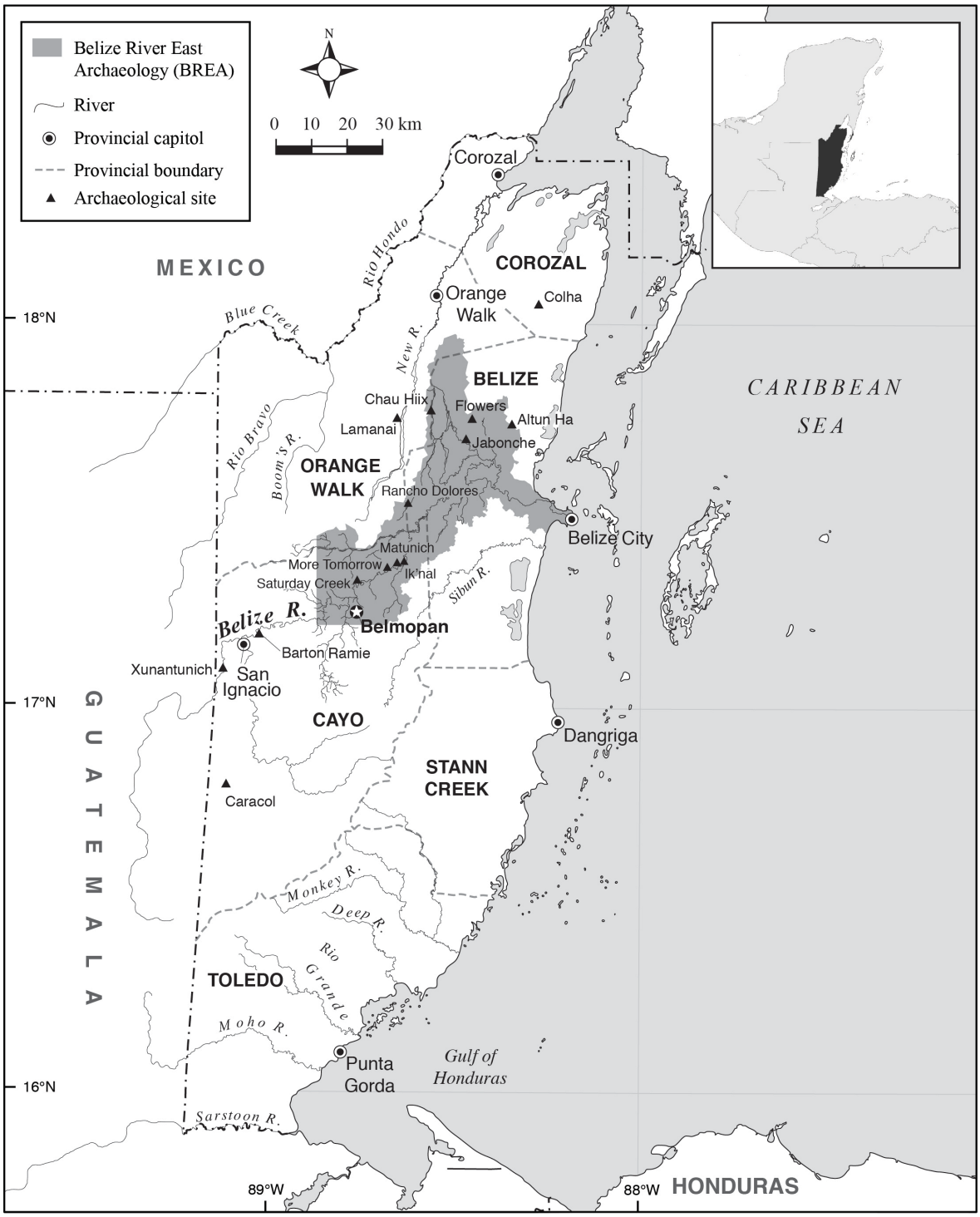

Figure 1.1 Map of Belize showing BREA study area (map prepared by M. Brouwer Burg).

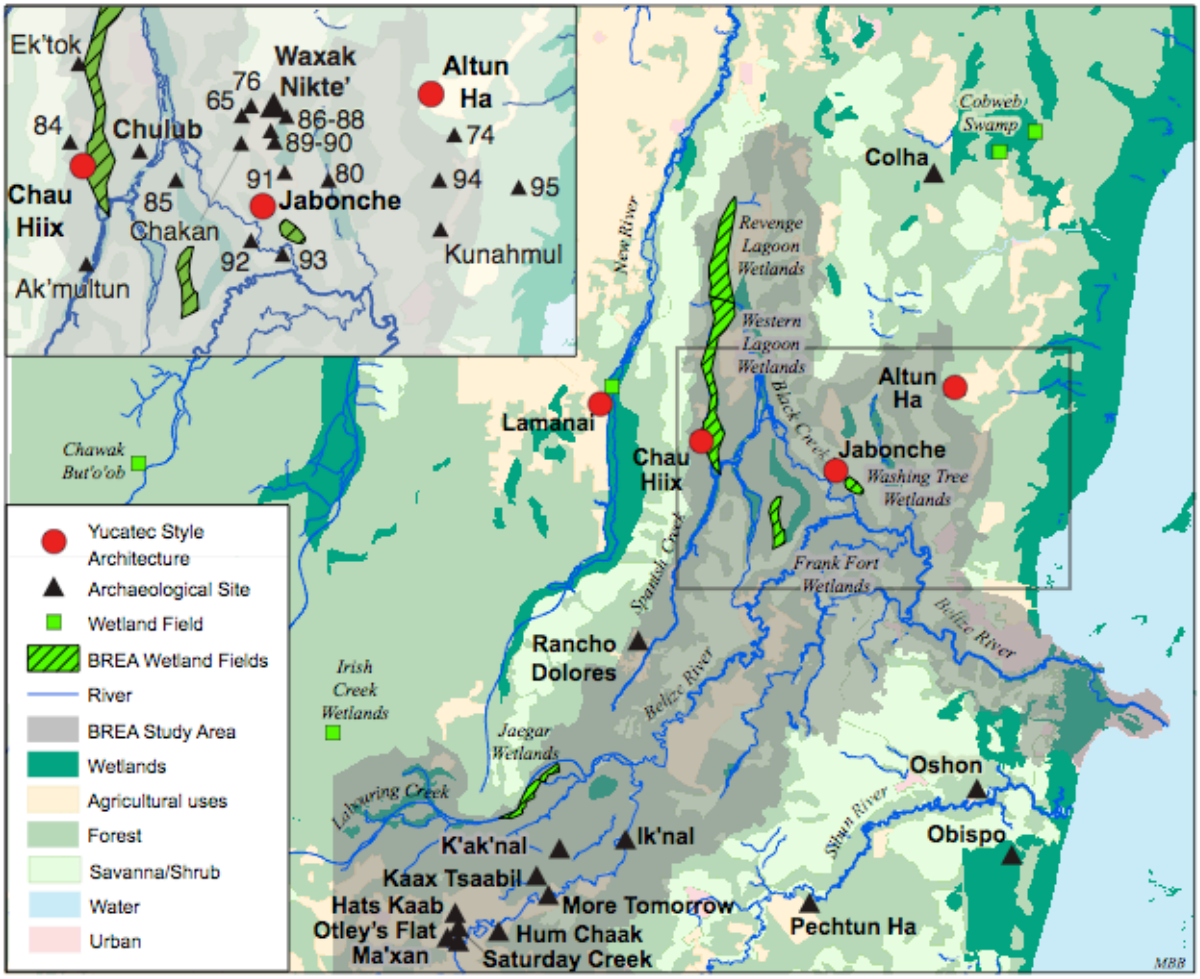

Figure 1.2 BREA study area showing Maya sites in the middle and lower Belize River Watershed (map prepared by M. Brouwer Burg).

Between 2011-2019, the BREA project has identified roughly 2500 Maya mounds representing nearly 100 different sites in the middle and lower Belize River Watershed, the majority of which were not previously reported or documented archaeologically. These sites range in size, from small house lots to larger centers with ballcourts and pyramidal architecture. We have mapped a number of these sites, including some of the larger centers (Chikin' Chi'Ha; Kaax Tsaabil, Saturday Creek, Hats Kaab, Ma'xan, More Tomorrow, Jabonche and Ek'tok) and a number of the smaller plaza groups (Hum Chaak, Ik'nal, Ta'as Mul, and Ma'tunich, and Chulub) using a Total Station (refer to **Figure 1.1**). In addition, these sites have been recorded with a handheld GPS unit and sketch mapped. All site data has been inputted into our master BREA GIS database.

The sites are primarily located along the main trunk of the Belize River, but some sites also have been found along tributary creeks and lagoons to the north and south of the river. For

instance, the sites of Ek'tok and Chulub are located along the seasonally inundated lagoon and wetland systems in the Crooked Tree area (see **Figures 1.1 and 1.2**). In recent years, our reconnaissance has focused on the lower part of the Belize River Watershed, specifically in the hinterland to the north and south of Chau Hiix, one of the largest Maya sites in this part of the BREA study area. Chau Hiix is situated along the Western Lagoon Wetland, the largest inland wetland in all of Belize, which is fed by Spanish Creek and (in the rainy season) by Black Creek. Between 2017-2019, BREA conducted intensive archaeological survey in the areas north and south of Chau Hiix, extending about a kilometer north of Ek'tok and as far south as Ak'multun on the western side of Spanish Creek (see inset on **Figure 1.2**). Unlike the uplands, we have found that settlement in this low-lying coastal zone is situated in relatively isolated pockets of higher ground. For instance, Jabonche—one of the largest sites that we identified and mapped between Chau Hiix and Altun Ha—is positioned on one of the few areas of high ground found along Black Creek, a tributary of the Belize River (Harrison-Buck, Brouwer Burg et al. 2016; Murata and Robinson 2015). The areas around Jabonche and other neighboring sites, such as Chulub, Ek'tok, Chakan, Waxak Nikte', and Kunahmul are surrounded by marginal land inadequate for farming. For this reason, I have argued that these sites were heavily reliant on the wetlands for agriculture, building ditched and drained fields (visible in satellite imagery), while also relying on these biologically-rich environments for hunting and aquaculture (Harrison-Buck 2014).

2018-2019 Field Work

This report is divided into three main sections detailing the fieldwork conducted during the 2018-2019 seasons. The chapters in "Section I" discuss fieldwork involving our archaeological survey, mapping and reconnaissance efforts. Chapters in "Section II" report on our investigations carried out at sites in the lower Belize River Watershed. Finally, the chapters in "Section III" present the analytical investigations that were carried out by our staff and specialists on the BREA project. Below, I provide an overview of each of these three sections and the chapter contributions included therein.

Section I: Survey, Mapping and Reconnaissance

Reconnaissance in the Lower Reaches of the Belize River Watershed

During January 2018 and 2019, we performed intensive reconnaissance to the north and south of Chau Hiix (**Buck and Murata, Chapter 2**). This included several days boating up the Spanish Creek in an effort to identify sites previously reported by locals, primarily situated along the western side of the creek where there is higher ground suitable for habitation. The east side

of Spanish Creek is predominantly wetland swamp and in my inspection of Google Earth imagery I have identified evidence for ancient wetland modification similar to the Western Lagoon wetlands, which I believe may have been used for aquaculture (see Harrison-Buck 2014). The BREA reconnaissance team also continued to conduct more intensive survey of ancient settlement in the area north of Chau Hiix, relocating some mounds mapped by Anne Pyburn's team and identifying many other new sites previously unidentified.

Mapping the Site Core of Ek'Tok

During the January 2019 season, we continued investigations at the site of Ek'Tok (see inset on **Figure 1.2**). Our mapping of this site began during the January 2017 field season (Murata, Gantos, Norris, and Buck 2018). We devoted three weeks in January 2019 to mapping more of this secondary ceremonial center, located roughly 1.5 km north of the Chau Hiix site center (**Murata and Kaeding, Chapter 3**). Anne Pyburn's team in the 1990s mapped the hinterland settlement for a little over a kilometer north of the Chau Hiix site center and caught the southern edge of the Ek'tok site, which appears to be a satellite center associated with Chau Hiix. Satoru Murata overlaid Pyburn's map onto what our survey team was able to map in January 2017 and was able to link the two by getting GPS points on some of the mounds that Pyburn mapped on the southern edge of Ek'tok (see **Figure 1.3**). The Ek'tok site consists of two pyramidal structures in the main plaza and a series of discrete residential plaza units (Plazas A-H). Using a Total Station and GPS, the BREA team was able to record detailed topographic information for more of the site core and more accurately tie in the site to our existing GIS map of the BREA study area (see **Murata and Kaeding, Chapter 3**).

Section II: Site Investigations

During the field seasons from 2018-2019, BREA carried out an extensive program of test excavations at three sites, two of which we mapped with a Total Station. Sites that were investigated include Ek'tok, Chulub, and and an historical site in Crooked Tree referred to as Tilletton. In addition, a series of test pits were excavated in several of the canal features found in the Western Lagoon Wetlands. The findings from all of these excavations are presented in the chapters in this report and are summarized below.

Excavations at the Historical Site of Tilletton in Crooked Tree Village

One of our goals during the January 2018 season was to further refine our understanding of the historical component of Crooked Tree. Many Belizeans commonly refer to Crooked Tree as one of the oldest (if not *the* oldest) Creole community in the country. When we asked about the location of the oldest part of the village, local informants pointed to the grounds of the Baptist Church, indicating that this was the site of the earliest village. Research in the Belize

Archives reinforced this local information, presenting a map from 1868 of this location and indicating it was called "Tilletton," so named from the William Tillett family who owned the property from the earliest historical occupation. With permission from the Village Council and Pastor of the Baptist Church, BREA carried out a three-week field season to investigate the church grounds for archaeological evidence of historical occupation. A systemic shovel test-pitting operation with regularly spaced postholes across the area confirmed the historical occupation of the area. Larger excavation units (Operations 37-40) were performed in areas with the highest concentrations of artifacts and the results of our investigations are reported herein (**Kaeding, Flanagan, and Craig, Chapter 4**).

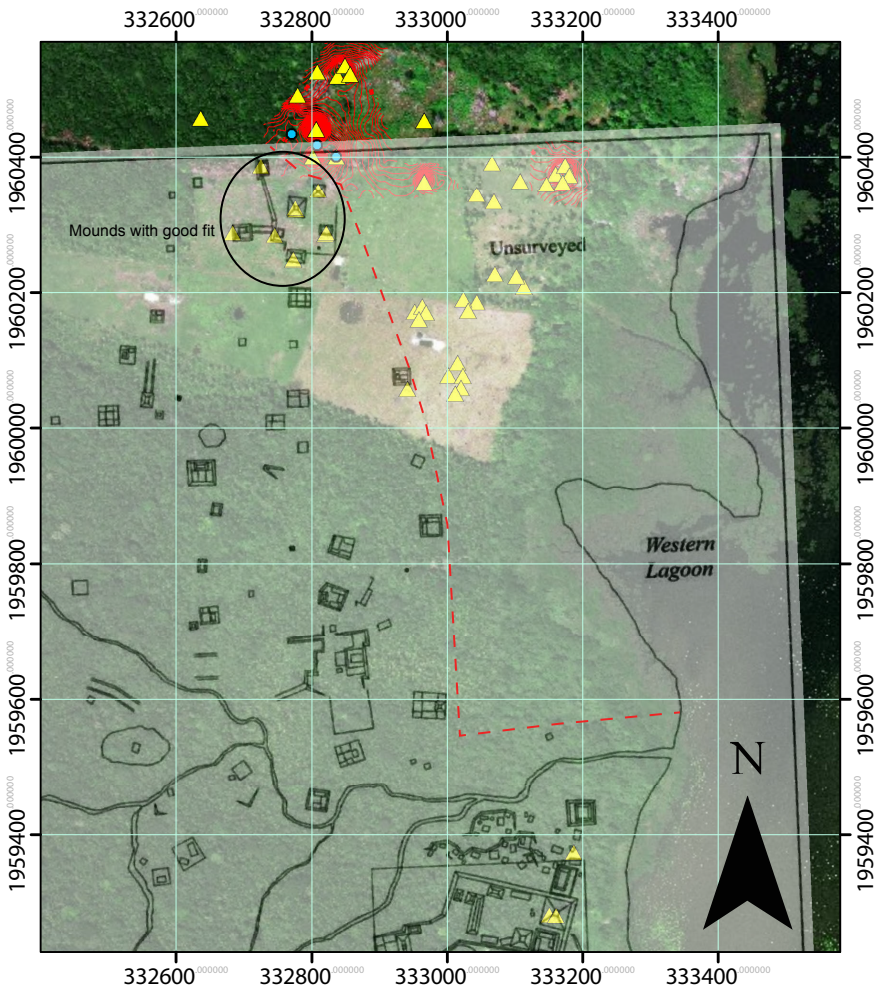

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Figure 1.3 Ek'tok (in red) to the north of Chau Hiix with an overlay of Pyburn's map (adapted from Pyburn 2003); Note the encircled six mounds, showing a good fit between the BREA GPS points (yellow triangles) and Pyburn's structures (prepared by S. Murata).

The 1868 map showed a series of dirt roads leading from the Tilletton property to other parts of the village. One road led east to the shoreline where boats were parked (prior to the causeway being built in the early 1980s, there were no cars on the Crooked Tree island and boats were the main mode of transportation to and from the island). Here, we performed a small test excavation (Operation 41) at a location known as Nicholson's Landing just east of Tilletton on the shore of the Crooked Tree Lagoon where we found additional evidence of historical occupation (**Flanagan, Chapter 5**). Another dirt road on the 1868 map led to the west-southwest in the direction of what is today the Health Clinic. Local informants told us that this area may have once been "slave quarters" and to test this hypothesis we carried out a series of shovel testpits around the clinic (**Rybka and Kaeding, Chapter 6**).

Archaeological Investigations at Ek'tok

We devoted all three weeks of the January 2019 season to carrying out a series of test excavations at the site of Ek'tok (see **Figure 3.2**). We placed one 2 x 6 m test excavation (Operation 42) on the western structure of Plaza E. Excavation of Operation 42 identified a platform structure with terrace and step construction and several different phases of construction, spanning Classic to Postclassic times (**Harrison-Buck, Chapter 7**). We conducted a series of shovel test pits in and around the eastern side of Plaza C at Ek'tok in search of midden deposits. One concentration of artifacts on the northeastern corner of this raised plaza suggested a trash heap and prompted the placement of a larger test excavation (Operation 43), which revealed cobble fill of the basal platform construction of Plaza C and a later (Postclassic?) refuse deposit higher up toward the surface (**Craig and Shelhamer, Chapter 8**). Another excavation unit (Operation 44) was placed in the low-lying area to the southwest of Plaza C, which exposed a large portion of an all-stone platform (**Rybka, Chapter 9**). This platform was initially thought to possibly represent a Contact period Spanish church. This shallow excavation unit had broad horizontal exposure and ultimately revealed what appears to be a Terminal Classic off-mound "post-monumental" construction. A final test excavation (Operation 45) was placed on the summit of Structure 16 to expose the remains of a Contact period deposit comprising a smashed Spanish Olive Jar, partially visible on the surface prior to excavation (**Kaeding, Chapter 10**).

Testing the Wetlands of Western Lagoon

During the summer 2019 field season, we carried out a series of test excavations in several of the canal features identified in the nearby Western Lagoon Wetlands (**Krause, Beach, and Luzzader-Beach, Chapter 11**). Here, modified wetland features have been recorded (Pyburn 2003) and our own inspection of satellite imagery has revealed much more substantial wetland modification than previously known, with extensive canals, ditched fields, and hydrological features that will be the focus of future BREA investigations (for further discussion see Harrison-Buck 2014). A series of linear canal features often connected to a pond or

catchment have also been identified throughout the Western Lagoon Wetlands, visible in publicly available satellite imagery (**Figures 1.4**). During June 2019, the BREA team carried out a series of test excavations (Operations 46, 47, and 48), bisecting three of the linear channels that crosscut the Western Lagoon Wetlands (**Krause, Beach, and Luzzadder-Beach, Chapter 11**). Material culture associated with these features confirms that they were modified constructions built by the ancient Maya. Elsewhere, we have speculated that they may have been used for aquaculture similar to fisheries documented in the Candalaria drainage (Harrison-Buck 2014:250). Geoarchaeological investigations of the canal features within wetland zones, as well as spot water sampling for geochemical testing, are aimed at further elucidating the chronology and use of these ancient water features.

Figure 1.4 Map showing a portion of Western Lagoon Wetlands with linear canal and pond features where three canals were tested in June 2019 (courtesy of Google Earth).

Excavating a "Pocket Bajo" Feature at the Maya Site of Chulub

During the summer 2019 field season, our investigations in the lower Belize River Watershed included a test excavation at the small site of Chulub (**Figure 1.2**). We devoted two weeks of the field season to further investigate a depression feature that closely resembles what are referred to elsewhere in Belize as pocket *bajos* **(**Grauer 2020). Excavations in 2019 focused on excavating one of a series of such pocket *bajos* found interspersed between the structures at Chulub (**Runggaldier, Harrison-Buck, and Krause, Chapter 12**). Chulub is a small ancient Maya site that consists of one formal plaza in the center of the site (**Figure 1.5**). Aside from this plaza group, most of the mounds at Chulub are isolated or configured in linear arrangements directly associated with the pocket *bajo* depressions, which were previously mapped in January 2017 ([**Figure 1.5**] Murata, Gantos, and Kaeding 2018).

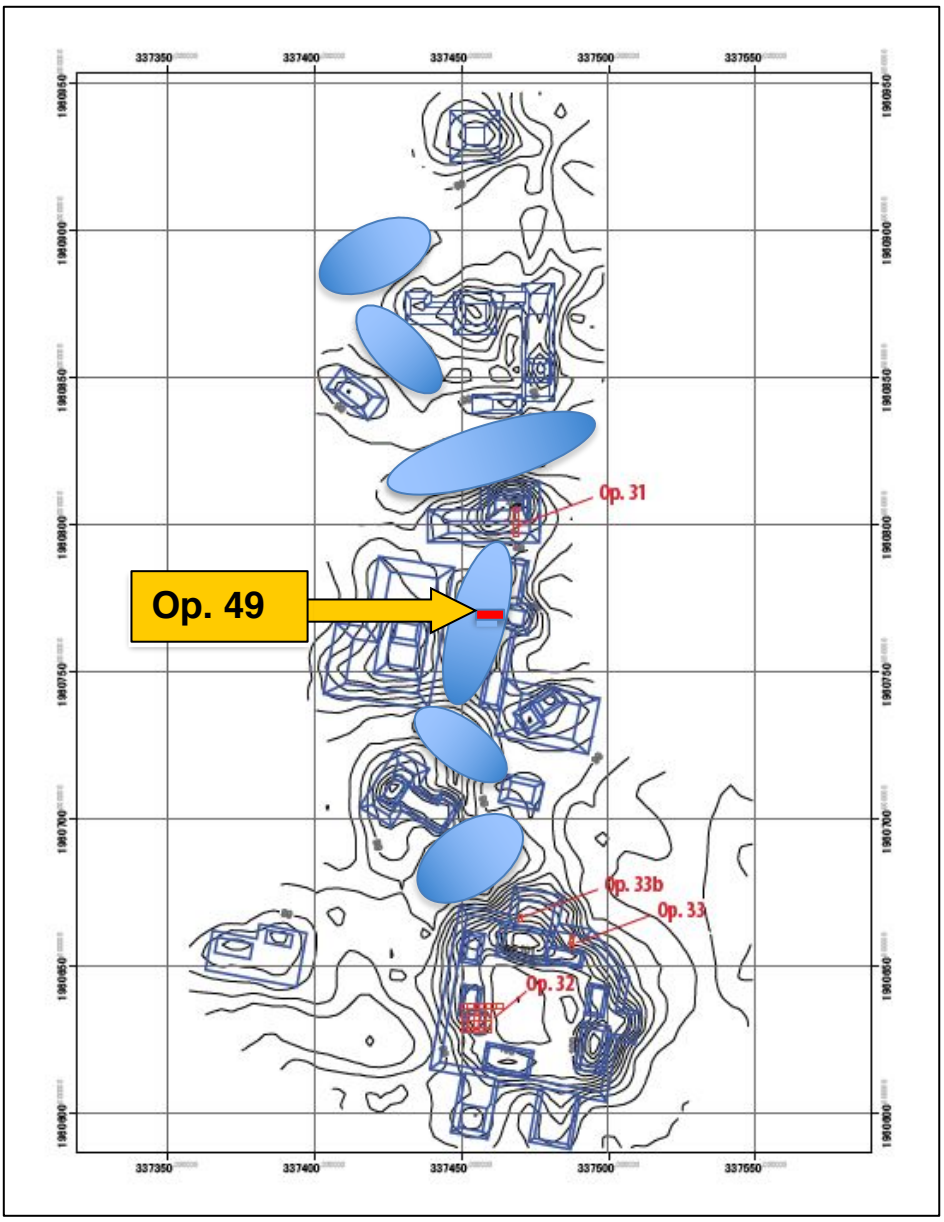

Figure 1.5 Chulub map showing locations of "pocket *bajos*" (light blue) and Operation 49.

At the time the site of Chulub was first recorded the depressions were filled with water and interpreted as "pond" features. During January 2017 we performed Operation 31, a 2m x 10 m excavation unit positioned on an outlying mound to the north of the main plaza, located adjacent to one of the pocket *bajos*. Excavation exposed the lower terraces of Structure 48 and the edge of one of the inundated depressions (see **Figure 1.5** [Flanagan 2018]). Returning in June 2019 prior to the onset of the rainy season, we found this same linear pocket *bajo* feature completely dry and decided to place a test unit (Operation 49) within the depression itself (see **Chapter 12**). Our goal was to test the depressions to see if these features were entirely natural or if they were culturally modified. Excavations revealed a natural undulating bedrock

depression that resembled the features reported from the site of Aventura (Grauer 2020). Excavations at Chulub exposed a dense midden deposit that lined the base of the pocket *bajo*. The midden contained a wealth of animal remains, including a complete turtle carapace, suggesting the possibility that some of the pocket *bajos* may have been used for seasonal aquaculture, including the storing of turtle and other wetland fidelic taxa. Preliminary analysis of the ceramics suggest that the site of Chulub and its pocket *bajos* date to the Terminal Classic-Early Postclassic (ca. AD 830-1200), which is coeval in date with the apogee of Aventura (see Grauer 2020:82).

Section III: Analytical Investigations

During summer 2019, BREA held a laboratory season in Crooked Tree Village where the BREA artifacts are stored. During this time, artifacts were washed, processed and entered into the BREA Filemaker Pro datatabase. Elsewhere, we have described the collection management framework that the BREA lab team has devised over the years and the laboratory methods we use for inventorying artifacts and other finds collected in the field by the BREA project (Runggaldier, Phillips, and Brouwer Burg 2018). Select assemblages were analyzed during the summer lab season by BREA specialists and other assemblages requiring more specialized analysis were exported to the US and analyzed there. For instance, the human remains from excavations of Terminal Classic burials found in an eastern shrine at Chikin'Chi'Ha' in the middle Belize Valley were exported to the Michigan State Bioarchaeology Laboratory, where they are currently being curated and analyzed by osteologists. Chapter 13 presents a preliminary report of the results of these analyses, including estimates of age and sex, and descriptions of skeletal indicators of diet, disease, trauma, and cultural modifications found on the Chikin'Chi'Ha' individuals (**Wrobel, Chapter 13**). In addition to providing the bioprofiles of the individuals recovered in Operation 30 at Chikin'Chi'Ha' this report confirms the interpretations about *in situ* body positions documented by the excavators (Craig et al. 2018).

During the summer lab season in 2019, BREA zooarchaeologist Lori Phillips continued classifying all faunal remains recovered in wetland and settlement excavations (**Phillips, Chapter 14**). We anticipate finding a heavy representation of locally acquired wetland-fidelic species from our excavations at sites like Chulub and Ek'tok that are located adjacent to the lagoons and wetlands of the lower Belize River Watershed. This was a primary goal of our test excavations at both of these sites in January 2017 and 2019 where we targeted residential structures with associated midden (trash) deposits containing faunal remains (see Flanagan 2018; Shelhamer and Craig 2018; **Craig and Shelhamer, Chapter 8**). Phillips is writing up the faunal analysis as part of her doctoral dissertation at Washington State University in Pullman.

A final analytical chapter involves a study of clay samples from the middle Belize Valley (**Philibert, Bryce, Fahnestock, Jones, Buck, and Harrison-Buck, Chapter 15**). The goal of this project is to identify clay sources that may have been used for ancient Maya ceramic

production. The collection of clays was conducted initially during the January and summer 2014 field seasons by Jones and Buck who previously reported on their preliminary results (Jones, Bryce, Prado-Fahnestock, Buck, and Harrison-Buck 2015). For the present study, some new samples were analyzed and some of the existing clay samples were reanalyzed. This study aims to build on an ongoing geochemical study led by Bryce and Harrison-Buck examining BREA ceramics using Neodymium (Nd) isotopes, a geochemical tracer that has not been previously used for sourcing clays or ceramics in Mesoamerica. Combined, the results of these studies suggest that the signature of clay bodies within the watershed aligns with the local ceramic signature (types that most commonly appear in the assemblage), but does not align with the Nd signature of imports (rare types in the assemblage presumed to be non-local). The preliminary results are exciting as they suggest Nd isotopes offer a viable geoarchaeological tracer and accurate method for sourcing ceramics.

Conclusions

This report offers a comprehensive look at the results of our year and a half of field and lab work on the BREA project from 2018-2019. The results presented here are a testament to the strength and breadth of our research, which ranges from reconnaissance and mapping to material culture studies. In my final chapter of this report, I discuss our future directions and goals of the BREA project, both long-term and immediate plans for the upcoming season, which will build upon our work from 2018-2019. We plan to carry out another short three-week excavation season with survey, mapping, and reconnaissance during January 2020 and artifact processing and analysis in summer 2020, and will continue to expand our investigations of the lower reaches of the Belize River Watershed.

Our reports and analyses have developed into a robust suite of recently published work, reconstructing the deep history of the middle and lower Belize River Watershed from Preceramic to Colonial times (Harrison-Buck and Clarke-Vivier 2020; Harrison-Buck, Houk, Kaeding, and Bonorden 2019; Harrison-Buck and Pugh 2020; Harrison-Buck, Willis, Murata, and Brouwer Burg 2020; Stemp and Harrison-Buck 2019). Given the continual occupation, this area offers an ideal context in which to review the changes taking place during periods of significant cultural transformation in Maya history—first during the Archaic to Preclassic transition, then later during the so-called Classic Maya "collapse" period, and finally during the Spanish and British Colonial periods from the sixteenth through the twentieth centuries. Through our continued investigations in the eastern half of the Belize River Watershed, we aim to expand our understanding of the social, political, and economic changes that occurred in this area through time and reveal the rich cultural and environmental diversity that this area has to offer.

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Section I

Survey, Mapping, and Reconnaissance

Chapter 2

Reconnaissance Around Spanish Creek and Western Lagoon

David G. Buck and Satoru Murata

Introduction

Previous seasons' survey and reconnaissance in and around the Crooked Tree Wildlife Sanctuary has primarily focused on the western shores of Western Lagoon to the north of the main ceremonial center of Chau Hiix (see Murata et al. 2018; Norris et al. 2015). Reconnaissance in this area, locally referred to as Blackburn, has revealed extensive ancient occupation stretching several kilometers north of Chau Hiix. During January 2019, survey and excavation at the secondary center of Ek'tok, located 1.5 km north of Chau Hiix, was carried out by BREA project members, reported on in other chapters of this report (see Murata and Kaeding, this volume; Craig and Shelhamer, this volume; Rybka, this volume; Harrison-Buck, this volume). Here we discuss additional reconnaissance that was conducted during January 2019 along the Western Lagoon, in areas north and northwest of Ek'tok. In addition, we outline reconnaissance carried out in January 2018 along Spanish Creek, which drains into Western Lagoon to the south. Local informants have repeatedly discussed known sites along Spanish Creek, with headwaters that originate south of Rancho Dolores. This navigable creek runs through this Creole community as well as the Creole village of Lemonal. During the inaugural BREA season of 2011 and March 2012, BREA team members conducted preliminary reconnaissance in the vicinity of these communities where sizeable ancient Maya sites have been identified (Harrison-Buck and Buck 2011; Harrison-Buck field notes, March 2012). These communities are linked to the Crooked Tree area via Spanish Creek. Additional ancient Maya settlement was identified on the west side of the creek during January 2018, as described below.

Objectives

1. Conduct initial reconnaissance in the areas of Flanders Bite, Caesar Cato, and Wade Bank along the western bank of Spanish Creek.

2. Fill in gaps of un-surveyed areas along the Western Lagoon.

Methods

Reconnaissance along Spanish Creek was conducted by boat and targeted three areas previously described to BREA team members by local informants. These areas included

Flanders Bite, Caesar Cato, and Wade Bank on Spanish Creek. Reconnaissance along the Western Lagoon was focused in the area to the north and west of the site of Ek'tok (Murata et al. 2018; Murata and Kaeding, this volume) and was conducted on foot. Locations of archaeological mounds and other cultural features were recorded with a *Trimble* GeoXH GPS unit and approximate dimensions of mounds and features were recorded and sketched.

Reconnaissance along Spanish Creek

Sites along Spanish Creek were accessed via a motorized skiff departing from the village of Crooked Tree and traveling south. Three specific areas were visited over the course of three days (**Figures 2.1 and 2.2**).

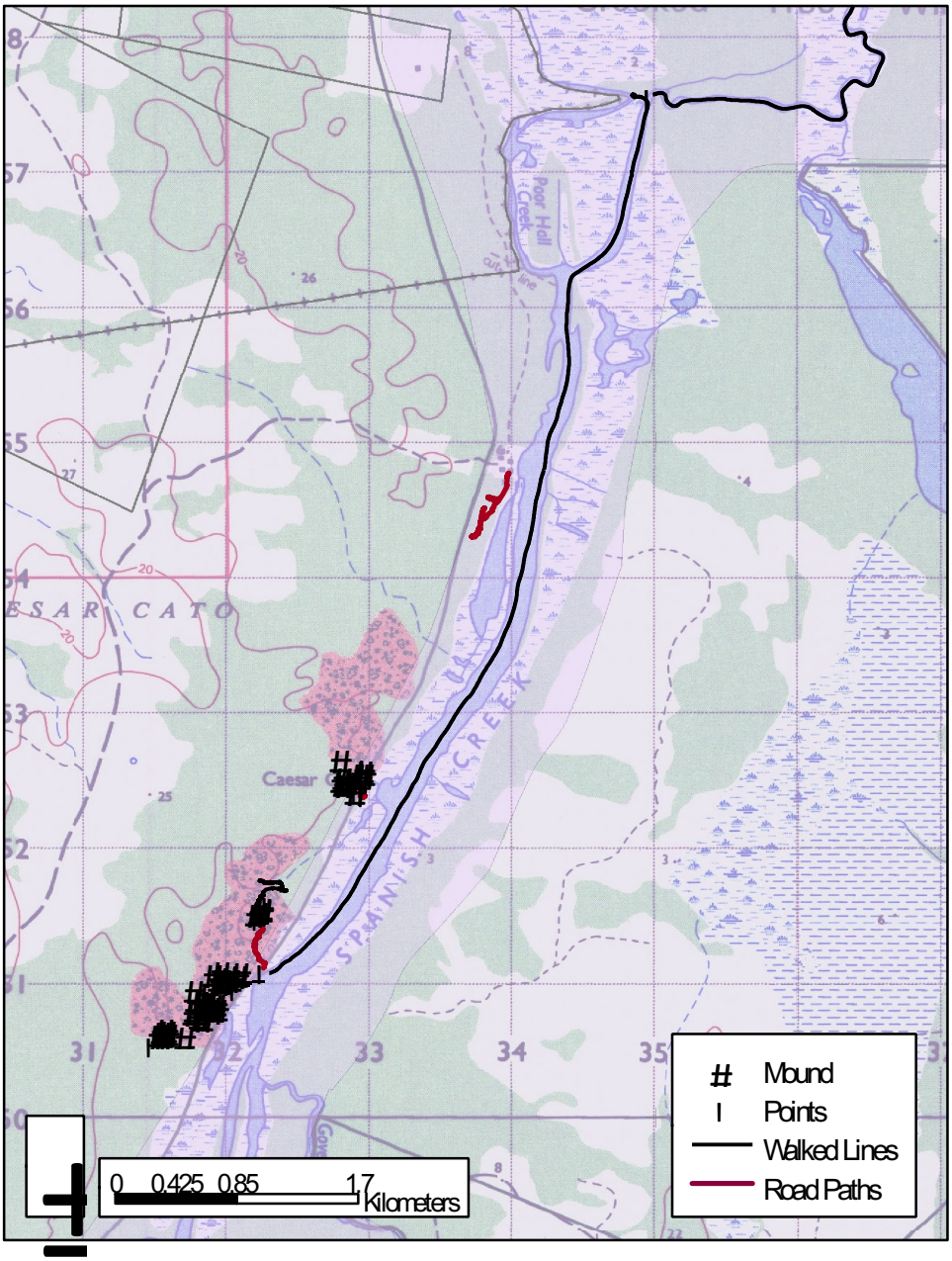

Figure 2.1 Map of reconnaissance conducted along Spanish Creek.

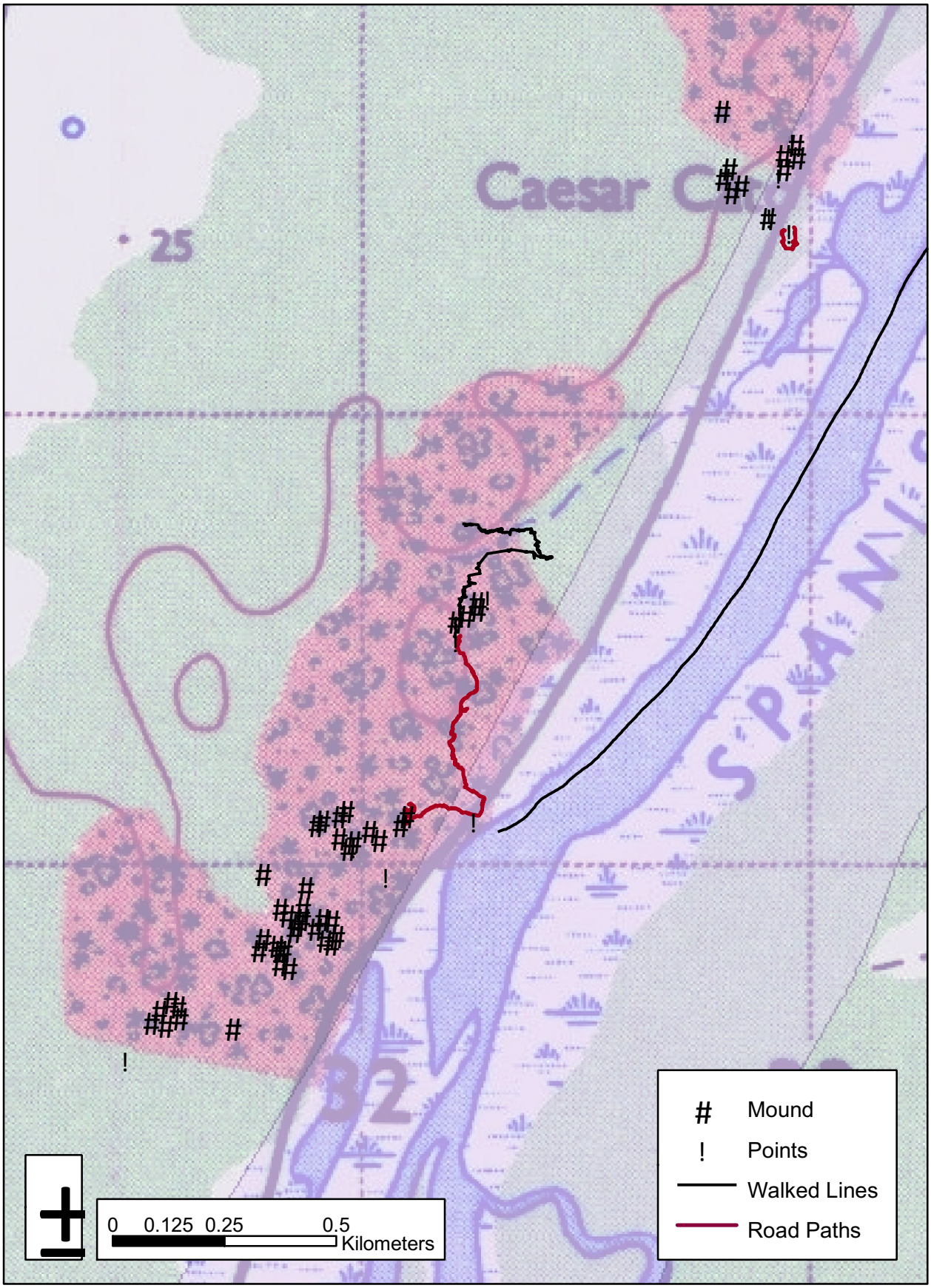

Figure 2.2 Close-up map of Flanders Bite and Caesar Cato.

Flanders Bite Landing and North

The boat landing at Flanders Bite was the milpa of Daniel Crawford from Lemonal. The cleared area included large exposed blocks of natural chert outcrops, with several distinct lines of chert oriented perpendicular to Spanish Creek. Ancient Maya ceramics were scattered throughout the cleared milpa area. In addition to the ancient ceramics, colonial and potentially modern ceramics were also visible on the surface (**Figure 2.3**). Reconnaissance to the north of the initial boat landing (**Figure 2.2**) found a terraced area that included 3 house mounds.

Figure 2.3 Artifact scatter found at the Flander's Bite landing. (A) metal fragment of possible chicle pot; (B) broken metal handle; (C) fragment of colonial jar; (D) Maya ceramic fish net weight; (E) colonial-era blue and white transfer ware. Sunto compass for scale (photo by D. Buck).

Flanders Bite – South

South of the main Flanders Bite landing, a large area of denser ancient Maya occupation was identified by the reconnaissance team. This area included at least 20 mounds that were documented with GPS (**Figure 2.2**). Structures within this complex of small plazuela groups, range structures and at least one plaza group with a 4 m tall, heavily looted

pyramid (**Figure 2.4**) were all oriented cardinally north-south. A small creek bifurcated the area, draining to the east towards Spanish Creek.

Figure 2.4 Image of a heavily looted pyramidal structure at Flanders Bite - South.

Caesar Cato

The Caesar Cato area, located to the north of Flanders Bite, sits on a high bank on the west side of Spanish Creek (**Figure 2.2**). The ancient Maya site includes a plaza group of four mounds as well as at least six other mounds extending northward. One or more an all-stone, low-lying structures were noted that resemble possible round structures similar to other Terminal Classic examples found elsewhere (Harrison-Buck 2012) . Further investigations are needed to confirm this. Notably, a marine conch shell, often associated with these building types was found on the surface not far from one of the all-stone structures.

Wade Bank on Spanish Creek

Reconnaissance was conducted at the area locally referred to as Wade Bank (**Figure 2.1**), also the site of the recently abandoned Spanish Creek Lodge, which was originally established in the mid-1960s to attract international tourists, primarily fly fishermen. The abandoned lodge area was surveyed, including an abandoned tractor road leading to the south of Wade Bank and multiple trails cut into the forest to the west of the tractor road. No evidence of ancient occupation was observed during a 2-hour period of reconnaissance.

Reconnaissance Along Western Lagoon

Bill Tillett's Pasture

A pasture area owned by the late Bill Tillett of Crooked Tree village was also the focus of reconnaissance in January 2018 (in summer of 2019 Bill Tillett died at the age of 80). His property is located along the western banks of Western Lagoon and was previously unsurveyed (**Figure 2.5**). Numerous isolated small house mounds as well as small plaza groups atop raised platforms were observed in the open pasture. Structures ranged in size from less than 0.5-m in height to more than 4 meters tall. With the exception of plowing scars along the edges of two mounds, no clear evidence of looting or other impacts to the structures were observed. A creek drained the property to the east towards Western Lagoon.

North and West of Ek'tok

In summer 2016, BREA conducted preliminary reconnaissance around the site center of Ek'tok (Murata et al. 2018). In January 2019, BREA revisited this area and conducted detailed survey and excavation of the site (Murata and Kaeding, this volume; Craig and Shelhamer, this volume; Rybka, this volume; Harrison-Buck, this volume), we expanded the reconnaissance to include areas north and west of the site center that had previously been unsurveyed (**Figure 2.6**).

A small creek, locally referred to as Wade Creek, separates the site center of Ek'tok from a forested area to the north. Several isolated mounds were located within this forested area including one 3-m tall pyramid with a looter's trench into its northern side and a pit dug into the center of the structure. This pyramidal structure was associated with two other low-lying mounds (< 1-m in height). GPS coordinates could not be obtained on these structures because of dense forest cover.

The area to the west of the Ek'tok site center includes both open pasture and forested areas. Immediately to the west of the site center are three small plaza groups built on top of smaller raised platforms. The plaza group closest to the site center includes a 1-m tall platform with 6 mounds oriented cardinally and the northern most mound rising approximately 3-m above the platform (see Murata and Kaeding, this volume). A second plaza group is located to the west and south of this first plaza that includes a 1-m tall platform

and 4 structures on top with maximum heights under 1-m tall. Further to the west is a third plaza group with 3 mounds sitting on top of a lower 0.5-m high platform.

To the north of the third plaza group, across Dawson Creek, is a group of mounds not clearly arranged as a plaza group but that includes low range structures and a small house mound, all with clear stone construction and ancient Maya ceramics on the ground surface.

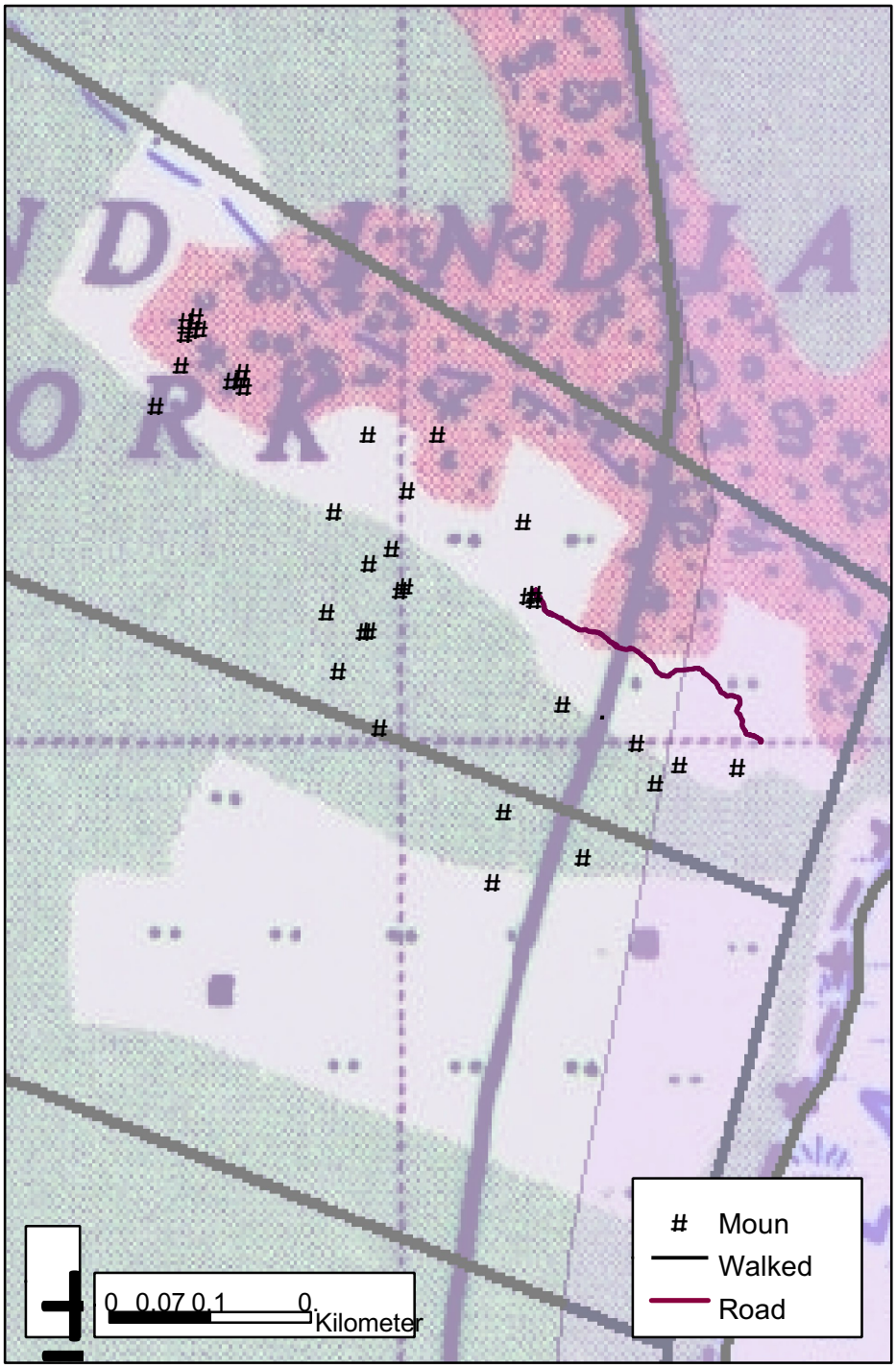

Figure 2.5 Overview map of mounds observed on Bill Tillett's pasture, along the western bank of the Western Lagoon.

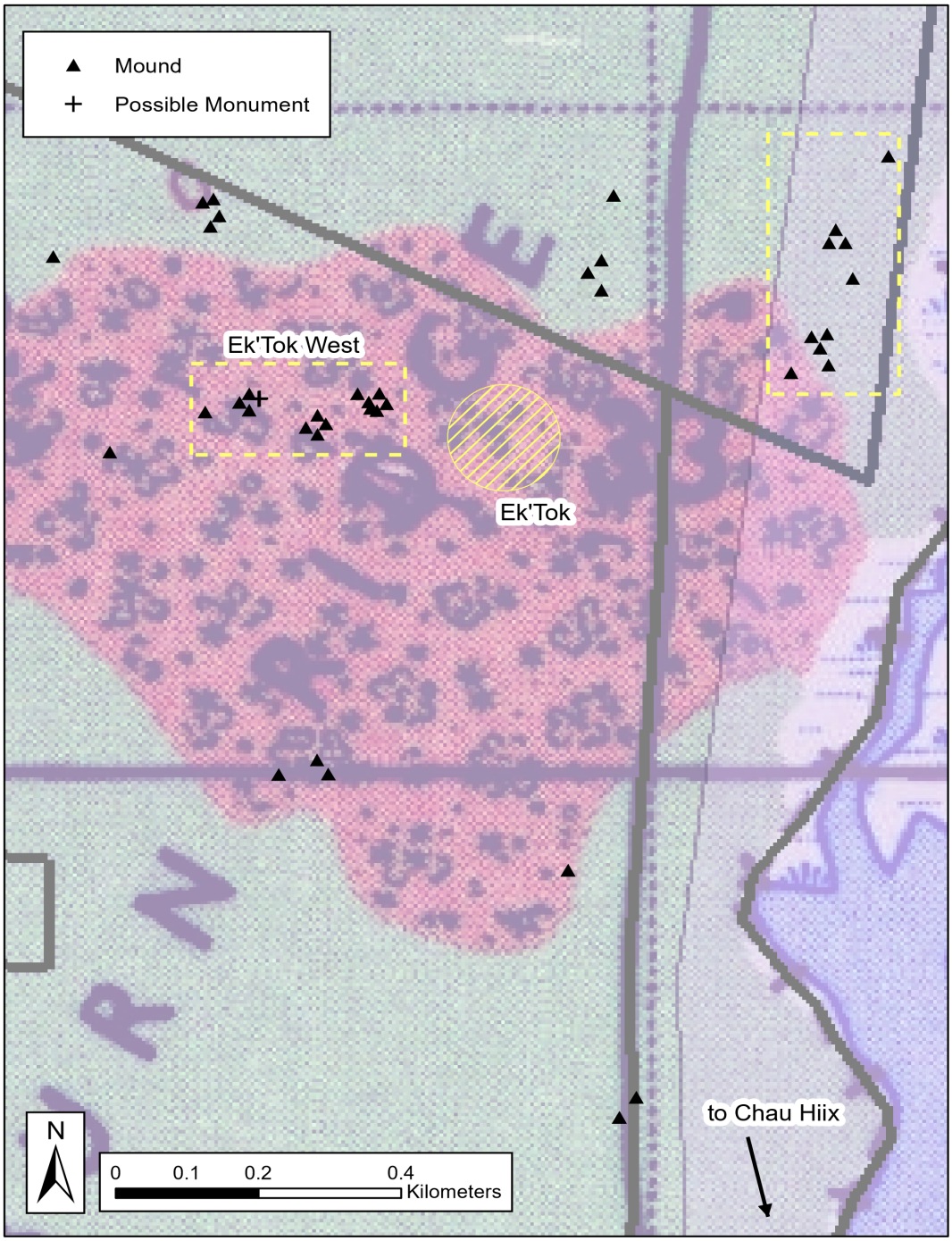

Figure 2.6 Overview map of January 2019 reconnaissance in areas adjacent to Ek'tok.

Future Directions for BREA Reconnaissance

Initial reconnaissance along Spanish Creek conducted in 2018 revealed areas of dense occupation during the ancient Maya times that likely continued up through the colonial period. Extending survey and reconnaissance along the length of Spanish Creek is likely to yield additional settlement. Linking these sites both to sites currently under excavation by BREA along Western Lagoon with the potential overland route proposed by Harrison-Buck and colleagues (2020) should be further explored as part of future investigations.

Given the extensive effort BREA has invested in survey and reconnaissance along the Western Lagoon, future field work in this part of the study area is unlikely to result in the identification of additional sites. Future reconnaissance efforts instead may want to focus on linking the settlements documented in and around the Western Lagoon with areas to the east, towards Altun Ha and potentially to the west, towards the New River Lagoon and the site of Lamanai.

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Chapter 3

Survey and Mapping the Maya Site of Ek'Tok

Satoru Murata and Adam Kaeding

Introduction

In January 2019, we returned to the site of Ek'Tok on the western bank of the Western Lagoon near Crooked Tree village, Belize. The site was originally identified by the BREA reconnaissance team in summer of 2016, and a portion of which was preliminarily mapped during the January 2017 season (Murata et al. 2018). This chapter describes the objective, method, and the result of the mapping program in 2019, as well as recommendations for future program(s).

Objectives

1. Finalize the map of the site, at least the parts of which have been cleared by the respective landowners.
2. Identify the western boundary of the site.
3. Understand the relationship of this secondary center with the large city of Chau Hiix to the south, which has been previously investigated by K. Anne Pyburn.

Methods

The first step in mapping a site is to set up a series of "stations"—strategically placed semi-permanent points of reference, marked using iron rebars and set by means of GPS and total station measurements that allow for mapping of mounds and other archaeological features (see Murata 2011). Upon returning to the site at the beginning of January 2019, we found that many of the stations we placed on and around the mounds of Ek'Tok two years prior in January 2017 had been removed or trampled in the intervening years. In order to save time, we relied on three of them (Stations 7, 8, and 10) that appeared more or less intact, to reestablish the other stations as well as new ones.

The mapping was carried out by two teams, led by Murata and Kaeding, each instructing two field school students at a time, who were provided with basic training on the operation of the total station and accompanying data collector. Since we clearly lacked sufficient time to complete the map within the field-school setting, Murata and Kaeding also spent one weekend

mapping areas of the site with a lower density of structures as well as re/establishing old/new stations. A small, residential plaza group ("*plazuela*") in a recently-cleared northwestern portion of the site was mapped by the field school students as part of their end-of-term exam (see **Figure 3.1**); therefore, the data for this group are accumulated data collected by all students.

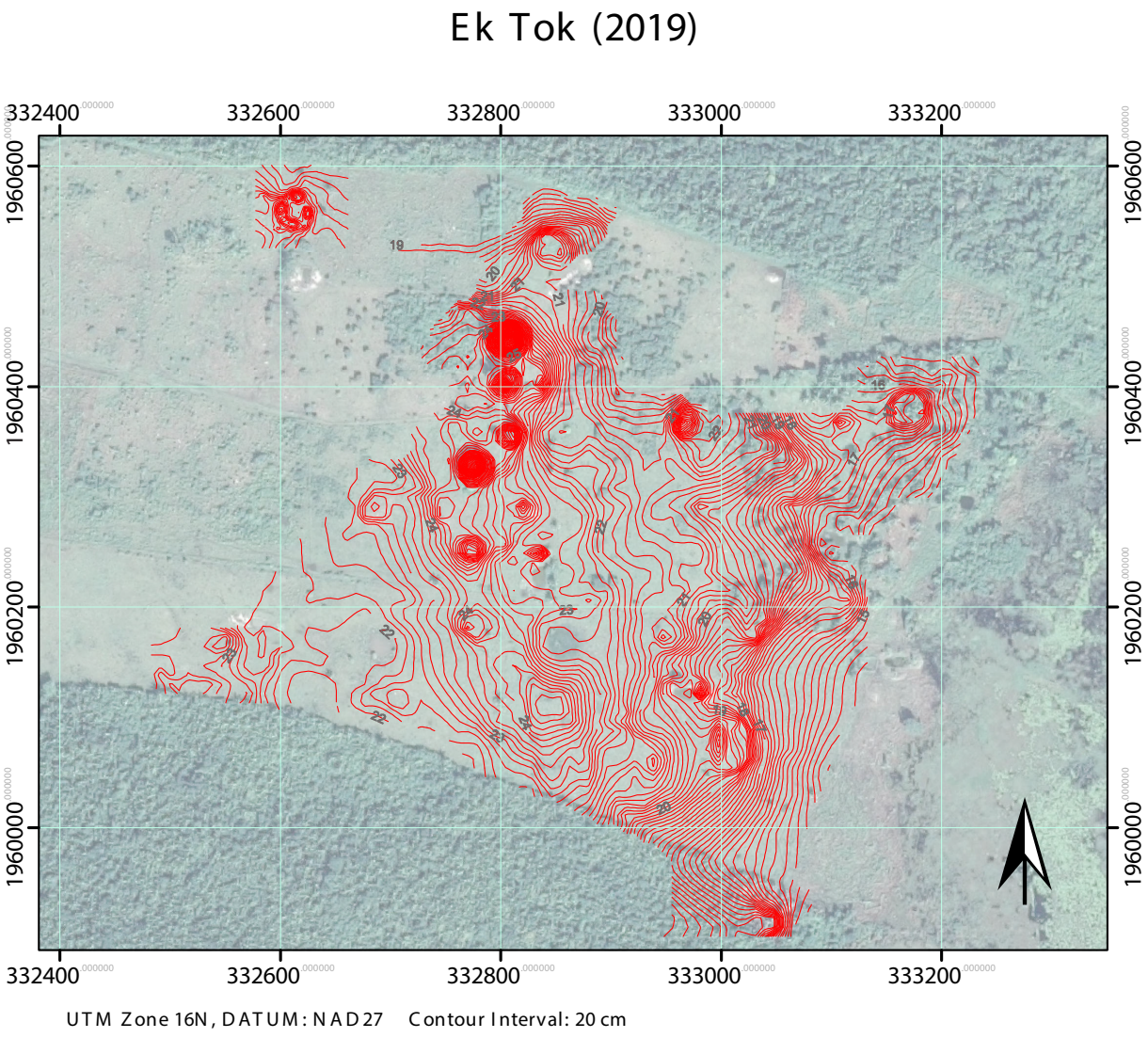

Figure 3.1 Topographic map of Ek Tok, combining data from the January 2017 and 2019 seasons (map prepared by S. Murata and A. Kaeding).

Results

The resulting topographic map is shown in **Figure 3.1**, while in **Figure 3.2**, a Mahlerized map with rectified structures overlies the topographic map. We were able to map most of the major structures and plaza groups that have been identified to date, including the two large groups with monumental architecture (A and G) and seven residential groups (B, C, D, E, F, H, and I).

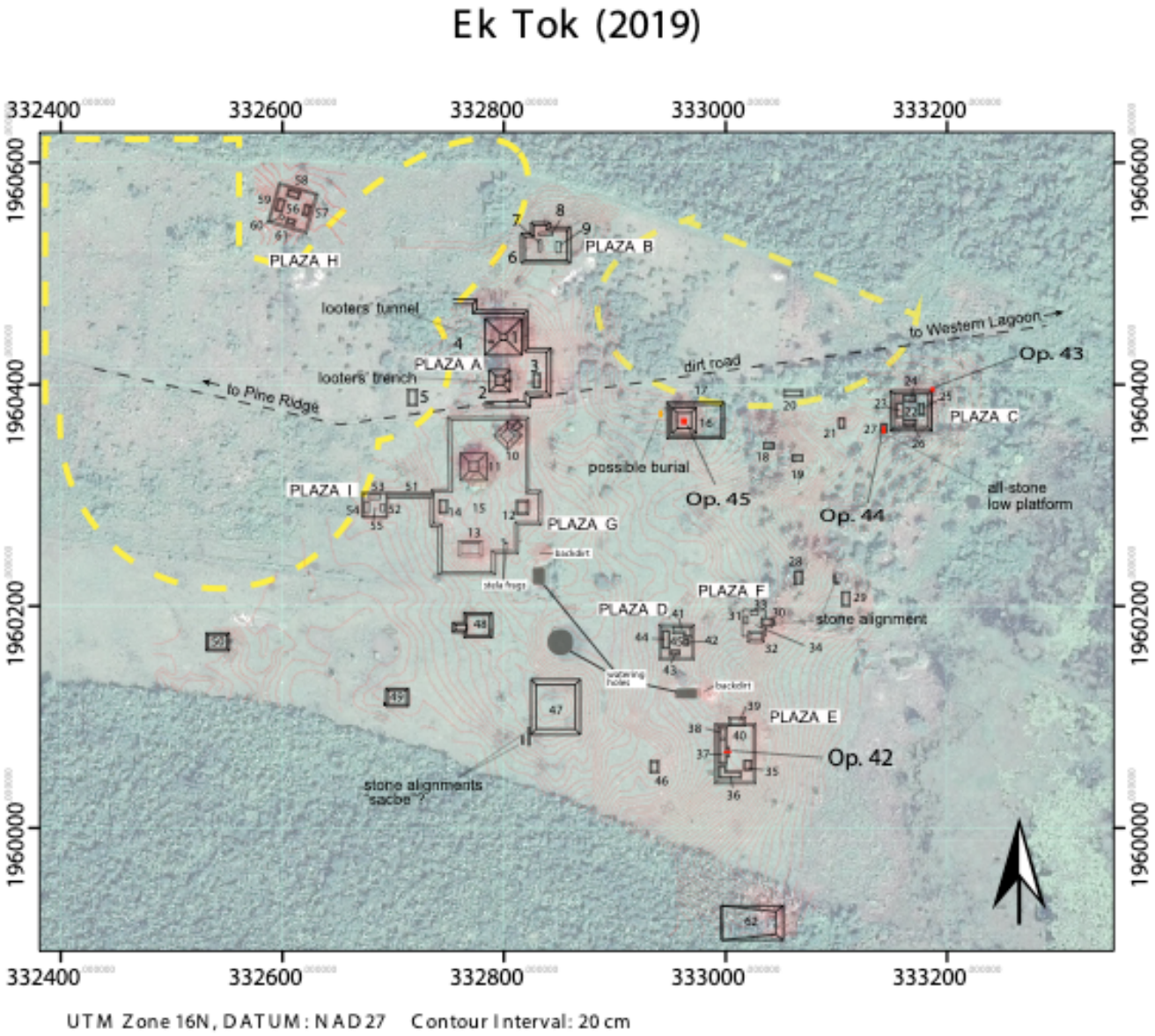

Figure 3.2 Rectified map of Ek'Tok, showing the various structures, plazas, as well as modern features. Note: yellow dashed lines demarcate areas for which no TDS points have been taken (map prepared by S. Murata and A. Kaeding).

Preliminary Observations and Conclusions

Some interesting observations that were made during mapping (refer to **Figure 3.2**); these are listed below, in no particular order:

(1) Although the structures mostly followed the typical Maya convention of being strictly cardinally oriented, Structure 10 in Plaza G, with an orientation of 45 degrees east of north, and the structures of Plaza H, oriented 17.5 degrees east of north, were notable exceptions. Considering that Late Preclassic / Early Classic potsherds were noticed on the surface of Plaza B, the building groups to the north (Plazas B and H) may represent earlier components of the site. Plaza H was mapped by the students as part of their exam.

(2) While we noticed multiple possible *sacbeob* (ancient Maya raised causeways) at the site, Structure 51 is notable in that it clearly connects the monumental Plaza G with the residential Plaza I, which may suggest the significance of the latter.

(3) As can be seen from the underlying satellite imagery, Structure 62 (south of Plaza E) is in an area that had, until recently, been forested; however, in January 2019, this area had been cleared of trees. According to a student who spent time there on the prism pole, the area, especially to the west of the mound, is filled with potsherds on the surface. Considering the morphology of the mound, it may have been bulldozed to obtain a flat top, thereby exposing artifacts that had been buried inside.

(4) Two large pieces of stone, which appear to be stela fragments, were found between Structures 12 and 13, near the southeast corner of Plaza G.

(5) Structure 13 in Plaza G has a well-defined set of stairs on its north face.

(6) Structure 50 (to the west-southwest of Plaza I) appeared to be the western-most structure in that portion of the site. Although the pasture is well-cleared, we visually confirmed that no mound-like structures were present to the west, all the way to the pine ridge savannah.

Suggested Future Mapping

Although much of the site has now been mapped, there still remain a few areas that should be mapped to fill the remaining gaps. Areas for which no points have been taken are indicated by the yellow dashed lines (**Figure 3.2**). In particular, the eastern area is of higher importance, as we have visually identified multiple structures therein, including one (Structure 20) that has been recorded with the GPS. In the western area delimited by the yellow dashed

line, most critical would be the northeastern portion connecting plazas A, B, and H, where we have visually identified a small platform lacking any superstructures, as well as Structure 5, which again has been recorded with the GPS, but not with the total station (see Buck and Murata, Chapter 2). Structures have also been reported in the western half of this area, which should also be mapped as much as time permits.

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Section II

Site Investigations

Chapter 4

Shovel Test-Pitting and Excavations at the Tilletton Historical Site (Operations 36, 37, 38, 39, and 40)

Adam R. Kaeding, Jessica H. Craig, Kelin Flanagan, and Eleanor Harrison-Buck

Introduction

Excavation efforts during the 2018 January season were focused on a central area within Crooked Tree Village referred to here as the Tilletton Site. Crooked Tree Village has been the headquarters for the BREA team as the larger survey objective of the project continues to progress east throughout the lower Belize River watershed. Crooked Tree is also an archaeologically significant area in its own right – not only with regards to ancient Maya settlement distribution but also in the history of the Belizean Kriol (Creole)—descendants of Europeans and enslaved Africans brought to Belize for the logging industry during the colonial period. The lower Belize River Watershed is often referred to as the "birthplace" of Kriol culture and Crooked Tree is considered one of the oldest Kriol villages in the country (Harrison-Buck et al. 2019).

Several sources of information recovered during BREA research into the Kriol history of Crooked Tree Village have helped identify the Tilletton Site as a target for excavation. These sources include local informants, ethnohistoric interviews, and historical documentation. Local residents of Crooked Tree who have worked alongside BREA team members for the last three years are often very open to sharing their memories of the village's history along with the stories from their parents and grandparents. While these conversations have yielded a wealth of information and personal depth regarding the history of the area, there also have been some recurring themes. Among those themes includes the general agreement that while the earliest settlement was a logwood camp north of the village around Cadle Bank, the earliest settlement in the village proper dates to the early nineteenth century and was the location referred to in archival maps as "Tilletton," which includes the buildings and grounds of the current Baptist church (**Figure 4.1**).

These conversations have included in-depth interviews with village elders in an effort to record their recollections of this particular location. One Crooked Tree resident, Steve Tillett, has taken the lead in documenting the stories of older generations. Steve's ethnohistoric efforts have provided invaluable and detailed accounts of many aspects of the community's history, including exactly how the area was organized and occupied. At one point in the history of the Baptist church property, it served as the community school. Village elders remember their time attending school in the structure that still stands on the lot today (see **Figure 4.2**). These conversations not only provide insight into the use and architectural development of the site, but

also add a deeper personal element to the investigations, including stories of schoolyard mischief and teacher favoritism. All of this information gathered through Steve's research and our conversations with Crooked Tree residents has helped to guide the archaeological research strategy described below.

Figure 4.1 1868 map of William Tillett's property ("Tilleton" site) in Crooked Tree village that was donated to the Baptist Church (courtesy of Belize National Archives).

Historical Background to the Research

In addition to the insights provided by local informants, BREA researchers have recovered valuable historical documentation from ethnohistoric accounts recorded by the Baptist Church missionary and records found in the Belize National Archives. **Figure 4.1** shows a map from the archives recording the Tilletton property in 1868 when ownership was transferred from Mrs. William Tillett to the Baptist Church (Harrison et. al 2019). Prior to 1868, this site was the homestead of several generations of Tilletts who descended from a William Tillett, Esq., one of the earliest and wealthiest inhabitants of Crooked Tree. William Tillett's father, of the same name, was an English sea captain who came to Belize in 1784 for the logwood trade. William's mother, Mary White, was of mixed race, probably partially Miskito Indian and African in descent, which is why her son William Tillett, II. and his brother George were characterized in the 1832 census as "coloured" (Johnson 2018:39). Both were described in an 1832 census as "Creole" rather than white but were listed as "Esq.," an indication of their wealth and status in Belize's colonial society (Johnson 2018:39). According to the census, William Tillett, II. "owned five slaves: two men in their thirties, two small children, and a woman in her thirties" (Johnson 2018:39). While slavery was abolished in 1834, we know that the formerly enslaved continued to work as apprentice-laborers for the Tillett family. In an 1835 census, the Tillett brothers were described as "white" and working for them were 13 "apprentice-laborers" (Johnson 2018:39)—a term that marked the enslaved person's new status in the transition to emancipation. For owners of mahogany works like William and George Tillett, they needed a sizeable labor force to continue carrying out these activities post-abolition. Therefore, it can be reasonably assumed that the grounds would have likely been the center of activity for the teams of formerly enslaved African laborers.

Figure 4.2 Children at Crooked Tree Baptist Church School House in 1948, on property formerly known as Tilletton.

Although William Tillett II died in 1848, his land and house in Crooked Tree appear to have been passed down to his children, which included another son named William (III) and a son named George Hulse Tillett. The 1857 will of the latter suggests George left the Crooked Tree house and property to his children, which included another son by the name of William Tillett (IV). We suspect that it was the wife of this William Tillett IV who commissioned the 1868 plan and survey map of the Crooked Tree property (E. Harrison-Buck, personal communication 2019). As indicated in the map in **Figure 4.1**, the homestead was "formerly named Tilletton," a name given to this place by the Rev. Alexander Henderson, pastor of the Queen Street Baptist Church, who visited the Crooked tree Baptist Church station in 1844. There, he met William Tillett II and his wife, and their 15 children and observed that there were around twenty houses and a sizeable population (Crowe 1850:370-371; Harrison-Buck et al. 2019:215). He was so taken with the Tillett family that he felt the community should be named "Tilletton" (The Baptist Magazine 1844:435), although this name did not last long.

The 1868 map not only provides the historical context for the site but also yields information regarding site layout, including a sketch of four buildings shown standing on the plot at that time (for further discussion see Harrison-Buck et al. 2019). While there are issues of scale, ground truthing of the current landscape suggests that this map provides a generally faithful representation of the area at the time. The map shows the larger landscape with particular detail paid to the lagoon's shoreline. It also shows the distribution of structures of the Tilletton site. This information was critical in guiding the archaeological investigation strategy described here.

Overall Objectives of Tilletton Excavations

Structure Distribution

The lot currently features several large structures and some associated outbuildings (**Figure 4.3**). The largest structure is an elongated building (approx. 23 m x 12 m; main axis oriented north-south) that serves as the current Baptist church. According to local informants and documentary sources, this church building was constructed in the 1960s. Immediately north of this longer structure separated by only about a meter is a smaller building with a roughly square footprint measuring roughly 9 x 9 m (see **Figure 4.3**). This is the oldest building in Crooked Tree that previously served as the church building, and was also the school building prior to the construction of the new school in a different part of the village.

Local informants indicate that the first Baptist Church was established in Crooked Tree as early as 1835. The Baptist Church missionary letters suggest that the original church was later replaced with a larger church-school building that was constructed in the mid-to-late 1840s (Crowe 1850:382; Harrison-Buck et al. 2019:216) We believe this is the largest building depicted on the 1868 map and is the structure that still exists today. According to local accounts,

the building that exists today was once two stories and was up on stilts, similar to the sketch pf the largest building depicted in the 1868 map. However, according to local residents the second floor blew to the ground during the hurricane of 1930. The photo from 1948 suggests that the second floor of the building was repaired following the storm; children stand on stairs leading up to a second floor and the first floor appears enclosed as a first floor room (**Figure 4.2**). Local residents who are in their 80s recall using the first and second floors of the building as classrooms (the second floor was reportedly used as a classroom for older students while the first floor was for younger children). At some point, likely due to instability, the second floor of the building was moved off the stilts and the location of the building shifted somewhat where it became the single story building it is today.

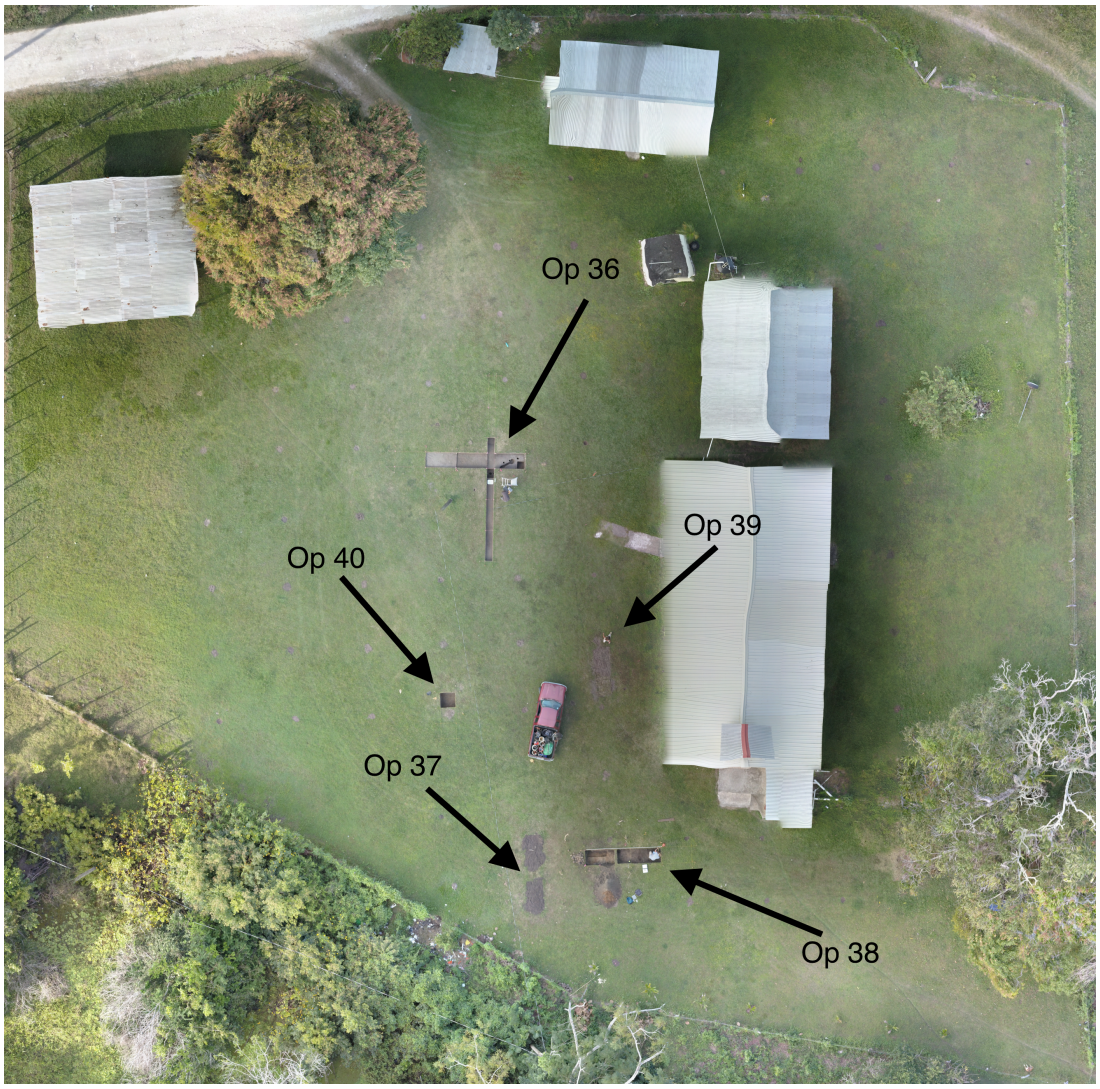

Figure 4.3 Locations of Tilletton Operations (36-40). Note: north is oriented up.

Figure 4.4 Distribution of Tilletton Shovel Tests). Note: north is oriented up.

Today, no other buildings exist on the church grounds south of the extant remains of the old Baptist church/school, aside from the modern Baptist Church building (**Figures 4.3** and **4.4**). However, on the 1868 map a second structure is shown seemingly just to the south of the main, two-story building believed to be the single-story structure existing on site today. Further south from that second building the map depicts two even smaller structures (**Figure 4.1**). These structures are smaller, but particularly regarding their relative height suggesting that they were at ground level, not two-story buildings. The rendering of the second building suggests that it was perhaps slightly elevated on posts, although given the detail of the map, this is only speculation. Assuming a north-south linear arrangement as this map might suggest, this second building would have been in the location now occupied by the longer current Baptist church structure. Interestingly, none of the local informants recall a structure preceding the current church building in that location. Rather, several of our informants recalled exactly the variety of large mango tree that stood in that area prior to the construction of the new church.

The general agreement was that there was a separate standalone building on site that served as the schoolmaster's/teacher's residence. This was remembered generally west and south of the old church building (making it west and north of the modern longer church building). There is no structure in that location today, however, there is a slight rise in the otherwise fairly level churchyard. The rise is slight – maybe 25 centimeters (cm) at its most pronounced – and would easily go unnoticed if the yard was not so well maintained. The smaller, lower representation of this building on the map may have been to indicate that it was set back (to the west) of the primary structure – farther away from the perspective of the map's author. Local informants also recalled that there was another separate area farthest to the south on the grounds that served as outhouses, one for boys and one for girls, and where trash was discarded. We surmised that this same location may have been used similarly through time and that the smallest building farthest to the south on the 1868 map may represent a privy and that the two black dots represented a tandem outhouse for accommodating both males and females (see **Figure 4.1**).

Operation and Unit Placement Rationale

The informant recollections and the arrangement of the structures, both modern and historically documented, guided excavation strategy in two primary ways. First, the architectural components of the site apparent on the current landscape that were reported from local informants and documented in the historical record were central to our decisions about operation and unit placement. For instance, the slight rise potentially representing the last remaining signature of the second structure on the 1868 map warranted further investigation and guided the placement of Operation 36 (see **Figure 4.3** above). The methods employed to investigate the nature of this rise are described below (see Operation 36). Other subtle features observed on the current landscape farther to the south were several very slight, roughly circular depressions. These features were interpreted as potential privy locations and guided the placement of Operation 38 (see **Figure 4.3** above). Privies provide a refuse disposal feature type that can be particularly desirable for finding associated historical materials in secure contexts. While a trash pile or sheet midden can be fairly easily moved, disturbed, or contaminated with more recent materials, objects disposed into a privy tend to be pretty well sealed into a contained deposit, in a vertical chronological sequence. Privy contexts also often provide favorable preservation conditions for associated historical artifacts.

The site was also subjected to a program of systematic shovel testing to identify the distribution of artifacts, which was an overall tactic of the research design to try to identify where the densest deposits of refuse from the period of historical occupation were located. A total of 73 shovel test pits (STPs) distributed at 5-meter (m) intervals indicated areas featuring particularly high densities of artifacts and a diversity of artifact types. **Figure 4.4** shows the distribution of the 73 STPs. Our methods of shovel test-pitting, discussed below, guided the placement of three other operations (Operations 38, 39, and 40) where spikes of different kinds

of historical material were recovered (**Figures 4.3** and **4.5**). Below we begin by describing the shovel test-pitting operation, followed by a detailed discussion of each of the operation excavations (Operations 36-40) carried out at Tilletton during January 2018.

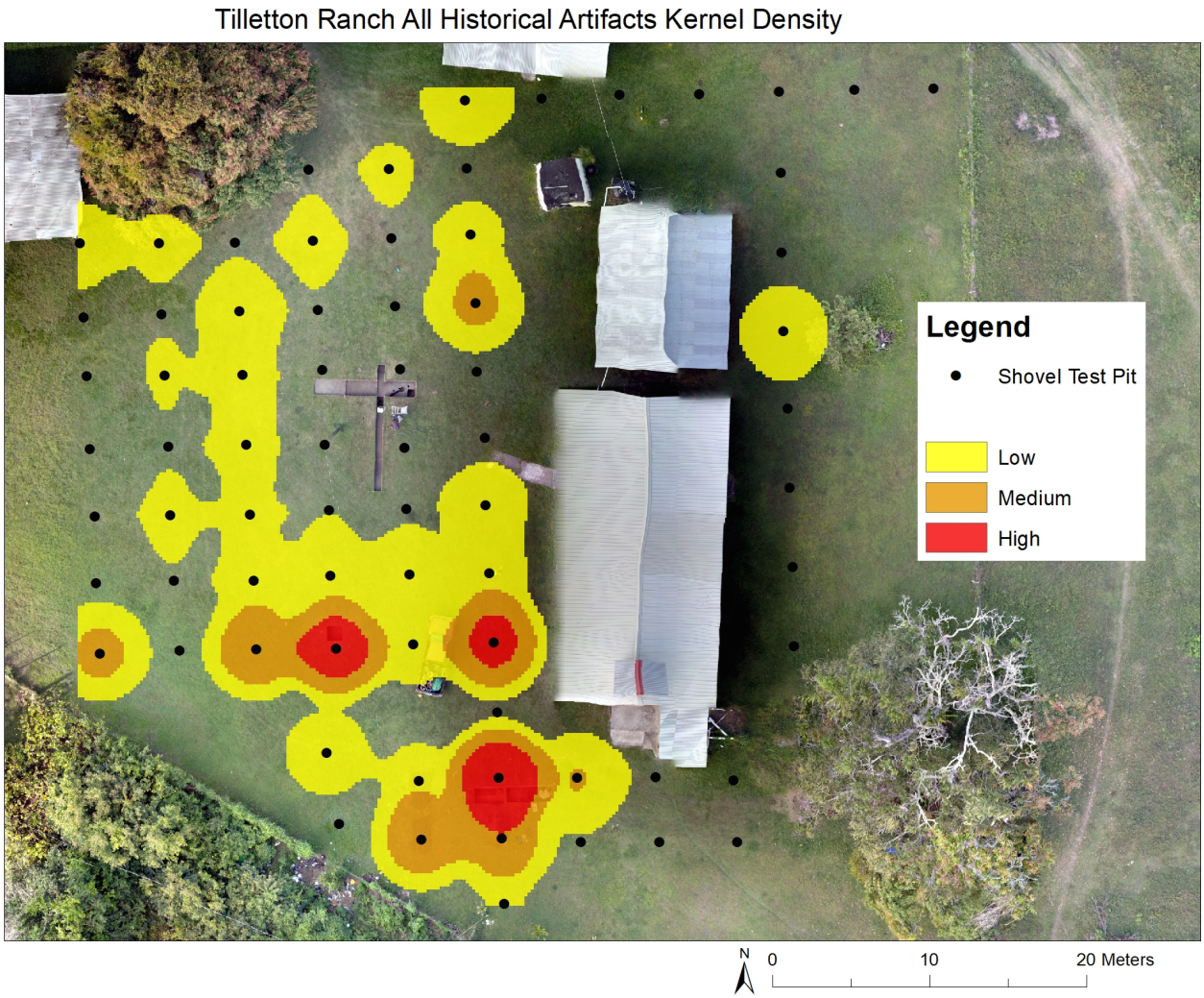

Figure 4.5 Overall kernel density distribution of all historical artifacts from STPs at Tilletton. Note: north is oriented up (map produced by L. Phillips).

Shovel Testing

In addition to the information provided from the distribution of structures, local informants, and historical documentation, the lot was investigated with a series of shovel tests (**Figures 4.4**). The shovel tests were circular excavations measuring roughly 30-45 cm in diameter and distributed at a 5-m interval. This effort provided a sense of the lot's geomorphological characteristics and yielded insight into the distribution of artifacts across the lot (**Figure 4.5**).

The geomorphological characteristics recorded during shovel testing generally indicated historical flooding. The eastern side of the site, east of the church buildings, is characterized by sandier, better sorted soils than the rest of the site. This may be interpreted as evidence that this portion of the site was frequently inundated. Local accounts of particularly high-water flood events reaching the church buildings support this observation. The southwest corner of the church lot features a relatively gradual depression. While the lowest point of this topographical basin currently holds standing water, the shovel testing program indicates that this water feature has historically (and likely more recently) been considerably larger. The intact artifact signature associated with the Tilletton site is constricted to the area immediately south and west of the extant church buildings.

Within the artifact distribution identified at the Tilletton site, two observations were explored further with three archaeological operations. Operations 38-40 were placed and designed to investigate areas identified with the greatest artifact density – respectively south and west of the current church's southwest corner (see **Figures 4.3** and **4.5**). Operation 40 was designed to investigate not just artifact density but also diversity. In this area west of the southwest corner of the modern church building, STPs yielded a higher concentration of metal artifacts than elsewhere in the site. It was interesting because metal artifacts were relatively underrepresented elsewhere in the lot. Because the earliest component of the Tilletton site may have involved logging, an activity that features an artifact signature with a high proportion of metal artifacts, this area was selected for additional investigation.

Excavation of Operation 36

Objectives

The overall objective of Operation 36 was to investigate the potential location of the no-longer-extant building discussed above. The unit placement strategy and decisions made during excavation were guided by the following, more specific, objectives"

- Explore the nature of the mound observed within the Tilletton historical property;
- Investigate claims that the building may have served as the school teacher's residence;
- Determine the orientation of the structure;
- Recover diagnostic artifacts to assign dates to the structure; and
- Examine material culture related to turn-of-the-century Crooked Tree.

Excavation Strategy

As mentioned above, placement of Operation 36 was guided by the goal of exposing the footprint of a historical structure that may be depicted on the 1868 map. Operation 36 was composed of six consecutive 2 x 0.5 m units oriented north-south and four consecutive 2 x 1 m

trenches oriented east-west (**Figure 4.6**). Combined these created two long linear trenches that intersect to create a cruciform shape traversing the slight topographic rise discussed above and interpreted as a potential signature of the no-longer-extant building. This approach was designed as the best means to investigate the nature of the otherwise amorphous topographic rise which was expected to lack any stone foundation materials.

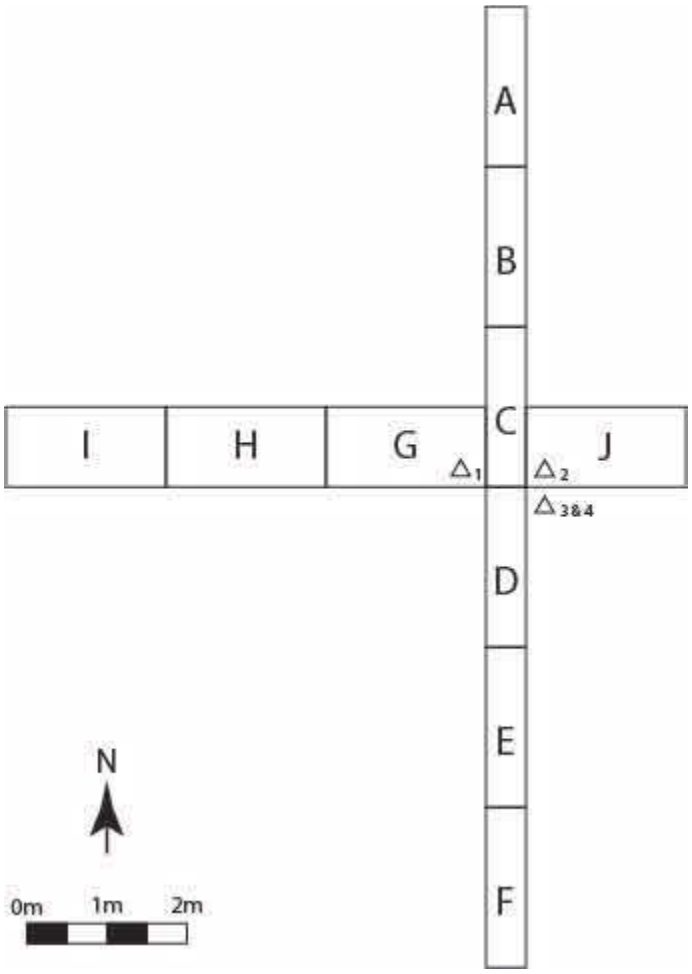

Figure 4.6 Operation 36 Plan-View map Showing Excavation Square and Datum Locations (map prepared by K. Flanagan).

Zone 1

The topzone of Operation 36 was a dark (10YR 3/2), loose sandy loam measuring approximately 10 cm thick with heavy grass and root bioturbation, a light artifact density and modern trash. This zone was observed in all squares, but only excavated in squares C through J. Zone 1 ends at a rocky context (Zone 5) change in Square C. Faunal bone was observed in Squares D and H, and historical metal fragments were observed in Square H. This zone was particularly thin in Square J, averaging only 2 cm before a context change was observed.

Zone 2

The second zone was an uneven, thin, earthen layer (2-5 cm thick) composed of a very dark greyish brown (10YR 3/2) semi-compact to loose sandy loam matrix. This matrix was found throughout Square F but only in the southern third of Square C and the southern quarter of Square E. A light artifact density (mid to late 20th century artifacts) was observed in this zone that included a coin dated 1956 (Square C), historical glass, metal fragments (Square E), whiteware sherds, and faunal bone (Square F).

Zone 3

The third zone was a "beachy" pebbled sandy clay layer (~10 cm thick) with a high density of charcoal inclusions. The matrix was dark brown (10YR 2/2) with a medium artifact density found within Squares C, E, F and J. This is the midden context found "heaping" on the northern and southern sides of Zone 4 (interpreted as the structure platform) (**Figure 4.7**). The difference between Zone 3 and Zone 4 was hard to detect due to a similarity in color and texture. The boundary between these two adjacent zones was determined based on compactness and artifact density. Zone 3 had a medium density of artifacts and a semi-compact matrix while Zone 4 was compact with a light density of artifacts. Some artifact mixing between the zones occurred as a result of the difficult-to-detect transition in Squares C and E. Zone 5 (limestone rock disturbance) was observed above this zone in Square J (**Figures 4.7** and **4.8**). Notable artifacts recovered from this midden context include slate pencil fragments, buttons, historical metal, glass, whiteware, prehistoric body sherds, both square-cut and round nails, a complete Vaseline bottle, a glass bottle stopper, kaolin pipe fragments, faunal bone and slate fragments. Additionally, a large chunk of burned wood was identified in Square F, 70 cm south of the northern edge of the square.

Zone 4

This zone is a compact, thin (2 cm) earthen layer below Zone 2 observed in Squares C, D, E, G, H and J. This zone is likely a platform associated with the historical structure. Due to similarities in color and texture, Zone 4 was difficult to distinguish from Zone 3 in Squares C and E, causing some possible artifact mixing. The dense compactness of this matrix and sparse artifact density distinguishes Zone 4 from the adjacent Zone 3. Evidence of disturbance was identified in Square D with the presence of plastic fragments along with historical whiteware sherds. This zone increased in depth in the southern portion of Square D. In Square H, this zone was only identified in the northeast corner. Artifacts recovered from this zone in Square J include historical glass, square-cut and rounded nails, whiteware sherds, prehistoric body sherds, slate fragments, a button, and metal fragments.

Zone 5

The fifth zone of Operation 36 was a 3-5 cm thick, compact lens of white limestone pebble-sized stones and sandy-gravel matrix (10YR 3/2) separating Zone 2 and Zone 1 from Zone 3 and Zone 4 in Squares C, G, and J. Elevations are generally lower in Square C. The stones were likely placed here to fill and level a localized depression that creates a puddle within the current walkway to the church during. Artifacts were nearly absent in this zone and those recorded from within Square C are likely more appropriately assigned to Zone 3. Artifacts recovered in Square G include a kaolin pipe stem, possible gun flint, metal fragments, glass fragments, and faunal remains. Artifacts recovered from Square J included plastic, an elastic hair tie, modern glass, a round nail, and a milk glass dish fragment. These were found close to Zone 1 and demonstrate the disturbed nature of this zone.

Figure 4.7 Operation 36 Zone 3 Midden Context within Square C (photograph by K. Flanagan).

Figure 4.8 Operation 36 Zone 3 Midden Context within Square J (photograph by K. Flanagan).

Zone 6

Zone 6 was a pit feature or possible post-hole identified within Zone 3 as a dark stain in the northeastern corner of Square D. The matrix was a sandy clay (10YR 2/1) matrix with charcoal and "beachy" pebble inclusions. The only artifacts recovered were three small faunal bones.

Zone 7

This zone was a brown, sandy clay earthen layer (6-12 cm thick) below Zone 3 with fine beachy pebble inclusions (light density; lighter than Zone 3). Zone 6 (pit feature/posthole) cuts

into this zone in the northeastern corner of Square D. Zone 8 is below this zone in the northern quarter (60 cm) of Square D. This zone was left unexcavated in Squares C, E, F, and G.

Zone 8

This zone was an earthen layer located below Zone 7. It was approximately 15 cm thick, composed of a beachy pebbled brown matrix (10YR 3/3) with limestone speckle inclusions and yellowish-brown mottling (10YR 5/6). Zone 8 was removed only in the north 60 cm of Square D to clarify Zone 6.

Zone 9

Zone 9 was a concentration of artifacts and charcoal (6 cm thick) in the northeast corner of Square C. The matrix was semi-compact silty clay (10YR 2/1) with a medium artifact density. Artifacts recovered include historic glass, nails, and prehistoric sherds. Some mixing of artifacts with Zone 3 occurred. This zone was initially interpreted as a burn pit but may also have been intermixed/displaced by tree root activity.

Zone 10

Zone 10 was a constricted vertical extension in Square D in order to reach the depth of the sterile clay zone (Zone 17) and tie into the stratigraphic sequence noted in other nearby operations. This zone was a dry, compact, sandy clay (10Y 3/4) terminated when the clay was encountered.

Zone 11

Zone 11 was a dark, sandy and loose matrix located off the topographical rise that guided the placement of this operation. This sandy zone indicates the end of the extent of the Zone 4 structure platform. The transition to Zone 4 in this square was difficult to detect. The soil color was similar to Zone 4, but the matrix was sandier and looser. Some artifacts from this zone may have been collected as Zone 4. A coin dated to 1961 was found at the interface of this zone and Zone 4.

Zone 12

This zone was initially excavated as a possible pit feature in the southern half of Square J. It had a semi-compact sandy clay matrix and was 21 cm thick. It was an ill-defined dark (10YR 2/2) soil stain with decaying ceramics, charcoal and faunal bone. Due to the friable nature of the artifacts, nothing was easily recovered. While the condition of the artifacts, the presence of

charcoal, and the color of the soil indicates potential burning, the nature of the stain suggests feature may also be the result of bioturbation associated with a no-longer-extant tree.

Zones 13, 14, and 15

These three zones were identified as pit features within Square J (**Figure 4.9**). Zones 13 and 15 were similar in matrix (semi-compact sandy clay, 10YR 2/2), dimensions and spacing, depth (~20 cm) and aligned roughly northeast to southwest. Zone 14 was another pit feature aligned with Zones 13 and 15. The matrix was a very dark gray stain with two concentric ring stains (an outer ring characterized by 7.5YR 3/1 soil and an inner ring of strong brown 7.5YR 4/6). Initial interpretations for these features include a possible fence line or wall posts.

Figure 4.9 Operation 36 Zones 13, 14, and 15 Excavated in Square J (photo by K. Flanagan).

Zone 16

The sixteenth zone was a disturbed layer of brown (10YR 3/2), semi-compact silty clay with heavy limestone speckled inclusions. The organically-shaped, "veiny" stains in this zone appear to be bioturbation from insects.

Zone 17

The final zone recorded for Operation 36 was identified as the sterile white mottled (7.5YR 4/6) semi-compact sandy clay layer found below all other excavations at this site. For this operation, a post-hole digger was used to excavate a portion of this zone within Square D. Limestone bedrock (10YR 6/3) was encountered underneath the clay.

Figure 4.10 Closing Shot of Operation 36 (photo by K. Flanagan).

Operation 36 Conclusions and Interpretations

The excavation of Operation 36 met the objectives that guided its placement. As expected, no direct architectural components were identified during the excavation of Operation 36. However, the distribution of artifacts and differences in relative soil compaction provided strong proxy evidence of where a structure once stood. Some of the features described above (Zones 13-15 in particular) may be signatures of some architectural elements such as small posts,

but the distribution and content associated with these features is not sufficient to confidently make that claim.

Table 4.1 Operation 36 Zones.

Zone	Squares	Soil Matrix		Contents
		Color	Texture	
1	C,D,E,F,G,H,J	10YR 3/2	Sandy Loam	Light: metal/plastic, animal bone,
2	C,D,E,F,G,J	10YR 3/2	Sandy Loam	1956 coin, plastic, glass, metal
3	C,E,F,J	10YR 2/2	Sandy Clay	Slate, charcoal, pipe stem, whiteware, glass (including intact glass bottle), bone, nails (round and square), slate pencil nibs, buttons, Maya ceramic sherds, glass stopper
4	C,E,D,G,H,J	10YR 4/3	Compact Sandy Loam	Whiteware, modern nail, metal, glass, slate, button bone
		10YR 2/2	Semi-Compact Sandy Clay	
		10YR 4/2		
5	C, G, J	10YR 3/1	Compact	Animal bone, glass, nail, plastic, milk glass, pipe stem, gun flint
		10YR 3/2		
6	D	10YR 2/1	Semi-Loose	Animal bone, charcoal
7	C,D,E,F,G	10YR 4/3	Semi-Compact	None
8	D	10YR 3/3	Semi-Compact	None
		10YR 3/3		
9	C	10YR 2/1	Semi-Compact	Animal bone, historical glass, historical metal, prehistoric ceramic body sherds, nails
10	D	10YR 3/4	Compact	None
11	H	10YR 4/3	Semi Compact	Modern debris
12	J	10YR 2/2	Semi-Compact	Ceramics, charcoal, animal bone
13	J	10YR 2/2	Semi-Compact	None
14		7.5YR 3/1		
15				
16	J	10YR 3/2	Semi-Compact	None
17	D	7.5YR 4/6	Semi-Compact	None

Regardless, these data collected serve to confirm ethnographic and historical evidence of regarding a structure located here. The artifact distribution pattern above described as "heaping" (Squares C and F) suggests that the orientation of the structure was off-cardinal. Further exposure of that signature would be necessary to better refine that observation, but it seems likely the it was oriented to roughly parallel the shoreline of the lagoon.

While the artifact collection from Operation 36 awaits further analysis, early interpretations suggest that the majority of the assemblage dates to the mid- to late- 1800's at the earliest. Additional initial observations provide further insight. Specifically, certain artifacts were recovered in relatively high concentrations in Operation 36 that were not recovered in similar densities elsewhere. These include, in particular, fragments of slate and slate pencil nibs. These artifacts speak directly to the use of the site in general, and this portion of the site in particular, as a school area; again, confirming other sources of information regarding the site. As is discussed throughout this chapter, the general archaeological signature of the site indicates many different categories of land use and activities. The fact that the Operation 36 location sees the highest concentration of artifacts associated with that educational component may be considered relatively strong evidence that the structure that stood here was a focus point for those activities. The schoolmaster's residence would certainly fit this description.

Operation 37

Objectives

As mentioned above, the primary objective of Operation 37 was to identify the privy associated with the historic buildings on the property. Assuming success in the primary objective, additional specific objectives guided the excavation; these included:

- Identification of sealed archaeological deposit that could inform some of the earlier stages of the historical period land use at the site;
- Controlled vertical excavation of a chronological sequence of refuse deposit to ideally inform changes in land use/material culture through time;
- Examine the material culture of turn-of-the-century Crooked Tree

Excavation Strategy

This operation was laid out as a 5 x 1 m unit with the long axis oriented north-south. As described above, the unit placement was selected in order to attempt to identify historic privies expected to be located toward the rear of the lot (see **Figure 4.3**). The operation was laid out so that Squares A and C (both 2 x 1 m) were centered on the locations of the privies as indicated by surface depressions and shovel testing. Square B was unexcavated in the space between the two depressions.

Zone 1

Zone 1 is the topsoil comprised of dark, organic rich earth (10YR 2/2). Very few stones or artifacts were recovered in this zone. The layer was about 10 cm in thickness across the square.

Zone 2

Zone 2 is a 10 cm layer comprised of sandy soil with small pebble inclusions (10YR 3/2). A significant number of historical artifacts (like bottle glass), modern refuse, and some animal bone were recovered in this zone. This layer is present across the square except for a layer of large stones in Square A (Zone 4) that is located along the north wall of the square.

Zone 3

Some of the historical metal observed during the excavation of Zone 2 was ultimately identified as the top of a metal drum (designated Zone 8). Zone 3 is an oval-shaped dark stain (10YR 2/2) that was found at the transition between Zones 2 and Zone 5 in Sq. C, excavated separately to ensure that the content of the drum was maintained as an isolated context. Plastic refuse was recovered during the excavation of Zone 3, indicating that it is a recent feature.

Zone 4

Zone 4 is a deposit of medium to large stones that are located only along the northern edge of Square A (**Figures 4.11** and **4.12**). These have been interpreted as capstones covering the top of the sealed privy to prevent collapse. The limestone complex was designated and excavated as Zone 4.

Zone 5

Zone 5 represents a change to sandier soil (10YR 3/2) and a sharp decline in archaeological material. Zone 5 was excavated until exposing the top of a barrel or drum. This zone averages 15 cm in thickness.

Zone 6

Zone 6 is a circular 60 cm barrel or drum. Based in the deteriorated metal that could be seen from the top of Zone 6, it was unclear whether this circular container was a wooden barrel with metal straps or a drum made entirely of metal. In an effort to answer this question and to investigate the chronology of the drum, the top 5 cm was removed from the fill inside the

barrel/drum. However, as we removed soil, pieces of the barrel metal continued to disarticulate, so these excavations ceased. Modern refuse (plastic) was found within this 5 cm, indicating that at the very least this latest part of the filling event (and the Zone 4 cap) was a recent event. Based on this data and the possibility of the recent disturbance at the site, it was decided that excavating the fill surrounding the drum itself (not its contents) would be a better indicator of when the drum was installed (see Zone 7 below).

Zone 7

Zone 7 is an 80 x 10 cm test trench that was dug within the fill of the construction pit into which the privy drums were installed (the overall pit was excavated as Zone 11; see below). The objective of sampling this fill was to determine the time the drum was set into place and presumably used. This zone is about 50 cm in depth (from 39 cm below datum [cmbd] to 92 cmbd). At the bottom of the zone, between 80 and 92 cmbd a small piece of plastic and what appears to be a wire were recovered. These finds indicate that this barrel/drum is not historic, but rather was set into place, used, and capped/closed in modern times.

Figure 4.11 Operation 37 Zone 4 Stones above Zone 6.

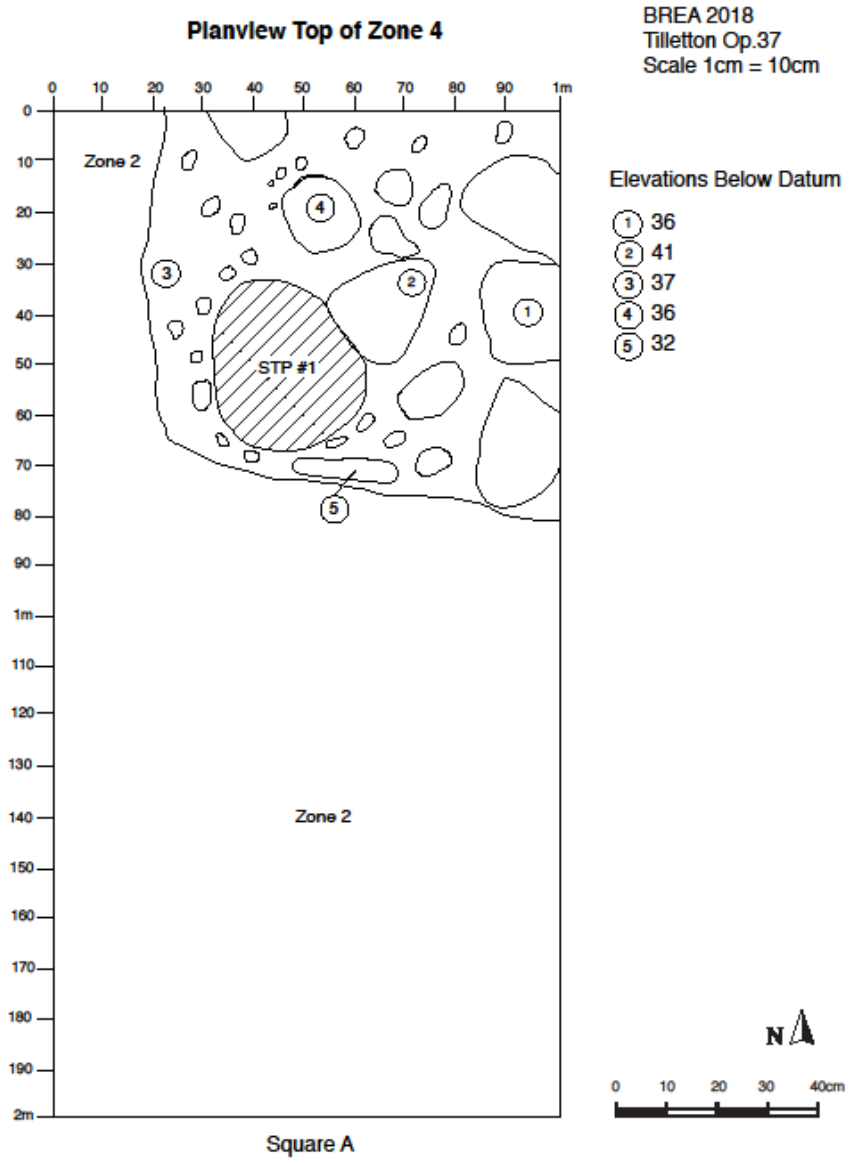

Figure 4.12 Operation 37 top of Zone 4.

Zone 8

Zone 8 is one of two circular containers that were found during excavations in Square C. Zone 8 is the southern container and measures 60 x 60cm. The soil within the drum is compact and dark (10YR 2/2). The metal was better preserved in Zone 8 and we were able to excavate farther down into it (25 cm) (**Figure 4.12**). From these excavations it is clear that this is a metal drum and not a wooden barrel. A mix of modern and historic refuse was recovered from the excavations of the Zone 8 drum, including plastic, aluminum foil, historic bottle glass, and an

intact bottle of Woodward's Gripe Water, which it has been difficult to definitively date but is almost certainly no older than 1876.

Figure 4.12 Operation 37 Excavation into the Southern Drum in Square C (Zone 8).

Zone 9

Zone 9 is the northern drum. Like Zone 8, the Zone 9 drum also measures 60 cm in diameter. Since the Zone 10 fill clearly surrounds both drums, suggesting they were put in place and presumably used simultaneously, Zone 9 was left unexcavated.

Zone 10

Zone 10 represents the pit fill into which the two drums were placed (**Figure 4.13**). It is clay-rich and heavily mottled (10YR 2/2 and 7.5YR 5/6). The Zone 10 trench itself is a 140 x 20 cm excavation within Square C. Zone 10 was excavated 70 cm below the top of the drums. It is

the equivalent of Zone 7 from Square A. Unlike Zone 7, no modern materials were recovered from the larger Zone 10 exposure.

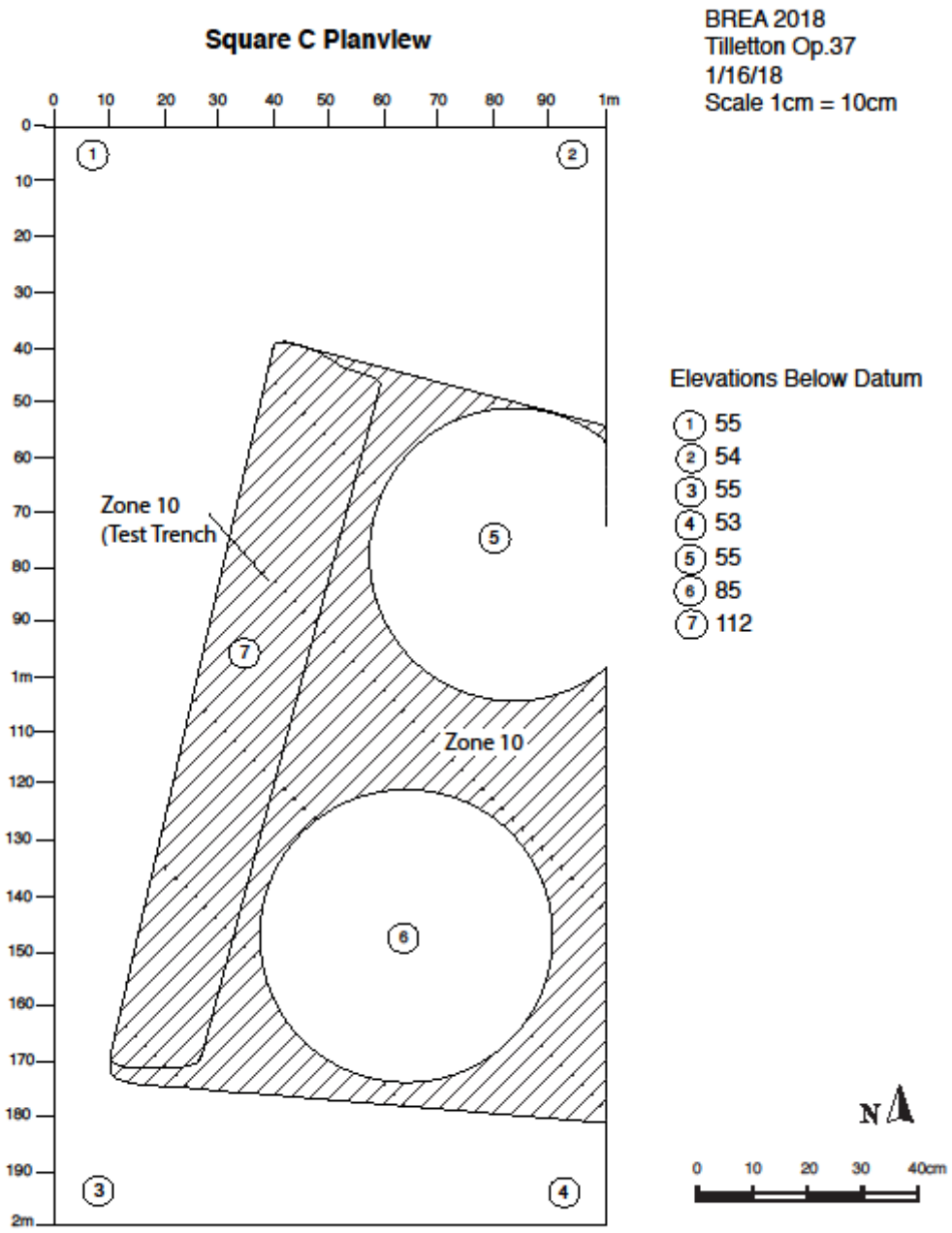

Figure 4.13 Operation 37 Zone 10 Square C Planview.

Zone 11

In Square C, soil patterns identified during the excavation of Zone 5 clearly identified the intrusive pit into which the metal drum lined privy was installed. Meanwhile, excavation of the

interior of the privies was logistically challenging and the top layers from the Square A privy (Zone 6) were yielding a mixed artifact collection. In order to assess the chronology of the privy installation, a portion of the surrounding trench was excavated rather than the interior of the drums. This installation pit into which the privy drum was placed was excavated as Zone 11. Zone 11 is demarcated by a clear color (10YR 2/2) and soil change. Lighter inclusions (7.5YR 5/6) are present throughout. The soil is very rich in clay and forms a rectangle around the drum (**Figure 4.14**; Note: this was also observed in Square C – see below). Few artifacts in general and no modern materials were recovered from this zone.

Figure 4.14 Operation 37 Zone 6 Drum with Zones 7 & 11 Fill.

Zones 12 & Zone 13

During the final cleaning of Square A two small circular pit features were uncovered within Zone 5 (the matrix into which the privy drums and installation pit were excavated and subsequently filled) (**Figure 4.15**). Zone 12 (5YR 3/2) and Zone 13 (10YR 2.5/3) are both dark stains that, after being fully excavated to a depth of roughly 9 cm, yielded no archaeological material.

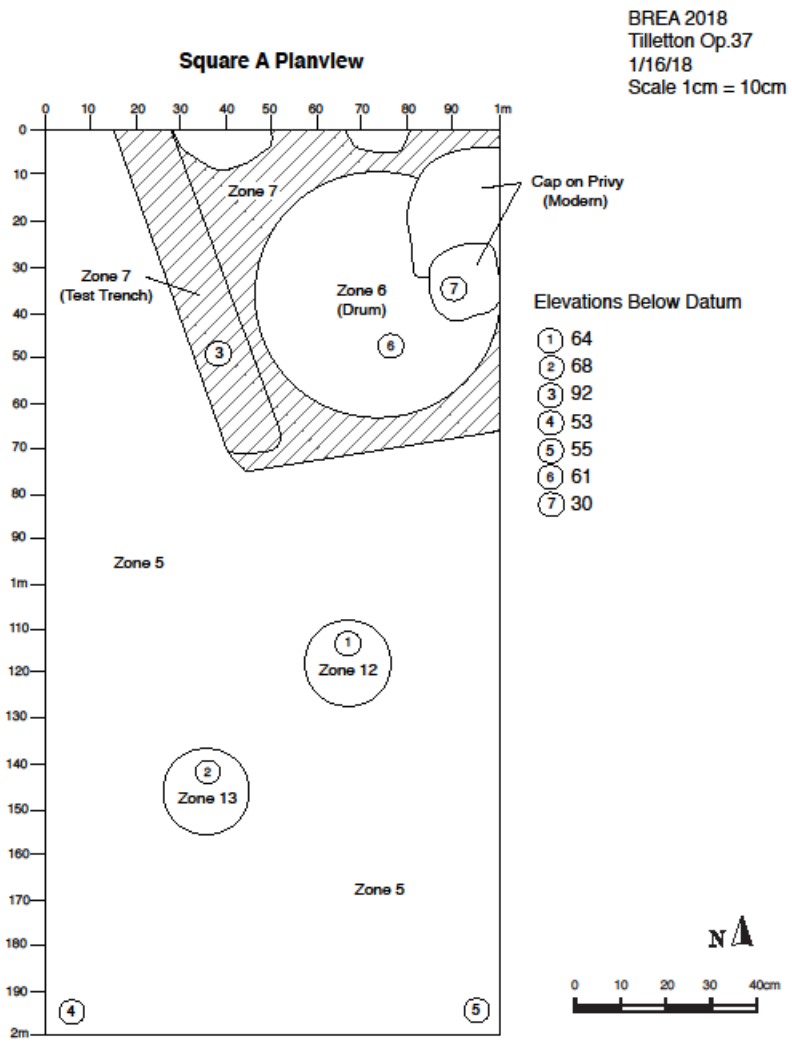

Figure 4.15 Operation 37 Square A Planview with Zones 5, 7 12, and 13.

Operation 37 Conclusions and Interpretations

As stated above, the primary objective of Operation 37 was to identify a portion of the lot containing the privies associated with the historical use of the site and recover the materials deposited in those features. Certainly, the first half of that objective was accomplished. However, the material recovered from the privy contexts and, more importantly, the pit excavated for the installation and construction of those privies was not particularly old. Though a more comprehensive artifact analysis is still underway, a preliminary assessment of the artifact assemblage indicated that the features likely date to the mid-1800s at the earliest. Concentrations of artifacts dating to roughly the same time period were also identified in different portions of the Tilletton site and were being investigated concurrently through the other operations described in this chapter. Those assemblages were recoverable with a considerably

reduced level of effort than the excavation of the contents of two constricted 50-gallon drums. Accordingly, Operation 37 was terminated once the relative chronology of the privy features and the other Tilletton deposits was generally established. While the privy features and their contents remain intact for future excavation if further investigation should be warranted, the excavations related to the identification and preliminary characterization of these features provided artifact data that complements rather than significantly expands upon the data recovered throughout the site.

Table 4.2 Operation 37 Zones.

Zone	Square	Soil Matrix		Contents
		Color	Texture	
1	A,C	10YR 2/2	Semi-Compact	Historical ceramics, historical glass
2	A,C	10YR 3/2	Semi-Compact	Historical ceramics, historical glass, historical metal, animal bone
3	C	10YR 2/2	Semi-Compact	Historical ceramic, historical glass, modern refuse
4	A	10YR 2.5/1	Semi-Compact	Historical ceramic, historical glass, modern refuse
5	A,C	10YR 3/2	Semi-Compact	Historical ceramic, historical glass, historical metal, animal bone, modern refuse
6	A	10YR 2/1	Semi-Compact	Historical glass, historical metal, historical ceramics
7	A	10YR 2/2 7.5YR 5/6	Compact	Historical glass, historical ceramic, historical metal
8	C	7.5YR 2.5/2	Semi-Compact	Historical ceramic, historical glass, historical metal, modern refuse
9	C	N/A	N/A	N/A
10	C	5YR 5/6	Compact	Historical ceramic, historical glass, historical metal
11	A	10YR 2/2	Semi-Compact	Historical ceramic, historical glass, historical pipe stem
12	A	10YR 3/2	Semi-Compact	None
13		10YR 2.5/2		

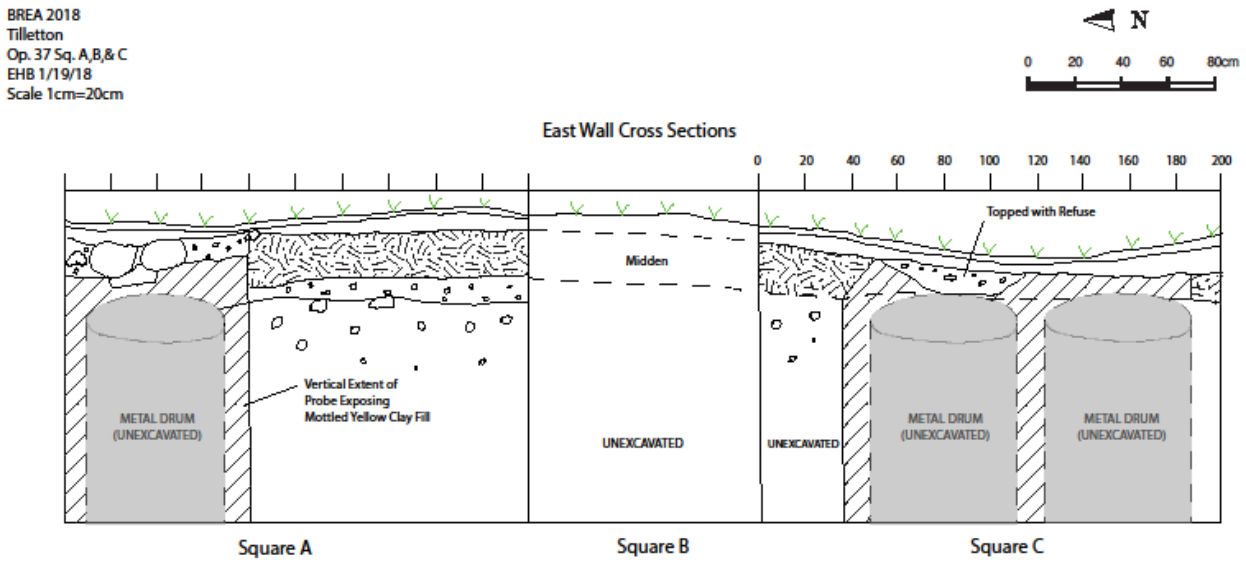

Figure 4.16 Operation 37 Planview.

Operation 38

Objectives

The primary goal of Operation 38 was to isolate and learn more about the artifact-rich "midden layer" that was observed just below the topsoil during shovel testing and during the excavation of Operations 36 and 37 (see **Figure 4.3** above). Additional specific objectives guiding excavation of Operation 38 included:

- Expand collection of a high diversity of artifacts in order to more thoroughly document the material culture associated with the historical occupation of the site;
- Investigate potential vertical variation within the deposit that may suggest changes through time
- Establish the archaeological signature for general refuse at the site to allow for a contrast to/comparison with the signature of the specific feature types investigated in Operations 36 and 37 (structure and privy, respectively).

Excavation Strategy

In order to efficiently meet the specific objectives listed above, all zones below the topsoil were separated arbitrarily every 10 cm and excavated relatively quickly with mattocks, hand picks, and trowels. Operation 38 began as a 3 x 1 m trench directly east of Operation 37 (Square A) and was then extended to the east (Squares B and C) and to the west (Square D).

Square B measures 1 x 1 m and abuts Square A. Square C measures 2 x 1 m extends from Square B.

Zone 1

This is the 5-10 cm of topzone (10YR 2/2) that contains very few artifacts. This zone sits on light grey, loose sandy matrix, which was mostly removed as part of Zone 1.

Zone 2

This is a dark sandy soil (10YR 2/1) with small pebbles and a dense concentration of artifacts. Given the high density of artifacts and dark soil matrix, this was initially identified and approached as a midden deposit, though later analysis suggests it may be more appropriately considered a redeposited midden (see below). It is comprised of historic and Maya artifacts (**Figure 4.17**). This zone represents the top 6-8 cm of the midden deposit.

Figure 4.17 Operation 38 Zone 2 Midden Deposit.

Zone 3

Zone 3 is comprised of a midden-rich dark matrix (10YR 2/1) with a light density of inclusions (1-4 cm) and a high density of historical material. This zone represents the bottom 10-15 cm of the midden deposit. At the base of Zone 3 we encountered some larger stones and a higher density of pebble inclusions. There was a high density of fragmentary animal bone mixed in with midden debris. As with Zone 2, some ancient Maya artifacts were present, including a ceramic net weight recovered from Square C.

Zone 4

Zone 4 is a relatively thin (3-4cm) earthen layer (10YR 2/1) underlying the Zone 3 midden. Within this zone we found large stones directly on top of the clay bed. Close examination of the distribution of these stones in the view afforded by the Operation 38 layout ultimately determined that they were not deliberately placed/arranged. That is, the stones seem far more likely to represent natural deposition rather than placement reflecting any architectural or other intentional purposes. Very few artifacts were recovered in this zone.

Zone 5

This zone is comprised of dense clay (7.5YR 3/2). In Square A Zone 5 is only represented by a 50 x 50 cm test excavation in NW corner of trench. In both the Square A test trench and in Square B, excavation extended 10-15 cm down into the clay bed to confirm that this layer represented sterile soil. No cultural material was recovered from this zone.

Zone 6

Zone 6 represents the top 5cm of the midden deposit in Squares B and C. This zone is comprised of fairly loose dark soil (10YR 2/2) with some limestone inclusions and small cobbles as seen in Zone 2 of Squares A and D. Some artifacts were recovered, but not the density that was found in Squares A and D.

Zone 7

Zone 7 is a dark (10YR 2/1), loose matrix with small and large stone inclusions and is the bottom 10-15 cm of the midden deposit in Squares B and C. This zone corresponds to the Zone 3 midden filled matrix in Squares A and D. The density of midden material was high in the western edge of Square B and continued west in to Squares A and D. The density of the midden is dramatically reduced on its eastern end in Squares B and C. Towards the base of Zone 7 in Square B an iron cross was exposed (**Figure 4.18**) along with several dark pit features. None of

the pit features were excavated, as their shape suggests they were likely caused by prior tree disturbances.

Figure 4.18 Metal Cross Found at the Bottom of Zone 7, Square B. (photo by E. Harrison-Buck).

Operation 38 Conclusions and Interpretations

The excavation of Operation 38 greatly expanded the volume and diversity of the artifact collection from the Tilletton site. The assemblage from Operation 38 includes materials similar to those found elsewhere through the site associated with what seems to be the full chronological span and range of activities represented here. Unfortunately, neither the vertical excavation profile nor any initial assessment of the artifacts suggests any stratified sequence of deposit. Therefore, it is not possible to document any changes through time in the assessment of data recovered from Operation 38. It was also difficult to ascertain the character of the deposit based on its horizontal characteristics. Given the density and diversity of the artifact assemblage this feature was interpreted as a refuse deposit, but there was no archaeological indication of any kind of bounding pit feature (with the exception of Zone 8 at the bottom of the sequence). Similarly, the deposit failed to yield a profile suggesting any degree of mounding, like might be expected from more of an intentional and sustaining refuse heaping over time. Instead, the artifact assemblage seems to have been more less broadcast over this particular part of the lot in what seems to have been a one-time or at least a relative short-lived event. Based on this observation and the mixed nature of the artifacts within the deposit, the current interpretation of this feature

is that it was created during the construction of the newer church building. It seems likely that a more typical refuse pit, mound, or sheet midden existed in the location of the current church which would have then been towards the rear of the older buildings documented on the 1868 map. During the construction of the newer church building, existing refuse features may have been excavated and redeposited further toward the back of the lot in the area investigated through Operation 38.

Figure 4.19 Operation 38 (Squares B and C) and Modern Church. Note iron cross in foreground (photo by E. Harrison-Buck).

Table 4.3 Operation 38 Zones.

Zone	Square	Soil Matrix		Contents
		Color	Texture	
1	A, B, C, D	10YR 2/2	Silty-Clay	Historical ceramics, glass
2	A, D	10YR 2/1	Silty-Clay, Sandy-Silt	Historical ceramics, historical glass, historical metal, historical pipe stem
3	A, D	10YR 2/1	Silty-Clay	Historical ceramic, historical glass, historical metal, historical pipe stem, animal bone, lithic debitage, ceramic net weight, Maya ceramic sherds
4	A,D	10YR 2/1	Silty-Clay	Historical ceramic, historical glass, lithic debitage, historical metal, Maya ceramic sherds
5	A,D	7.5YR 3/2; 7.5YR 4/3	Clay	None
6	B, C	10YR 2/2	Silty-Clay	Historical ceramic, historical glass, historical metal, historical pipe stem
7	B, C	10YR 2/1	Silt; Silty-Clay	Historical ceramic, historical glass, historical pipe stem
8	B	10YR 2/1	Silty-Clay	Historical metal cross

Interestingly, the artifacts collected from throughout the Tilletton site lacked materials that can be directly associated with the site's function as a church yard. While the current land use, ethnographic interviews, and historical documentation all indicate that the church was the central component on this lot from at least the mid to late 1800s, the vast majority of the artifacts seem to be general domestic/residential refuse. The iron cross recovered from Zone 8 of Operation 38 is the one clear exception.

Operation 39

Objectives

Like Operation 38, the general objective of Operation 39 was to explore the densest artifact deposit at the Tilletton site. Shovel testing had identified that the dense deposit targeted in Operation 38 extended to the north to the west side of the current church building. Several specific objectives guided excavation; these include:

- Explore potential horizontal variations in the distribution of artifacts and artifact types within the midden deposit;
- Investigate potential for vertical stratification that could inform change at the site over time;
- Expand the collection of artifacts informing turn of the century Crooked Tree.

Excavation Strategy

Operation 39 was a 3 x 1m trench oriented north-south located north of Operation 38. The trench was not divided into separate squares but was instead excavated and recorded as a single unit. It was excavated according to natural stratigraphy with all soils passed through a 1/4-inch screen.

Zone 1

This is the 5-10 cm of topzone (10YR 2/2) that contains very few artifacts. This zone sits on light gray, loose sandy matrix.

Zone 2

Zone 2 was defined arbitrarily (5-10 cm) and is comprised of silty clay (10YR 3/2). The bottom of this zone also corresponds to the top of the artifact concentration. A glass bottle and enigmatic metal object (maybe barbed wire) were found on the south side of the trench.

Zone 3

This is an arbitrarily defined zone (10 cm thickness) and is comprised of silty clay (10YR 3/2). The densest concentration of artifacts from Operation 39 was recovered in this zone, but this density is considerably lower than in Operation 38 at the same elevation.

Zone 4

This zone was arbitrarily defined (5 cm) and is comprised of silty clay (10YR 3/2). This thin zone represents the bottom of the artifact concentration and the top of sterile soil.

Zone 5

This zone comes down on a sandy layer (10YR 3/2) with abundant inclusions of small rocks and pebbles. Three dark stains were found across the zone, which were excavated

separately as Zones 7, 8, and 10 (Zone 9 was not assigned). The zone is about 5 cm in thickness and was ended due to the presence of the three potential pit features.

Zone 6

This zone represents the sandy layer down to the natural clay bed (7.5YR 3/2) and measures 10-15 cm in thickness. This is clearly the same clay bed that was found in Operation 38. The clay bed itself was not excavated. Four pit features were found at the bottom of this zone (Zones 11, 12, 13, and 14).

Zones 7, 8, and 10

Zones 7, 8, and 10 represent the three dark stains (5YR 2.5/1) that were found at the bottom of Zone 5. The top 10 cm was removed from all three of these zones and no cultural material was recovered from any of these features

Zones 11,12, 13, and 14

Zones 11, 12, 13 and 14 represent the four dark stains (5YR 2.5/1) that were found at the bottom of Zone 6. The top 10-20 cm was removed from all four of these zones and no cultural material was recovered from any of these features.

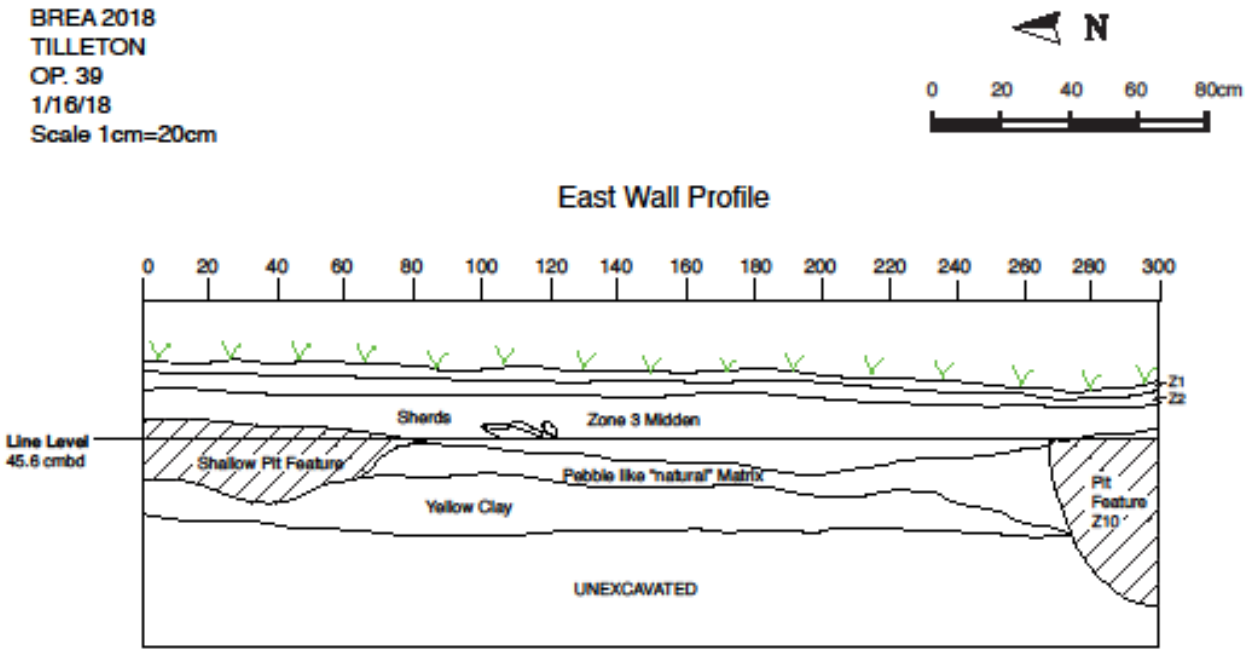

Figure 4.20 Operation 39 Profile.

Table 4.3 Operation 39 Zones.

Zone	Soil Matrix		Contents
	Color	Texture	
1	10YR 2/1	Silty Clay	Historical ceramic, historical glass, historical metal, historical pipe stem
2	10YR 3/2	Silt Clay	Historical ceramic, historical glass, historical metal, historical pipe stem
3	10YR 3/2	Silty Clay	Historical ceramic, historical glass, historical metal, historical pipe stem
4	10YR 3/2	Silt Clay	Historical glass, historical metal, historical pipe stem
5	10YR 3/2	Silty Clay	None
6	10YR 3/2	Silt Clay	None
7	2.5YR 2.5/1	Silty Clay	None
8	5YR 2.5/1	Silt Clay	None
10	5YR 2.5/1	Silt Clay	None
11	5YR 3/1	Silty Clay	None
12	5YR 3/1	Silt Clay	None
13	5YR 2.5/1	Silt Clay	None
14	10YR 3/2	Sandy Loam	None

Operation 39 Conclusions and Interpretations

Investigations at Operation 39 largely confirmed the observations from Operation 38. Regarding the layer of midden debris, it is considerably less dense than it is to the south in Operation 38. The nature of the midden was better characterized through the excavation of Operation 39, though it largely confirms that observations listed above in reference to Operation 38. That is, it seems likely that this midden was also redeposited from the area of the current church building.

Operation 40

Objectives

As discussed above, the collection recovered during the shovel testing of the Tilletton site was generally assessed for two characteristics: artifact density and artifact diversity. One portion of the Tilletton site yielded a considerably higher amount of metal than elsewhere. Though the density was relatively low, shovel testing in this portion of the site added a significant element of

diversity to the overall assemblage. The Tilletton site was initially established as a base for a logwood harvesting operation. The archaeological signature of a logging site is likely to include a high proportion of metal artifacts associated with the implements involved in those activities. The greater representation of metal in this portion of the site was, therefore, interpreted as a potential indicator of some of the oldest history of the site's occupation. The specific objective of Operation 40 was to further explore that potential deposit

Excavation Strategy

Operation 40 is a 1 x 1 m square (Square A) located west of Operation 39. Given the high density of metal artifacts identified near the surface, this operation was excavated in relatively thin levels. All excavated soils were passed through a 1/4-inch screen.

Zone 1

This is the 5-10 cm of topzone (10YR 2/2) that contains very few artifacts. This zone sits on light grey, loose sandy matrix.

Zone 2

Zone 2 is a thin (~5cm) layer of light gray sandy loam matrix (10YR 2/2) below the zone 1 topsoil. Artifact density is relatively light with some modern debris found. At the base of Zone 2 a layer of historical debris was defined and removed as Zone 3.

Zone 3

Zone 3 is a 10-15 cm layer of light gray sandy loam matrix (10YR 2/2) that contains a concentration of historical artifacts found below the Zone 2 matrix. The density of material is much lower than the midden debris found in Operation 38, and even that found in Operation 39. Material was found in relatively thin layer across the 1 x 1 m square, similar to Operation 36. A relatively high density of slate and metal was recovered (**Figures 4.21** and **4.22**).

Zone 4

Zone 4 is a dark circular stain (7.5YR 4/3) that was defined toward the base of the Zone 3 midden deposit. It intrudes into the Zone 7 earthen layer (see below). A metal object resembling a tin can was found directly above Zone 4 and it or its original contents may have caused the dark staining. The object was removed as part of Zone 4. The top 5 cm of the stain was excavated.

Figure 4.21 Operation 40 Zone 3 Midden Deposit.

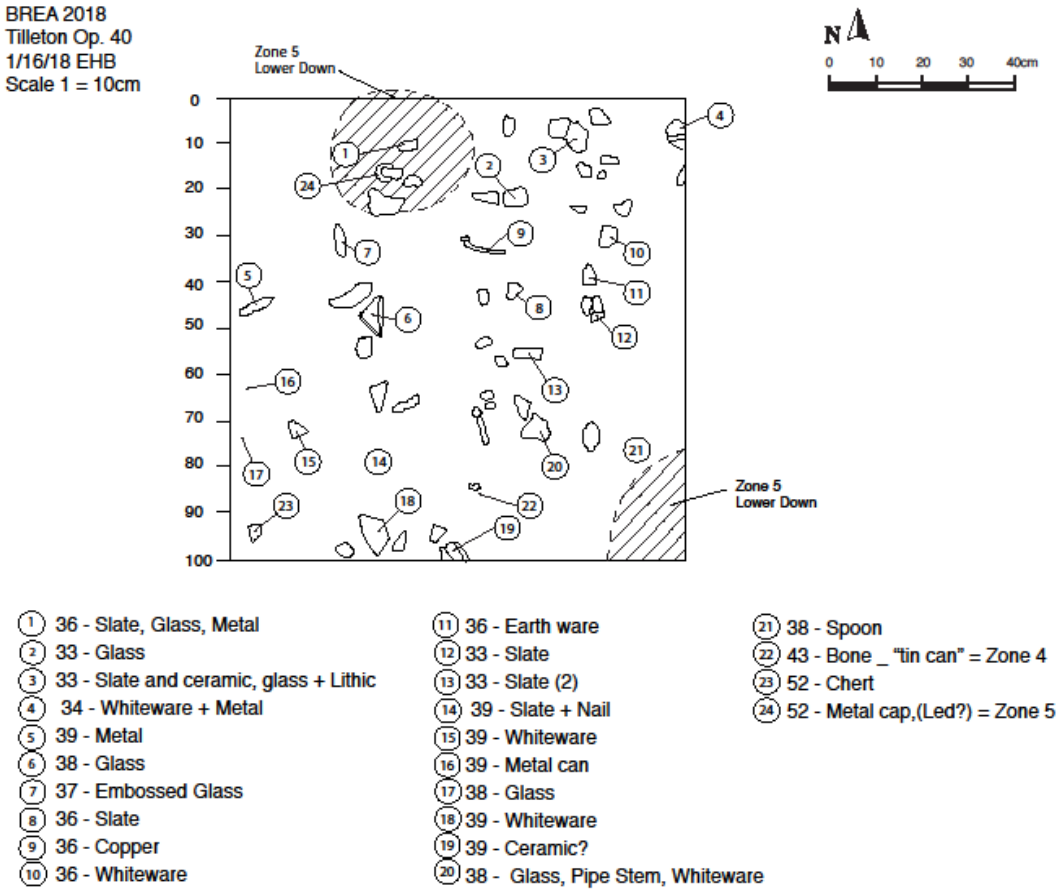

Figure 4.22 Operation 40 Zone 3 Midden Deposit Plan View Drawing.

Zone 5

Zone 5 is similar to the Zone 4 stain in color (7.5YR 4/3) and shape. Originally thought to be a pit feature, this shallow depression held a metal object, possibly a lid or cap to something like a milk jug in terms of size. The top 5cm of the stain was excavated and little else was found associated with this feature.

Zone 6

Zone 6 is also a dark-colored feature intruding into the Zone 7 earthen layer. Unlike Zones 4 and 5 which are shallow depressions, Zone 6 is a much deeper pit, 16 cm in depth, and is the size of a posthole. Modern debris is found at the base suggesting this is a recent posthole that was dug into the ground and penetrated the earlier surface. At the base of Zone 6 the sterile yellow clay found in Operations 38 and 39 was visible.

Zone 7

Zone 7 is an earthen layer (10YR 3/4) that underlies the Zone 3 midden debris. Three dark features appeared to cut into this surface (Zone 4, 5, and 6). Very few artifacts were found in the earthen layer.

Zone 8

Zone 8 is the yellow clay matrix (7.5YR 4/6) below the Zone 7 tan sandy layer. It is devoid of artifacts and appears to be the natural strata that underlies the whole area.

Operation 40 Interpretations and Conclusions

Operation 40 confirmed the stratigraphy that was established in Operations 38 and 39. The relative paucity of midden debris found in Operation 40 also helps to further define the distribution of that rather enigmatic layer of largely historic-era trash that is present just below the surface at this site. The specific objective of Operation 40 was to explore the possibility that the higher concentration of metal in this area might reflect an earlier component of the site's chronology. This approach was based on the assumption that the earlier use of the site as a headquarters for logging activity might be characterized primarily by metal artifacts. While the higher concentration of metal objects identified in the area of Operation 40 was confirmed during excavation, the metal artifacts do not seem to be related to logging. Furthermore, none of the artifacts recovered from Operation 40 seem to date to any earlier occupation than the materials that characterized the majority of the site's assemblage

Table 4.4 Operation 40 Zones.

Zone	Soil Matrix		Contents
	Color	Texture	
1	10YR 3/2	Sandy loam	None
2	10YR 2/2	Sandy loam	Modern refuse
3	10YR 2/2	Sandy loam	Lithic debitage, historical ceramic, historical glass, historical metal, historical pipe stem, Maya ceramic
4	7.5YR 4/3	Silty sand	Animal bone, historical metal
5	10YR 3/2	Silty sand	Historical metal
6	7.5YR 3/2	Sandy clay	Historical glass
7	10YR 3/4	Sandy silt	None
8	7.5YR 4/6	Clay	None

Overall Interpretations and Conclusions

The results from each of the operations is discussed above with reference to the specific objectives associated with those excavations. This section will discuss the conclusions of these investigations at different scales. First, the excavation of Operations 36 through 40 helped to refine our understanding of the land use and development of the Baptist Church site. This data has helped document land use dating back a relatively ephemeral Pre-Columbian Maya presence through to a heavily represented occupation dating to the mid- to late- 1800s. In that later, archaeologically rich era, artifacts associated with residence, education, activities have been found in abundance with minimal archaeological reference to the religious aspect of the site. Artifacts also suggest that this site hosted activities for wide cross-sections of the community including children (represented by things like slate, slate pencils, and doll fragments) as well as adults (including abundant evidence of tobacco and alcohol consumption). This data has helped refine an understanding of the site chronology and the development and changes to the architectural components of the site. This data has helped complement the information recovered from historical and ethnographic sources. Combined, this data helps present a fuller, more rounded picture of historical Crooked Tree.

The excavations at Tilletton have also provided a more nuanced understanding of the larger context in which historical Crooke Tree Village existed. The village of Crooked Tree – for all of its historical significance – has always been a remote, relatively inaccessible settlement (Harrison-Buck et al. 2019). Historical records document the difficulty in maintaining communication and trade between Crooked Tree and the larger population center in Belize City. Ethnographic interviews discussing previous generations and personal recollections of some of Crooked Tree's living residents support that ideal of isolation, featuring stories of weeks-long canoe trips for annual supply runs to the capitol. The construction of a causeway connecting the

community to the highway has addressed that isolation in recent decades, but it remains an aspect of community identity today. Given that geographic circumstance, it may be reasonable to expect that the earlier residents would have had minimal access to exotic materials. It certainly may be true that the materials available to Crooked Tree residents were limited by comparison to the residents of, say, Belize City. Further, it may also be true that the Tilletton site was a central, high profile, high status part of the community and that this might be reflected in the associated artifact assemblage. Nevertheless, the diversity of materials recovered from the Tilletton site do not seem particularly illustrative of a backwater settlement cut off from extensive trade networks and markets. Quite the contrary, preliminary analysis of the assemblage suggests that these materials represent an extensive global network, with artifacts potentially indicating a range of activities, age groups, and social statuses.

Finally, and perhaps most importantly, the excavations of the Tilletton site facilitated a deeper connection between the community members and the site's history. Much of the BREA team's excavation efforts have focused on pre-Columbian Maya sites usually in relatively remote, fairly inaccessible areas. The residents, informants, and laborers that we work with are aware of these sites and many are intrigued to varying degrees. It is not rare for considerable speculation to take place at a Maya site excavation, guessing at the function of unusual objects and features. At Tilletton, though, the focus the center of town; in an area that people walk past every day, where some of them attend church services, and were some of the elders attended school as children. Furthermore, the excavations yielded familiar materials; objects that were just like examples owned by the grandparents of our excavators and site visitors that were often direct parallels to tools and objects used today. This closer geographic and personal proximity to the excavations and the material culture they were producing allowed for a different level of interest and connection. To further harbor those connections, the Tilletton site hosted a public archaeology day where nearly every child in the village came to visit and learn about the archaeological process, inspect the excavations, ask questions and handle the artifacts that were coming out of the ground. Many of the village's adult residents also took advantage of the open house alongside the children. Finally, the collections from Tilletton are featured prominently at the Crooked Tree Museum and Cultural Heritage Center that opened the year after the excavations were conducted. Archaeological investigations of the historical Crooked Tree village continue alongside with the ongoing research at the area's pre-Columbian Maya sites. In these ongoing efforts, it is hoped that the successes of the Tilletton excavations described here can be repeated.

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Chapter 5

Shovel-Test Pitting and Excavations at Nicholson's Landing (Operation 41)

Kelin Flanagan

Introduction

On an 1868 map of the Crooked Tree property referred to as "Tilletton" there are a series of linear features extending across the property that appear to represent old village roads, which still run through the village today and are primarily used as foot paths (Harrison-Buck et al. 2019:216 [see **Figure 4.1**]). One of the roads on the archival map connects to what looks like a small pond feature with an associated house structure, located on eastern side of the island along the Crooked Tree lagoon, referred to on the map as the Northern Lagoon. Harrison-Buck and colleagues (2019:217) concluded:

> With no road to the Crooked Tree island, boats were the primary means of transportation prior to the building of a causeway to the Crooked Tree island in 1983. One local indicated that it was here that everyone used to dock their boats and a person by the name of Jex who lived in the house on the lagoon was in charge of the public boat transportation to Belize City. Only later when roads became the main mode of transportation did the Jex boat transportation become the Jex bus transportation that still exists today.

The goal of the shovel test-pitting on the shoreline during January 2018 was to locate the remains of the nineteenth century house demarcated on the map. Shovel test-pitting in the area along the shore was most intensive around a depression feature initially interpreted as a pond containing little water. The depression more closely resembles other wetland features known as pocket *bajos* that have been found on the southern end of Crooked Tree island (see Runggaldier, Harrison-Buck, and Krause, this volume). No definitive spike in artifacts was identified during the shovel test-pitting operation, but a concentration of historical material (glass and whiteware ceramics) was observed on the surface along the shoreline near the SE corner of Earl Nicholson's property on the eastern edge of the shoreline road. This concentration of historical artifacts visible on the surface of what is locally referred to as Nicholson's Landing determined the placement of Operation 41. Operation 41 is a 1m (E-W) x 2m (N-S) unit divided into two 1 x 1 m squares (A and B) placed right at the waterline on the eastern shore of Crooked Tree island

(**Figure 5.1**). The unit was located roughly 1.3 m west of standing water and was roughly 4.5 m NW of a powerline pole located in standing water at the time of excavation.

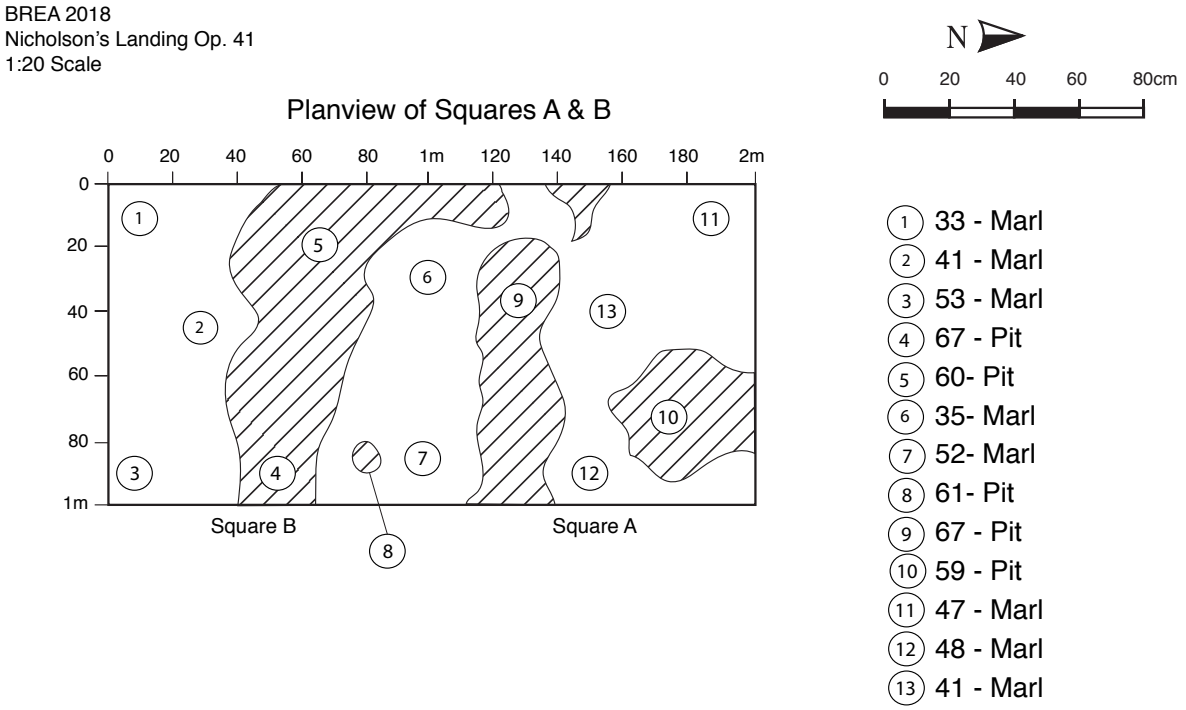


Figure 5.1 Plan-view of Nicholson's Landing Excavation (drawn by K. Flanagan, digitized by K. Titus).

Excavation Objectives

1. To locate any features related to the historical artifacts present on the surface.
2. To find evidence that this location was once used as a mooring location possibly temporarily associated with the structure on the 1868 map.
3. To recover diagnostic artifacts that would establish date ranges for the historical occupation.

Description of the Research and Methods Used

Reasons for placing the excavation along the eastern shore of Crooked Tree island at Nicholson's Landing include the presence of historical artifacts found on the surface Additionally, local knowledge indicated that this shoreline location was used to moor boats prior to the construction of the Crooked Tree causeway and likely would tie into the investigations of the Tilletton historical site (Kaeding et al., this volume). Operation 41 was placed where the

concentration of historical artifacts was most dense. Three people worked for three days with shovels, trowels, and a ¼" mesh screen until a sterile, undulating, eroded bedrock was reached. All artifacts were collected. Eight distinct zones were defined in Operation 40, as described below.

Zone 1

Zone 1 was a topzone composed of dark sandy loam mixed with a loose brown sand, grass and roots. This zone was unevenly distributed in both squares. The thickness of the matrix ranged between 1 cm and 8 cm thick. It was most present in the western half of the Operation and sloped up, eastwards, in both squares.

The matrix in square A was a dark (7.5YR 3/1) loose sand with similarly colored sandy loam mixed in. Evidence of bioturbation in the form of roots, grass and periodic inundation from the lagoon were apparent. This zone was unevenly distributed across the square. It ended when a dark, compact sandy clay was reached (zone 2). This zone, in square A had a light artifact density.

The matrix in square B was a damp, loose sand (7.5YR 5/1) located mostly in the southern half of square. Patches of compact white clay (7.5 YR 8/2) were identified at higher elevations in the SW and NE corners. This zone, in square B, yielded a medium artifact density of lithic debitage, historical ceramics and glass, and prehistoric pottery sherds. Approximately 55 artifacts were recovered in this zone.

Zone 2

Zone 2 was an earthen layer of dark sandy, semi-compact clay, identified below zone 1. Elevations and presence of this matrix vary radically between the two squares. This zone ended in Square B when the white marl was reached everywhere but the center of the square. Zone 2 ended in Square A when a more compact, undulating, white clay matrix was reached (zone 3).

The matrix in Square A was a dark, semi-compact, sandy clay (10YR 2/1) throughout most of the square, except in the northeastern corner where there was a grayish-white compact clay (Z3). This zone ranged from 3 cm to 8 cm thick, with the thickest areas in the western half of the square. Artifact density was medium (n = 30) and included lithic debitage, historical ceramics and glass, and prehistoric pottery sherds.

The matrix of Square B was a dark (10YR 3/2), semi-compact sandy clay below zone 1. This zone ends at white marl/clay (zone 3) which was revealed all over the square except for a pocket of soil in the center of the square (removed as zone 4). The thickness ranged from 3 cm to 20 cm with the greatest depth in the center of the square. Approximately 40 artifacts were recovered from this zone and square including lithic debitage, historical ceramics and glass, a pipe stem and prehistoric pottery sherds.

Zone 3

Zone 3 was a compact earthen surface of white marl/clay (2.5YR 8/1) found within both squares. This zone was left unexcavated as it was recognized to be a sterile level found throughout the project area. This zone was found below zone 2 as well as zone 4. This matrix undulated steeply and is likely eroded bedrock, creating little pockets or pits that were removed separately as zones 4, 6 and 7.

Zone 4

Zone 4 was a dark, compact, sandy clay (10YR 2/1) with a low density of small pebbles and limestone flecks beneath zone 2 in Square B. In both squares, zone 3 (sterile white clay) undulated dramatically, creating the "pocket" that zone 4 matrix was captured in. The zone ended at a context change at 56 cmbd (zone 7). A lens (1 cm in depth) of brown, loose sandy matrix was found in the west half of the pocket at 31 cmbd (zone 6).

Zone 5

Zone 5 was a small pocket of sand similar to zone 1 found within zone 3 in the NE corner of Square A. The matrix was 11 cm deep (49 cmbd to 60 cmbd) and the same color and texture as zone 1. No artifacts were recovered.

Zone 6

Zone 6 matrix was a coarse, sandy, loose lens (1 cm thick) with many small pebble inclusions below zone 4 and found only in the western 25 cm of square B, within the natural "pocket" within zone 3. This zone had a light density of lithic flakes.

Zone 7

Zone 7 was a dark, blueish-gray (7.5YR 2.5/1), compact earthen layer (approximately 25 cm thick) with limestone flecked inclusions below zone 4 and zone 6 in Square B only. This zone might be considered the same as zone 4, but seemed more compact and lighter in color. Also, it continued deeper than expected, therefore it was removed separately for artifact sequence. This zone was located only in the center of the square. Zone 7 ends at zone 8, a loose, sandy, white clay. A light density of lithics were recovered.

Zone 8

Zone 8 was a soft, white, sandy, clay (2.5Y 8/2) found while digging into zone 7 in Square A. It appeared to be similar to zone 3, although it was sandy and the structure was loose rather than compact. This zone should likely be considered the same context as zone 3. Zone 8 was excavated only below zone 7. This zone was sterile and filled with water at ~66 cmbd. At that point excavations halted to avoid flooding the unit.

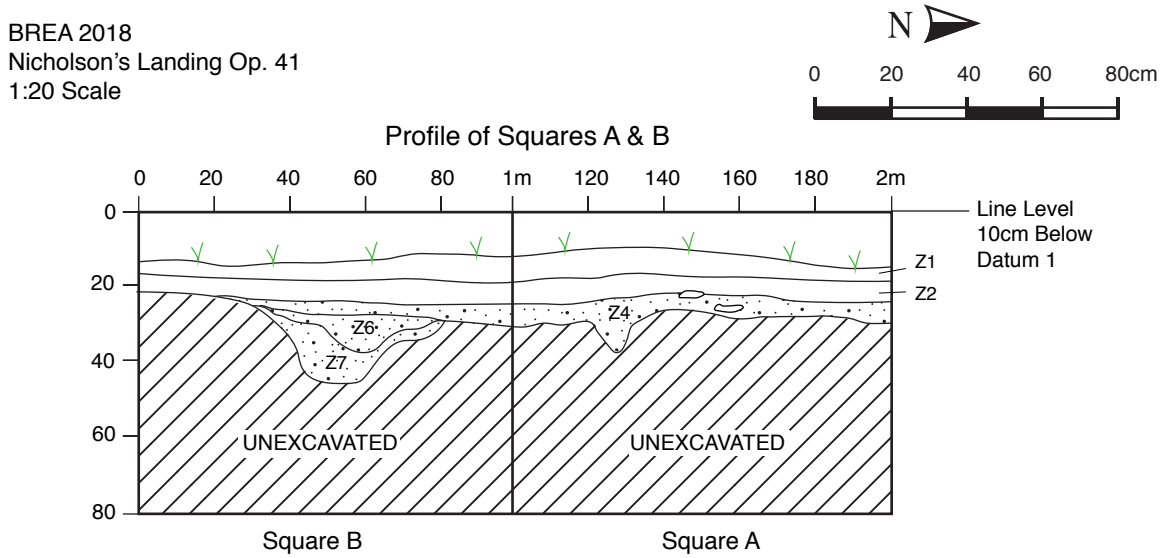


Figure 5.2 Profile of Nicholson's Landing Excavation, January 2018 (drawn by K. Flanagan, digitized by K. Titus).

Interpretations and Conclusions

The presence of historical artifacts on the surface was one of the primary reasons for placing the excavation along the eastern shore of Crooked Tree island at Nicholson's Landing. Additionally, local knowledge indicated that this shoreline location was used to moor boats prior to the construction of the Crooked Tree causeway and finds might tie into the investigations of the Tilletton historical site just to the west-southwest of Nicholson's Landing (see Kaeding et al., this volume). While a concentration of historical artifacts were recovered, no cultural features were exposed in the excavation. Only a thin lens of soil overlies what appears to be a naturally undulating bedrock surface (**Figure 5.3**). Artifact analysis is necessary to determine if any date ranges for the activities conducted at this location overlap with the Tilletton historical site. Artifacts recovered were a mix of historic and prehistoric materials. This mix of materials suggests an extended use of the shoreline through time; the range of materials could indicate mixed contexts due to periodic flooding of the lagoon waters.

The stratigraphy of this excavation revealed an undulating mix of sand, clay, and loam reflective of wetland shorelines experiencing periodic inundation and both human and natural disturbances possibly caused by both animals and people walking in the soft matrix. Additional analysis and excavation data are needed to form further conclusions.

Figure 4.3 Closing Shot of Nicholson's Landing excavation, January 2018 (photo by K. Flanagan).

References Cited

Harrison-Buck, Eleanor, Sara Clarke-Vivier, Adam Kaeding, and Lori Phillips
2019 Public Archaeology in Belize: Cultural Sustainability and the Deep History of the Lower Belize River Watershed. *Research Reports in Belizean Archaeology* 16:213-226.

Chapter 6

Testing for Historical Sites in and around the Health Clinic in Crooked Tree Village

Ryan T. Rybka and Adam R. Kaeding

Brief Introduction

During January 2019, our rationale for investigating the presence of historical sites in and around the Health Clinic in Crooked Tree was aimed at cross-examining information gleaned from archival and oral history accounts regarding this area of Crooked Tree village and to build on our prior historical site investigations at the Tilletton Site nearby (Harrison-Buck, Clarke-Vivier, et al. 2019; Kaeding et al., this volume). In January 2018, BREA focused investigations at the Tilletton historical site on the grounds of the Baptist Church, described locally to be one of the oldest settlement locations in the village. An 1868 map of the Tilletton Site found in the Belize National Archives contains a series of linear features representing old roads in the village, one of which extends to the south-southwest, leading roughly in the direction of the clinic area where we suspected there existed another historical site (**Figure 6.1**).

As further discussed in Chapter 4 (Kaeding et al.), the Tilletton property was originally owned by William Tillett, Esq., one of the earliest and wealthiest inhabitants of Crooked Tree. William Tillett's father, of the same name, was an English sea captain who came to Belize in 1784 for the logwood trade. William's mother, Mary, was of mixed race, probably partially Miskito Indian and African in descent, which is why her son William and his brother George were characterized in the 1832 census as "coloured" (Johnson 2018:39). Both were described as "Creole" rather than white but were listed as "Esq.," which is an indication of their wealth and status in Belize's colonial society (Johnson 2018:39). According to an 1832 census, William Tillett "owned five slaves: two men in their thirties, two small children, and a woman in her thirties" (Johnson 2018:39). Local informants have indicated to us that a "slave quarters" once existed on the property somewhere near the Health Clinic in the village. As noted above, this location appears to be linked to the Tilletton property by an old road demarcated on the 1868 map (**Figure 6.1**). The old road still runs through the village today and is primarily used as a foot path (Harrison-Buck et al. 2019:216). This road is visible today on the ground and in Google Earth satellite imagery (**Figure 6.2**).

If the area in and around the clinic was occupied by a group of enslaved persons, the ethnohistoric accounts suggest they may have been owned by the Tillets in the 1830s based on the ethnohistoric accounts. While slavery was abolished in 1834, we know that the formerly enslaved continued to work as apprentice-laborers for the Tillett family. In a later 1835 census, the Tillett brothers are described as "white" and have listed 13 "apprentice-laborers" (Johnson

2018:39)—a term that marked the enslaved person's new status in the transition to emancipation. For mahogany loggers like William and George Tillett, they needed a sizeable labor force to continue carrying out these activities post-abolition. Therefore, it can be reasonably assumed that such laborers continued to live in the same location proximate to William Tillett's property, perhaps throughout the nineteenth century. Although William Tillett died in 1848, an historic map from 1872 (**Figure 6.3**) indicates that at least one member of the Tillett family, Mr. Solomon Burnham Tillett, continued to have logwood and mahogany works on the Crooked Tree Western Lagoon property, which likely would have required such labor well into the late nineteenth century.

Figure 6.1 1868 map showing William Tillett's surveyor's plot plan and linear features representing old roads (courtesy of the Belize Archives). Note: Yellow star marks Tilletton and red star marks possible slave quarters connected by an old road.

Figure 6.2 Showing similar vantage point of 1868 map (courtesy of Google Earth). Note: yellow star marks Tilletton Site and red star marks possible slave quarters connected by a (still visible) old road marked with red arrows.

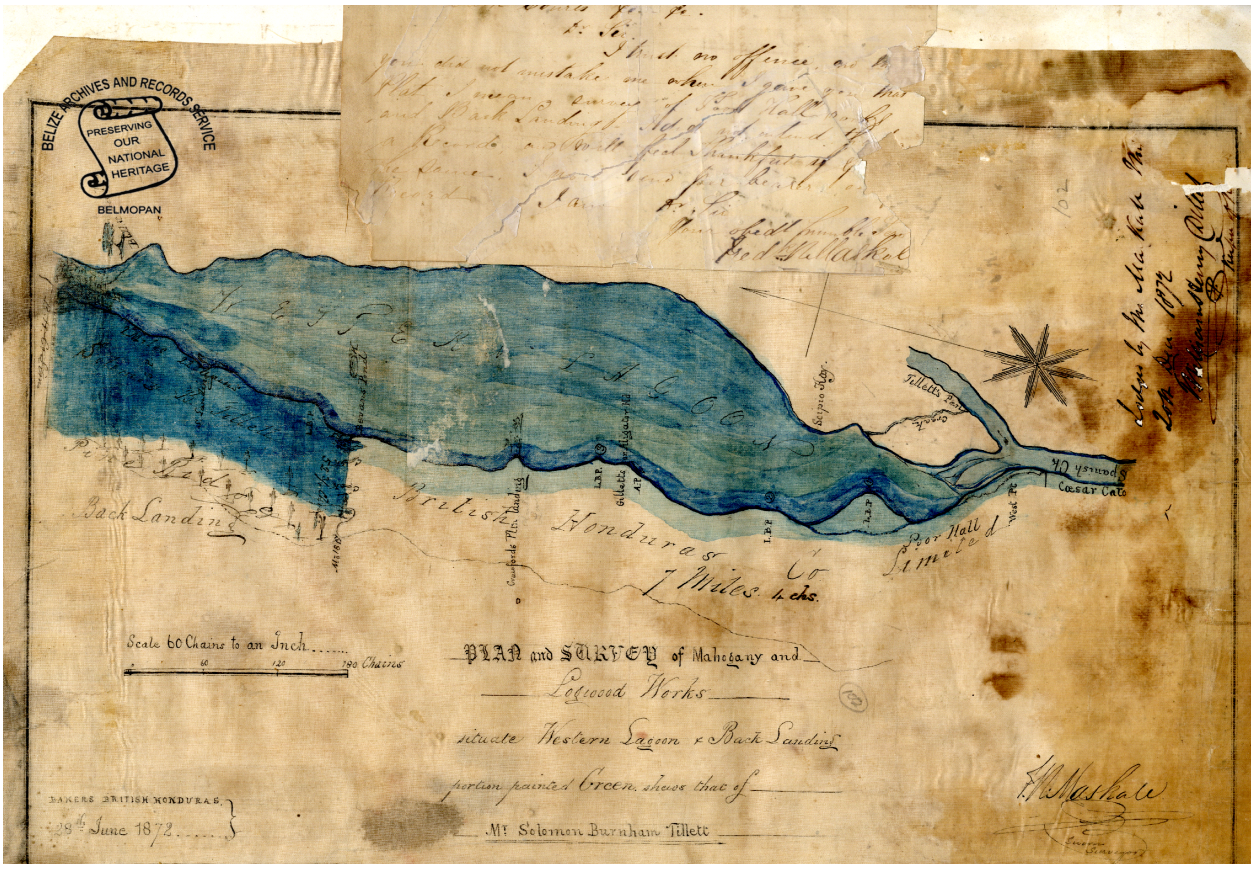


Figure 6.3 1872 map showing a plan and survey of the Western Lagoon and Backlanding area, designating the logwood and mahogany works of Solomon Burnham Tillett (courtesy of the Belize Archives).

Objective

The main objective of the clinic investigations was to cross-examine the archival and oral history accounts that archaeological evidence of slave quarters was present in the area in and around the Health Clinic.

Description of the Research and Methods Used

A series of shovel test-pits (STPs) were dug throughout the clinic yard, as well as the Adolphus property just to the west of the clinic yard. Using a tape and compass, the STPs were laid out in a cardinally oriented grid, first throughout the yard of the Health Clinic. Excavations proved to be rather low density or have material that was too modern, at which point we switched to the yard behind the clinic within the Adolphus property. This too yielded a very light density of material with little to no historical artifacts. A total of 35 shovel test pits were excavated with a posthole digger. All material was screened through a ¼ inch screen.

Table 6.1: STP Series S:008 Shovel Tests listed in numerical order.

STP #	Positive or negative	Ending Elevation	Stopping point of STP
1	Positive	71	clay
2	Positive	57	clay- Limestone mixed in the clay in the eastern wall
3	Positive	55	limestone
4	Positive	54	10YR 2/2 clay
5	negative	50	crumbling limestone, same as STP #3
6	Positive	58	10 YR 4/1 clay
7	Positive	54	limestone
8	negative	60	10 YR 2/1 clay
9	negative	50	10 YR 2/1 clay
10	Positive	55	10 YR 4/2 clay
11	Positive	61	limestone
12	Positive	60	10 YR 3/1 and 10 YR 7/1 limestone crumble throughout
13	negative	45	10 YR 3/3 clay
14	Positive	51	10 YR 2/1 clay mixed with limestone cribles
15	Positive	51	10 YR 2/1 clay mixed with limestone cribles
16	negative	50	clay
17	negative	55	clay
18	negative	50	clay
19	negative	58	10 YR 2/2 clay
21	negative	58	10 YR 4/3 clay
29	positive	70	10 YR 3/2 clay with iron inclusions
33	negative	60	10 YR 3/1 silty clay with limestone mixed throughout
34	Positive	60	10 YR 3/2 clay
35	negative	47	10 YR 6/4 fine sandy silt with limestone bits throughout.

Interpretations and Conclusions

After two days of excavating a total of 35 STPs, no artifact densities or distinct patterns of material culture were identified (see **Table 6.1**). Positive shovel test pits contained low densities of modern glass and iron as well as flaked stone, suggestive of prehistoric occupation. After the second day of testing, the search for the slave quarters in this area was ended. The following summer in 2019, the same local informant suggested that the location of the slave quarters may be across the street from the Health Clinic in the yard of Ms. Judith Tillett and future investigations of this area are planned for January 2020.

References Cited

Harrison-Buck, Eleanor, Sara Clarke-Vivier, Adam Kaeding, and Lori Phillips
2019 Public Archaeology in Belize: Cultural Sustainability and the Deep History of the Lower Belize River Watershed. *Research Reports in Belizean Archaeology* 16:213-226.

Johnson, Melissa A.
2018 *Becoming Creole: Nature and Race in Belize*. Rutgers University Press. New Brunswick, NJ.

Chapter 7

Excavations of a Residence in Plaza E at Ek'tok (Operation 42)

Eleanor Harrison-Buck

The site of Ek'tok was initially identified during a BREA reconnaissance in the summer of 2016 and mapped over the course of two field seasons during January 2017 and January 2018 (Murata et al. 2018; Murata and Kaeding, this volume). The site is located roughly 1.5 km north of Chau Hiix and may be linked via a series of sacbes or roadways. Ek'tok consists of a series of discrete plaza groups (A-H) of varying sizes (**Figure 3.2**). This secondary center was the focus of several excavations during the January 2019 field season, including Op. 42 presented herein (see also Shelhamer and Craig, Chapter 8; Rybka, Chapter 9; Kaeding, Chapter 10).

The site core of Ek'tok is mostly cleared cattle pasture, making it relatively easy for the surveyors to map the mounds and determine the aerial extent of the site (see Murata and Kaeding, Chapter 3). The creation of the pasture seems to have involved mechanized clearing with bulldozers, which pushed down trees and disturbed some architecture, including structures in Plaza E. Additionally, parts of the site have been heavily looted, including Plaza A, the main ceremonial center comprising several large pyramidal structures (see **Figure 3.2**). Operation 42 was an excavation positioned on Structure (Str.) 37 in Plaza E. This modest-size residential compound faces the Western Lagoon to the east and comprises an elevated basal platform (Str. 40), which supports five smaller platform structures (Strs. 35, 36, 37, 38, and 39 [**Figure 7.1**]). Structure 37, located on the west side of the plaza, was selected for excavation as it represents the longest, centrally-oriented building, perhaps indicating its function as an elite residence.

Objectives of the Op. 42 Excavation

1. To test a modest-size elite residence that appears oriented to the lagoon.
2. To expose a portion of the final form of this structure and any earlier phases of occupation.
3. To obtain ceramic and/or carbon samples from each construction phase for use in chronological analysis of the building's development.
4. To collect any associated faunal remains from Str. 37 to identify wetland taxa and assess any changing procurement patterns from Classic to Postclassic times.

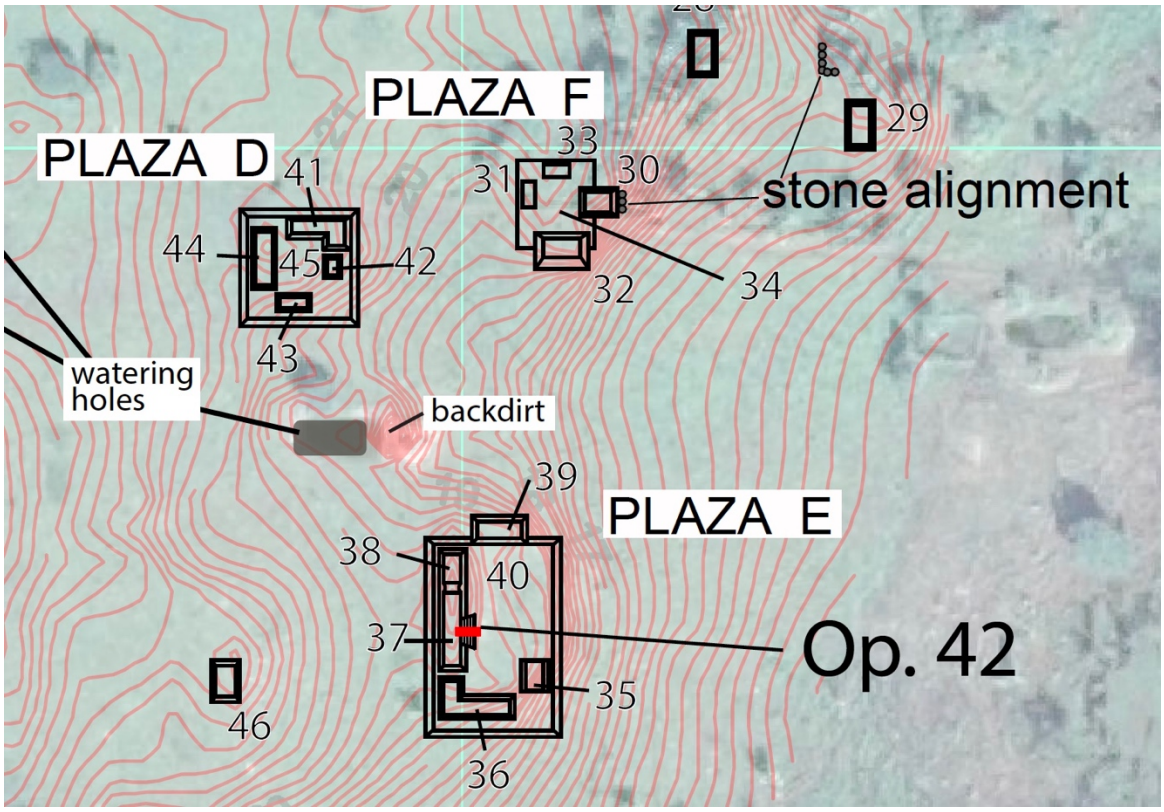


Figure 7.1 Map of Ek'tok (map prepared by S. Murata).

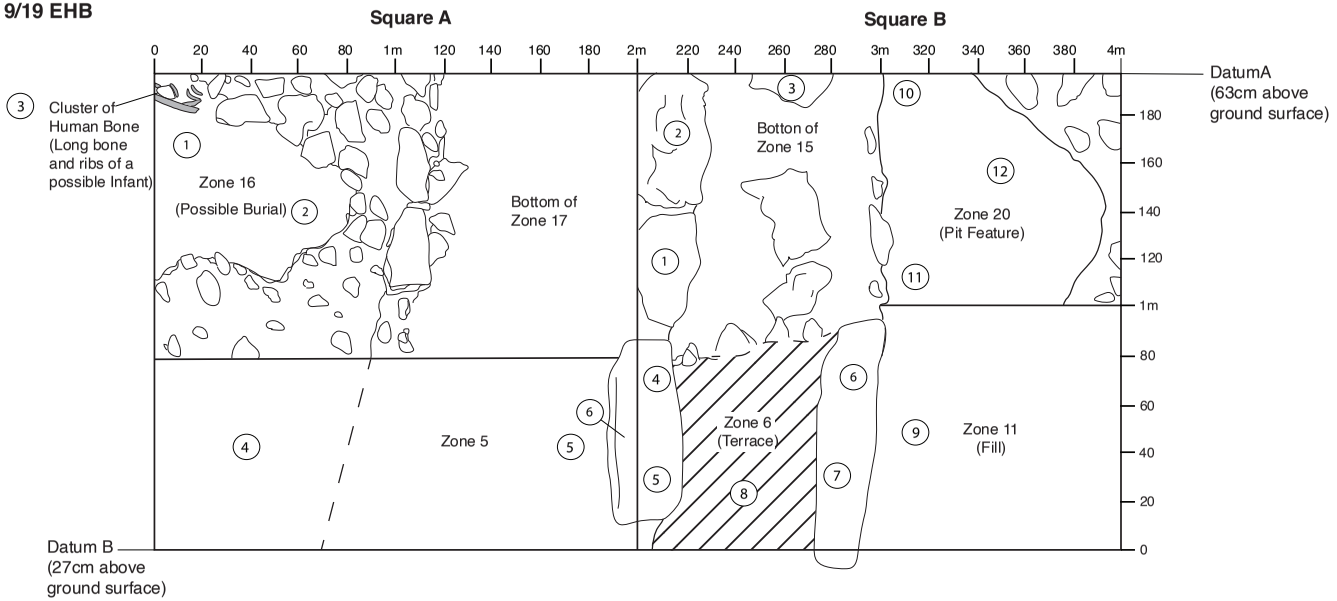
Description of Operation 42

Operation (Op.) 42 is a cardinally-oriented unit that measures 6 m east-west by 2 m north-south and was divided up into three 2 x 2 m squares (A-C) (**Figure 7.2**). The 2m (N-S) x 6 m (E-W) excavation unit was placed on the center line of Structure 37, an elongated platform with the front of the structure facing the east with a clear view of the lagoon. The platform extends roughly 16 m long (north-south) and roughly 8 m wide (east-west). Large cut stone visible on the surface suggested intact architecture possibly representative of a terrace or staircase leading to the top of a flat platform that likely once held a perishable structure (**Figure 7.3**). All three squares of Op. 42 were excavated during the January 2019 field season. Square A and the western half of Square B are located on the structure, while the eastern half of Square B and all of Square C exposed the plaza floor surface.

Ceramic analysis is ongoing, but preliminary studies of the material culture suggest some Postclassic occupation in the final phase of Str. 37 but that the construction dates to the Terminal Classic period. Some earlier material possibly dating to the Early-Late Classic was recovered in lower levels of the excavation (see further below). Two pit features (Zones 16 and 20) were exposed on the center line of the building in Squares A and C, at least one representing a burial deposit. Neither was excavated during the 2019 field season due to time constraints.

BREA 2019
Ek Tok
Op 42
Sq. A & B
1/19/19 EHB

Final Planview #3



Elevation Below Datum A

1	64
2	54
3	78
4	0
5	0
6	20
7	31
8	26
9	97
10	140
11	139
12	144

Elevation Below Datum B

1	64
2	67
3	60
4	58
5	71
6	66

Figure 7.2. Planview of Operation 42 (drawn by E. Harrison-Buck, digitized by K. Titus).

Figure 7.3. Opening shot of Operation 42 prior to excavation (photo by E. Harrison-Buck)

Excavation Methods

All vertical measurements throughout our excavations were taken from two temporary datum points (Datums A and B), which ultimately were logged as absolute elevations with the Total Station. Datum A was placed lower on the slope of the mound and was used for measurements in Squares B and C while Datum B was placed toward the summit of the mound and was used for measurements in Square A. We also used the Total Station to map the final plan view of the structure (**Figure 7.2**). For excavation, buckets measuring 5 gallons in volume were used to remove all soil, rocks, and other material from the unit. Zones were separated either arbitrarily at ~20cm depths or when a color or texture change was noted. In most cases, 100% of all dirt was screened through a ¼" mesh screen, but in some cases where artifact density was exceedingly low only 50% of the dirt was screened. Picks and shovels were used to remove the overburden and trowels were used to define architecture and *in situ* artifacts. Below I review the details of this excavation by zone, our smallest unit of excavation.

Excavations of Squares A-C in Operation 42

Zone 1 Humic Layer (Topzone)

Zone 1 is the thin humic layer across the unit. The topzone was excavated across all three squares (A-C) and consists of a semi-compact silty-clay matrix filled with roots, grass and acacia thorns. The matrix contains a high density of small stones consisting of a high density of limestone and chert. Most of the chert debitage and some of the larger nodules that were observed appear to have functioned purely as the collapsed remains of construction fill rather than as the remains of tool production. Therefore, only chert that showed clear signs of being a tool were collected. The artifact density in Zone 1 ranged from light to medium and artifacts recovered include animal bone, chipped tool, ceramics and non-pottery artifacts, debitage, and some obsidian.

In Squares A and B, the topzone was removed to expose a series of facing stones running north-south that bisect the unit. A series of larger facing stones were exposed, including that may be the partial remains of steps leading to the top of the Str. 37 platform. The largest of the facing stones appear to represent a retaining wall and runs through the western half of Square B (**Figure 7.2**).

Zone 2 Collapse Debris

Zone 2 in Square A had a medium to high density of artifacts on mound, despite the thin layer of soil and rock that was removed in this zone. Artifacts included a groundstone tool, lithics, and pottery sherds. Most of the inclusions were made of chert and were small (<5 cm) pebbles and cobbles with only a few larger chert cobbles noted in the collapse debris. Some remains of plaster were also observed, particularly in the vicinity of the north-south oriented facing stones visible in Square A.

Zone 2 in Square B composed of a semi-compact matrix filled with small and large chert cobbles similar to Square A. This debris appears to be collapse that covers the Zone 4 plaza floor surface exposed further below. The collapse partially covers the eastern ("megalith") wall that retains the eastern Zone 6 "step" in Square B (see **Figure 7.2** and **7.4**). Artifacts include animal bone, pottery sherds. A high density of debris in matrix of zone 2 in Square B. Could represent a mix of collapse of plaza surface (Zone 4).

Zone 2 in Square C the soil is very compact with a high concentration of limestone and chert inclusions. Zone 2 is the collapse that overlies the Zone 4 plaza floor surface in Square C. A high density of artifact material was collected, including debitage, animal bone, pottery sherds, and non-pottery ceramics. Large amount of chert cobbles 10-15 cm in size and smaller pebbles were removed. Only a few cobbles measuring greater than 20 cm were noted in the Zone 2 collapse of Square C.

Excavation of Square A in Operation 42

Zone 3 Collapse Debris

Zone 3 in Square A is defined as collapse debris (a continuation of Zone 2 found in Squares B and C). However, some of the lower matrix is a mix of construction fill from Zone 9 (found directly below the collapse) that was removed just from Square A. The matrix consists of mostly small (<5 cm) limestone and chert cobble and pebble inclusions. At the base of Zone 3, the remains of a one course high north-south wall and terrace construction (Zone 9) was exposed (**Figure 7.2**). A medium density of artifacts were recovered from the Zone 3 collapse, including debitage, pottery sherds, and one obsidian blade fragment.

Zone 5 "Lower Terrace" Construction Fill

Zone 5 is interpreted as a lower terrace surface that was exposed throughout Square A. The terrace wall (Zone 13) consists of several large cut chert boulders defined at the interface of Squares A and B (see **Figures 7.2 and 7.4**). Although the cross-section in **Figure 7.4** shows the Zone 5 construction capping the Zone 16 pit feature, field photos suggest that this pit likely intruded from higher up, cutting into the surface of Zone 5 (see **Figure 7.5**). Either way, it appears that the Zone 5 terrace originally was associated with Zone 14, the retaining wall of an "upper terrace," and that the Zone 9 "middle terrace" was a later addition. The intrusive cut (Zone 16) became clearly apparent at the base of Zone 5, as the top of a burial feature with some evidence of bone in the northwest corner of Square A was exposed (see further below). A heavy artifact density was recovered in Zone 5, including a chipped tool, debitage, human bone, and pottery sherds.

Zone 9 "Middle Terrace" and Construction Fill

Zone 9 consists of an intermediate terrace or step construction retained by a one course high wall in Square A. The construction is poorly preserved (see **Figures 7.6**). Excavations removed all of the Zone 9 fill and the retaining stones visible in Square A. The fill of Zone 9 measures roughly 10-15 cm thick and consists of a high density of stone cobbles and pebbles. The retaining wall comprises a single course of roughly hewn facing stones ranging from 30-45 cm in size. It is possible that this terrace or step construction was built to serve as an extension of the upper platform surface (Zone 14) and, as noted above, may have served to cap the Zone 16 pit feature (contradicting what is drawn in **Figure 7.4**). If the construction of Zone 9 is indeed capping the burial interment then it would post-date and/or be considered contemporaneous with this deposit. Zone 9 yielded a heavy density of artifacts, including mostly debitage and pottery sherds.

BREA 2019
EK Tok Op. 42
Group E
1/19/19 EHB

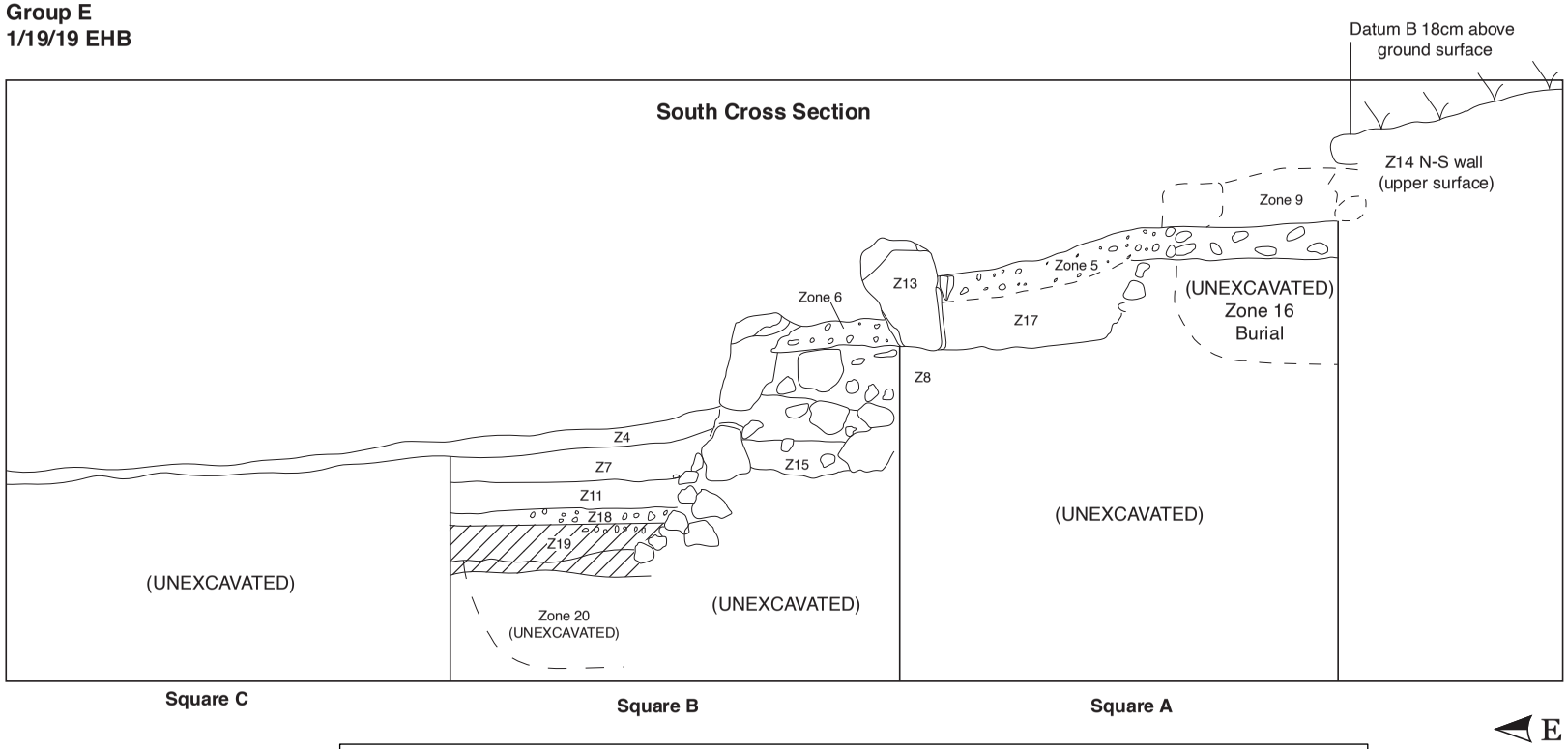


Figure 7.4 Cross-section of Operation 42 (drawn by E. Harrison-Buck, digitized by K. Titus).

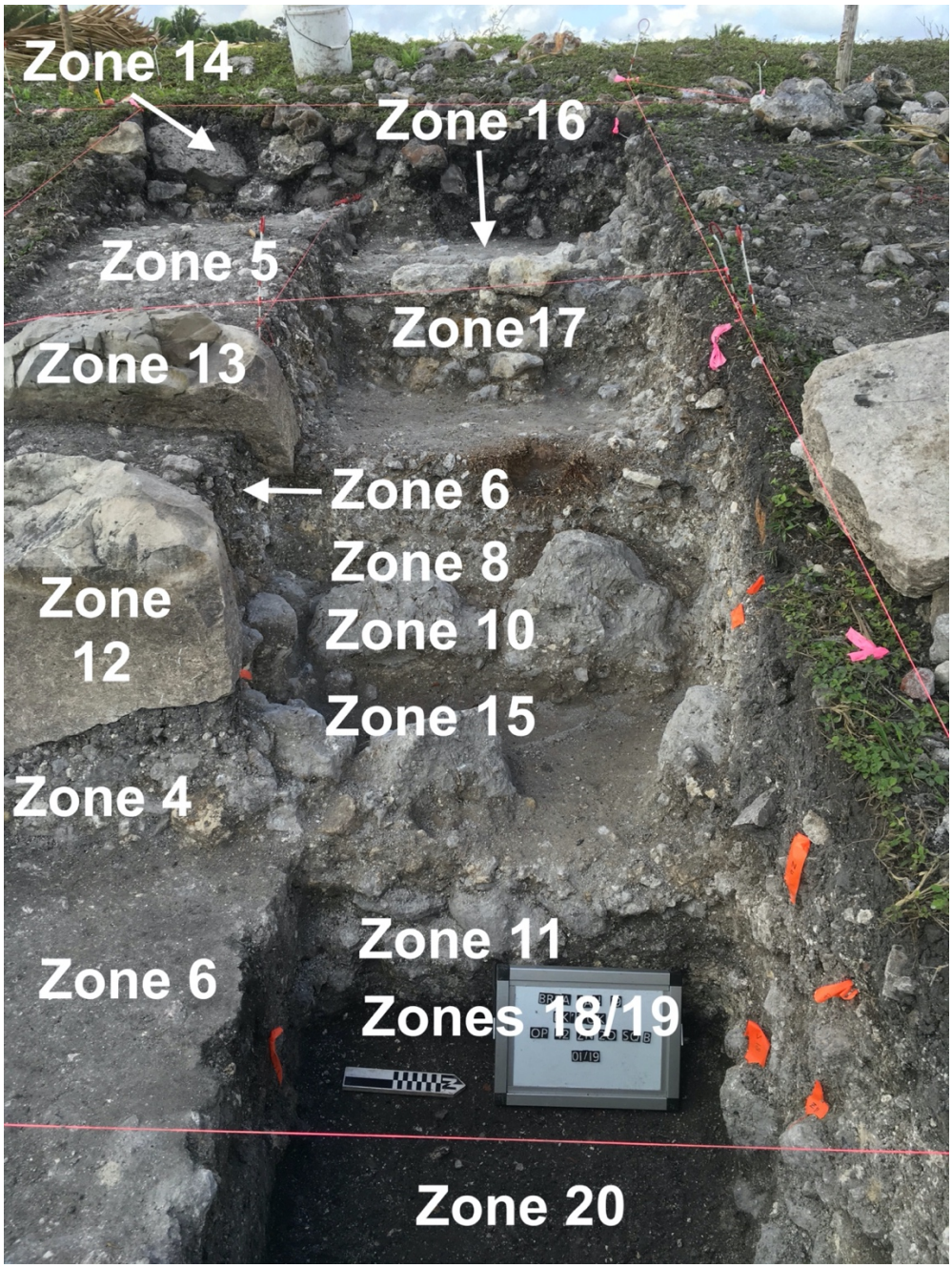


Figure 7.5 Closing shot of Operation 42 (with Zone 9 removed) showing location of visible zones of excavation (photo by E. Harrison-Buck).

Zone 14 "Upper Terrace" Retaining Wall

Zone 14 is a retaining wall of an upper terrace that may represent the summit of the Str. 37 platform, which was partially exposed in the western wall cross-section of Square A in Op. 42 (**Figure 7.5**). This roughly hewn wall appears to be several courses high and runs roughly north-south in orientation. This poorly preserved wall was unexcavated in January 2019, but was

partially exposed when the Zone 9 “middle terrace” was removed during excavation. Zone 9 served to protect Zone 14, covering all but the top course of the upper terrace retaining wall. Based on the surface topography of the mound, Zone 14 appears to represent the uppermost platform surface of Str. 37, but the limits of excavation makes this difficult to confirm.

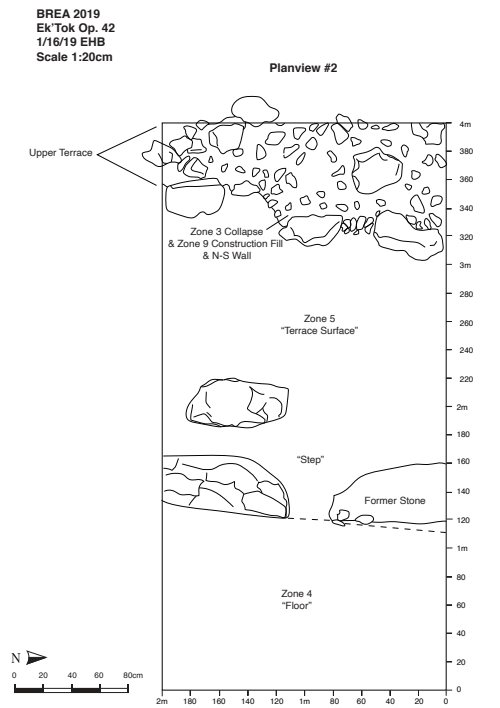


Figure 7.6 Zones 5 and 9 lower and middle terraces with some residual Zone 3 collapse debris in Square A of Operation 42 (photo by and drawing by E. Harrison-Buck; digitized by K. Titus).

Zone 16 A Possible Burial Pit Feature

Zone 16 is a pit feature found in the northwest corner of Square A that appears to represent a burial deposit. The pit seems to be associated with the Zone 5 lower terrace and may have originally cut into this surface (contradicting what is drawn in **Figure 7.4**). The pit clearly intrudes into the Zone 17 fill below Zone 5 and most certainly pre-dates the construction of the Zone 9 middle terrace or step construction, which may have served to cap this feature. The western and northern limits of the Op. 42 excavation unit make it difficult to clearly define the vertical and horizontal extent of the Zone 16 pit feature. Further excavation is necessary to confirm its stratigraphic and architectural associations.

The matrix of the pit fill is a semi-compact clay and the surface of the cut was defined, photographed and drawn in planview (**Figures 7.2** and **7.7**). The pit contains the fragmentary remains of what appears to be human bone, likely that of an infant. The small amount of bone was detected in the northwest corner of the square (see **Figure 7.7**). The burial was not excavated in January 2019 due to time constraints. As noted above, the pit feature extended outside of the excavation unit and time would not allow us to extend the excavation. Therefore,

the full extent of the interment was not defined and no bones were removed. The pit feature was found after the Zone 9 upper step was removed and excavations of Zone 5 were underway.

Figure 7.7 Possible burial cut (Zone 16) in Square A of Operation 42 (photo by E. Harrison-Buck).

Zone 17 "Lower Terrace" Construction Fill

Zone 17 is the underlying construction fill of Str. 37 that is underneath the Zone 5 terrace in Square A into which the Zone 16 burial clearly intrudes. A portion of the Zone 17 fill was excavated in the northeastern corner of Square A (see **Figure 7.7**).

Excavation of Squares B and C in Operation 42

Zone 13 "Lower Terrace" Retaining Wall

Zone 13 represents the retaining wall at the interface between Squares B and C that retains the Zone 5 middle terrace construction fill that extends into Square B (see **Figures 7.2** and **7.5**). The facing stones of the middle terrace are large roughly cut chert boulders. A portion of this middle terrace retaining wall in the northern half of the unit was removed to reveal earlier construction phases underneath (see Zones 5 and 17 above).

Zone 12 Eastern "Step" Retaining Wall of Structure 37

Zone 12 represents the exterior eastern retaining wall of Str. 37 that retains the fill of Zones 6 and 8 and consists of large cut chert boulders. One of the preserved facing stones extends halfway across the 2 meter wide unit (see **Figures 7.2** and **7.5**). Due to its sheer size, we referred to this cut stone as the "megalith." Only one of the large facing stones was found intact, while others to the north in the unit were dislodged or missing, likely disturbed when the area was originally cleared of bush. When the site was transformed into pasture less than a decade ago, we suspect that the bulldozing of large trees that were pushed down caused some of these large stones to dislodge. Given the disturbance in the northern side of Op. 42, we took the opportunity to further excavate this northern half of the unit in an effort to expose earlier phases of construction (see Zones 6, 8, 10, and 15).

Zone 6 "Step" Construction Fill

Zone 6 is the fill behind the Zone 12 retaining wall which forms a shallow step construction, which was excavated only in the northern half of Square B (**Figures 7.4** and **7.5**). As noted, this part of the unit was partially disturbed by tree disturbance, dislodging the exterior facing stones (Zone 12) and the fill that spilled out to the east was removed. Zone 6 was excavated to roughly 15 cm at its deepest point and the zone was arbitrarily changed to Zone 8. The fill of Zone 6 consists of a silty-clay matrix with a medium density of small limestone and chert inclusions. Artifact density is light and includes a groundstone tool and some pottery sherds. The Zone 8 fill directly below is a continuation of this construction event associated with the Zone 12 retaining wall.

Zone 8 Construction Fill

Zone 8 lies directly below Zone 6 in Square B and consists of more interior construction fill of the eastern step of Str. 37 (**Figures 7.4** and **7.5**). The matrix is somewhat siltier than Zone 6 and contains some large chert boulders in the fill. In addition, the artifact density appears to be heavier than Zone 6 with evidence of chipped tools and pottery sherds. Zone 10 is fill that directly underlies Zone 8.

Zone 10 Construction Fill

Zone 10 is the construction fill directly below Zone 8 and appears to predate the Zone 12 retaining wall and its associated construction fill (Zones 6 and 8). The Zone 10 fill may be part of an earlier phase of construction, but limited vertical exposure inhibits a fuller reconstruction. The Zone 10 matrix consists of a similar silty soil with cobble and pebble size inclusions

consisting of both limestone and chert. Several large boulders were defined at the base of Zone 10 (**Figure 7.5**). Artifact density continues to be relatively high consisting primarily of pottery.

Zone 15 Construction Fill

Zone 15 is construction fill directly below Zone 10 and appears to be a continuation of the same fill below the step construction. Like Zone 10, this fill should predate the construction of the step (defined as Zones 6 and 8 retained by the Zone 12 wall). The matrix consists of chert and limestone with a mixture of very large cobbles (>30 cm) mixed with smaller cobbles and pebbles. A medium density of artifacts was recovered.

Zone 4 Plaza Floor 1

Zone 4 is directly underlying the Zone 2 collapse debris in the far eastern portion of Squares B and C in Op. 42 and represents the latest plaza floor surface associated with the east side of Str. 37 in Plaza E (**Figure 7.4**). The floor was found only in Squares B and C. Initially, only the northern half of Zone 4 was excavated, but later the southern half was removed, exposing in Square B the base of the "megalith" exterior facing stone (Zone 12) of the eastern side of Str. 37 (**Figure 7.5**). There are significantly less cobble-size inclusions in Zone 4 compared to the Zone 2 collapse. The floor is poorly preserved and consists of a thin compact marl-filled matrix containing a high density of pebble-size limestone inclusions. A light to medium density of artifacts were recovered from Zone 4, including animal bone, debitage, and pottery sherds. In addition, a human tooth was found at the base of Zone 4 in Square B.

Zone 7 Plaza Floor 2 and Underlying Construction Fill

Zone 7 measures roughly 20 cm in depth and lies directly below the latest (Zone 4) plaza surface (**Figure 7.4**). The zone was restricted to the northern half of Square B just east of Str. 37 and appears to be the remnants of an earlier plaza floor surface (Plaza Floor 2) and its associated construction fill. The fill of the floor consists of a clay-filled matrix with some chert and limestone inclusions. The earlier floor was exposed when one of the "megalithic" stones of the eastern Zone 12 exterior retaining wall of Str. 37 was removed (see below). A medium density of artifacts was recovered from Zone 7, including animal bone, debitage, a groundstone tool, and pottery sherds.

Zone 11 Construction Fill

Zone 11 is construction fill that underlies Zone 7 (the earlier plaza floor surface and fill described above). The fill removed as Zone 11 measures roughly 15 cm thick and appears to be a continuation of the same looking construction fill (**Figure 7.4**). Like Zone 7, the matrix

contains a high density of small cobbles and pebbles but has a lighter density of artifacts, including chert debitage and pottery sherds.

Zones 18 and 19 Surface and Construction Fill

Zone 18 and 19 were mixed somewhat during excavation but appear to represent an earlier floor surface and associated construction fill capping the Zone 20 pit feature.

Zone 20 Pit Feature

Zone 20 is a pit feature that was identified in Square B directly below the Zones 18 and 19 floor and construction fill layers (see **Figure 7.3** cross-section). The matrix of the the pit is significantly darker black soil (Figure 7.4). A small portion of Zone 19 removed the first few centimeters of the dark pit fill when excavators realized they were in a new context and switched zones. It became clear that it would be necessary to expand the Op. 42 excavation unit to be able to expose the full extent of the cut of the pit feature.

Conclusions

Both Zones 16 and 20 appear to be intrusive pits and may both represent burial deposits based on evidence of bone and also based on their orientation along the central axis of Str. 37. Both pit features required us to extend the unit and because time did not allow for this we halted the excavation at this time and both deposits remained unexcavated during the 2019 season. Ceramics found lying on the surface of the Zone 4 plaza floor consist of a mix of Terminal Classic and Postclassic ceramics. The ceramic sherds associated with the construction fill of the latest floor appear to date purely to the Terminal Classic period (ca. A.D. 800-950) and may date the "megalith" architecture. However, preliminary study of the ceramic material associated with Zones 18, 19, and 20 indicate an Early-Late Classic date, suggesting an earlier initial occupation for the establishment of Plaza E. Further excavation is necessary to clarify the chronology of this residential complex.

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Chapter 8

Testing for Middens at Ek'Tok: Shovel Test-pitting and Excavations in Plaza C (Operation 43)

Jessica H. Craig and Katherine Shelhamer

Plaza C is a residential group situated to the east of Ek'Tok's main pyramid (Plaza A) (**Figures 3.1**). The plaza area consists of a raised basal platform with four cardinally-oriented structures circumscribing the plaza area (**Figure 8.1**). It is among the largest of the residential groups at the site and for this reason was selected as an area for midden testing along the back sides of the plaza. There does not appear to be any other architectural groups to the east of Plaza C, which is just 75-150 m west of the Western Lagoon shoreline. To this end, a series of shovel test pits (STP Series 010 and 011) were placed on both the northeast and southeast corners of the raised platform. Based on this testing and a density of faunal material recovered in STP Series 010, Operation 43 was conducted off the northeast corner of Plaza C.

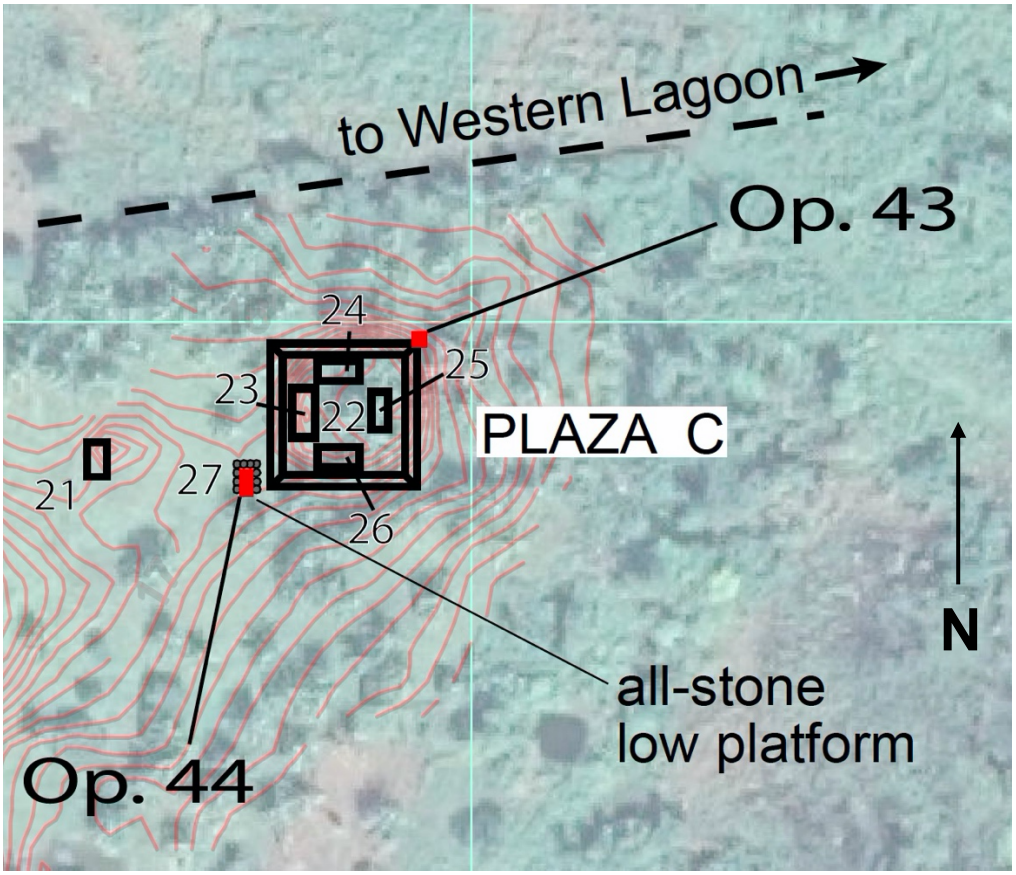

Figure 8.1: Plaza C at Ek'Tok Map showing location of Op. 43.

Objectives

1. Identify areas of refuse concentration on the eastern side of Group C.
2. Examine ceramics from midden deposits from Group C to establish a partial chronology of the site.
3. Examine animal bone from midden deposits from Group C to determine diet, namely in regards to aquatic resources.

Shovel Test Pit Series 010 and 011

Shovel Test Pit Series 010 (STP Series 010) was located off the northeast corner of Plaza C. STP Series 011 was located off the southeast corner of Plaza C. The goal of the shovel testing was to identify concentrations of refuse that might suggest a midden associated with this residential group.

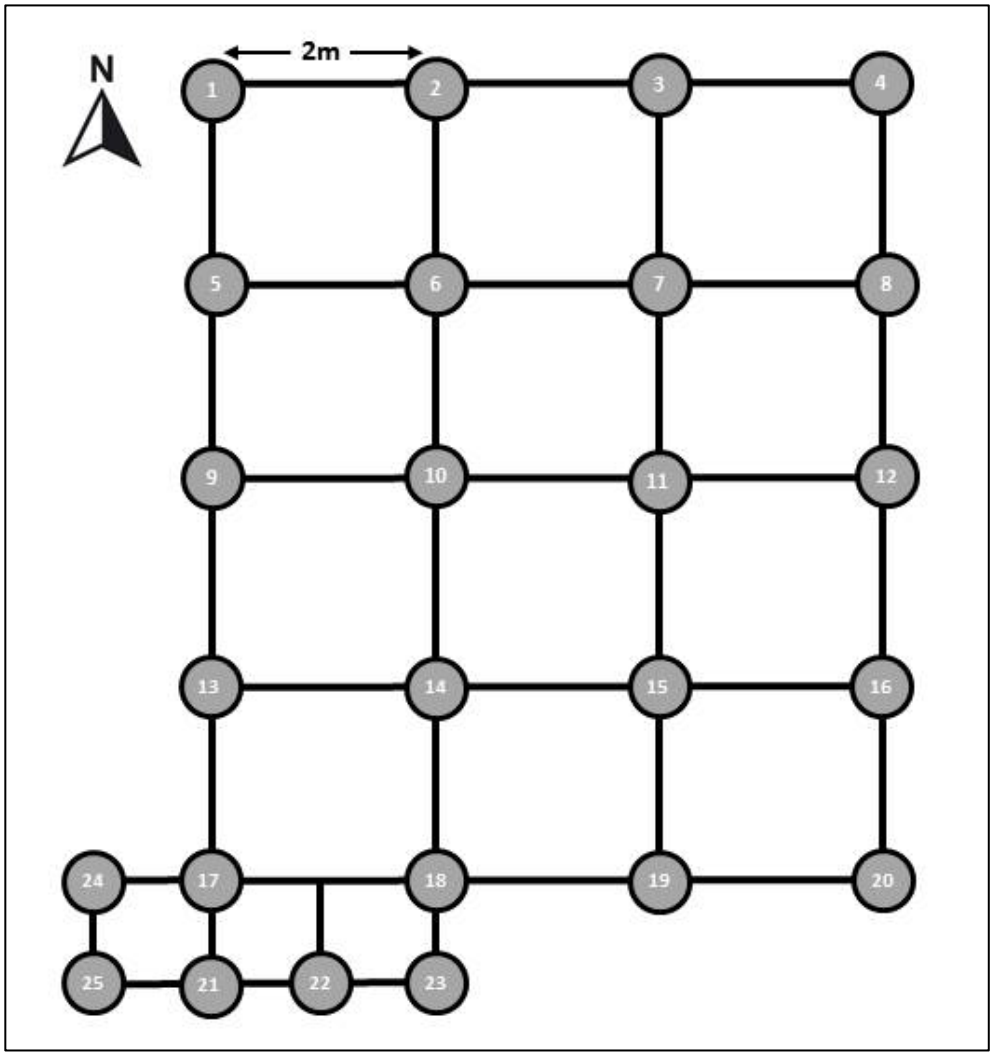

Figure 8.2 Layout of STP Series 010.

Methods for Shovel Test-pitting (STP) Excavation

- Using the total station, we first created a grid across an 8-x-6 m area, spaced at 2 m intervals (**Figure 8.2**).
- 1 meter intervals were used once a density of cultural material was identified.
- All test pits were dug using a posthole digger. Once the top soil was removed the post holes were dug until one of the following occurred:
    - A density of cultural material was recovered.
    - Enough architectural stone (building collapse) was encountered that digging could not continue.
    - A sterile layer of white clay marl was reached.
- Zones were not used.
- All material was screened through a ¼ inch screen.
- Each post hole was assigned a discrete number and materials were collected and bagged according to that number.

Discussion of STP 010 Finds

In the discussion that follows, only those shovel tests that yielded significant finds will be described in detail. The general findings of all the shovel tests dug in STP Series 010 are summarized in **Table 8.1** below.

Table 8.1 STP Series 010 Shovel Tests Listed in Order of Excavation

STP #	Findings	Ending elevation (cm below Datum 1)	Stopping point of STP
10	Little cultural material	160	White marl layer
13	Some sherds; fish bone	165	White marl layer
17	Metate; sherds; charcoal; animal bone	151	White marl layer
14	Some sherds; fish bone	157	White marl layer
11	Little cultural material	152	White marl layer
18	sherds; charcoal; faunal remains	142	White marl layer
22	Sherds; some animal bone	124	Clay layer above marl reached
21	Sherds; dense animal bone	106	Clay layer above marl reached
24	Some sherds; animal bone	39	Large stones/collapse
25	Dense animal bone	40	Dense concentration of animal bone

STP #17

A metate fragment was recovered right under the surface of STP 17. In addition, numerous sherds, few faunal remains, and some charcoal were recovered in first 50 cm below the surface. However, there was not the kind of density of cultural material to suggest the presence of a midden.

STP #18

This shovel test pit was very similar to STP 17 in terms of sherd density and some animal bone was recovered. Due to the presence of this density on the southern edge of the grid, it was decided to expand the grid in 1m intervals to the south to test for an increase in artifact density that would indicate a midden (**Figure 8.2**).

STP #22

This shovel test pit were very similar to STP's 17 and 18. Ceramics, animal bone, and some charcoal were recovered at 45 cm below Datum 1.

STP #21

STP 21 contained a denser concentration of animal bone (N=15) in addition to some sherds and charcoal) than any of the shovel tests up to this point. Some of the bone was burned. For this reason, the grid was expanded once more, in 1 m intervals to the west (**Figure 8.2**).

STP #24

This shovel test pit was very similar to STP 21. Sherds, numerous animal bone fragments and charcoal were recovered. Once again, however, the concentration was not dense enough to indicate an actual midden.

STP #25

At 40 cm below Datum 1 in STP 25 a very dense compact layer of animal bone was found. We stopped digging at this point, as this suggested that we had come upon a possible midden deposit. Operation 43 (see further below) began as a 1-x-1 m square around STP 25.

Discussion of STP Series 011 Finds

While excavation at Operation 43 was being conducted, we decided it would be worthwhile to test the southeast corner of Group C to determine if a similar refuse deposit could be identified. The finds from this testing are summarized in **Table 8.2** below. None of the shovel test pits yielded any kind of artifact concentration and many of them yielded no cultural material at all. As such, it was evident that no midden or midden-like deposit was present off the southeast corner of Plaza C and we did not conduct further investigations in this area. It should

be noted that we did encounter what could be evidence for some kind of platform that was built off this corner of the group. It would be interesting to conduct architectural investigations in future seasons to further expose this area.

Table 8.2 Summary of Findings from STP Series 011

STP #	Findings	Ending elevation (cm below datum 2)	Stopping point of STP
10	Small amount of animal bone	159	White marl layer
6	No cultural material	118	Large stone, possible architecture
7	No cultural material	150	White marl layer
11	No cultural material	182	White marl layer
9	No cultural material	10	Layer of small stones
5	Turtle shell (N=1)	79	Turtle shell
17	No cultural material	120	White marl layer
18	No cultural material	115	Layer of stones

Operation 43

The goal of Operation 43 was to expose the area of dense refuse that was found in STP Series 010. A very dense concentration of animal bone and other refuse was found in STP #25, and the finds from the three surround STP's (24, 17, and 21 – see **Figure 8.2**) suggested that some kind of deposit was present at this locale. Operation 43 began as a 1-x-1 m square (Sq. A) that encompassed STP 25. Op 43 was later expanded another 2 m to the east with the addition of Squares B and C once it was evident that we had indeed exposed some kind of midden deposit.

Zone 1

Zone 1 is the topsoil that was removed across Squares A, B, and C. This silty-clay soil is dark and rich with organic content (10YR 2/2). This humic layer is only 3-4 cm in thickness. A small quantity of sherds and animal bone were recovered within this surface layer.

Zone 2 (Square A) and Zone 4 (Squares B and C)

In these zones there is a subtle color change (10 YR 2/1) from the topsoil and the soil contains flecks of limestone and larger construction debris. It is possible that this material is simply collapse from the north or east buildings of Plaza C or the basal platform itself. It is also possible that these layers of debris represent some kind of cap that covered the deposit below. This layer ranged in depth from 5-15 cm across all three squares. A significant quantity of cultural material (animal bone, marine shell, sherds) was recovered. It should be noted that an

abundance of fish bones were recovered in Square A. The zones ended once the deposit itself was encountered. The midden deposit was removed separately as Zones 3 and 5 (see below).

Zone 3 (Square A) and Zone 5 (Squares B and C)

These two zones comprise of silty soil (10YR 2/1) containing a dense concentration of cultural material, largely dominated by turtle and marine shell. A significant portion of the turtle shell (about 50%) is burned. Once again, an abundance of fish bones were recovered in Square A. The midden deposit ranged in depth from 15-20 cm across all three squares.

Figure 8.4 Square B, Zone 5 – Deposit of Turtle Shell (denoted by arrows)

Pottery, some charcoal, and lithic material were also found within the deposit. While this feature is continuous across all three squares, the elevation of it is about 15 cm higher on the west side than it is on the east side, suggesting it was not placed on any kind of prepared flat surface, but rather on the angled slope of the northeast corner of Plaza C. The deposition suggests that the trash material was thrown off the edge the basal platform and may represent discard from a final occupation when the building was already in a state of disrepair, given the presence of underlying collapse debris. The deposit itself is densest in Square A (**Figures 8.4** and **8.5**) and least dense in Square C, but there is a cohune disturbance in Square B, which likely impacted the distribution of the remains. The 15-20 thick deposit itself does not typify a standard residential midden, in that it is largely comprised of aquatic animal remains and contains proportionately little other categories of refuse, like sherds and lithic debris.

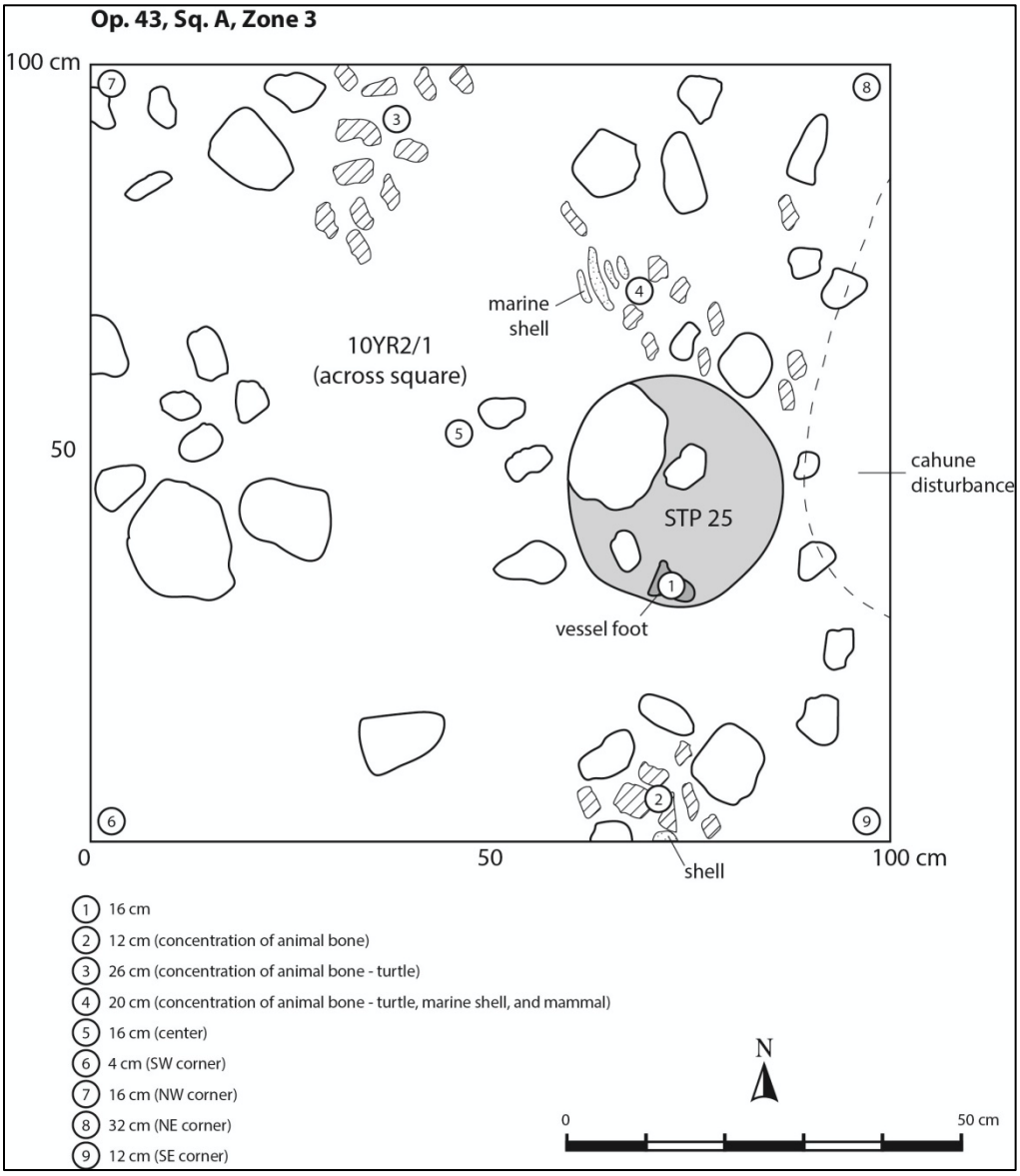

Figure 8.5 Midden deposit in Square A (Zone 3) showing marine and turtle shell.

Zone 6

Zone 6 is a lighter layer of silty-clay soil (10YR 3/1) just below the Zone 3 deposit in Square A. The artifact density is very light in Zone 6.

Zone 7

Zone 7 is a clean-up layer of dark silty soil (10YR 2/1). This zone only exists on the eastern edge of Square C and represents the border between the end of Zone 5 and the lighter soil beneath it. Zone 7 serves to better define the slope of Square C and get solidly beneath the darker layer of later soil before proceeding onto the lighter soil of Zone 8.

Zone 8

Zone 8 is a lighter layer of silty-clay soil (10YR 3/1) speckled with flecks of limestone and charcoal removed from across all three squares. This zone starts below Zone 6 in Square A, Zone 5 in Square B, and Zone 6/Zone 7 in Square C. Zone 8 is a sloping collapse layer with a very light artifact density. The zone is interrupted by a darker (10YR 2/1) cohune disturbance in the center of Square B. Zone 8 was ended arbitrarily after 10cm.

Zone 9

Zone 9 is a continuation of the collapse layer described in Zone 8 with the same soil color (10YR 3/1), texture, and light artifact density. This zone exists only in Square A and was largely unremarkable. Zone 9 was ended after about 15 cm due to hitting a layer of larger chert cobbles and boulders across the square. These large stones may be the core rubble fill of the basal platform of Plaza C.

Zone 10

Zone 10 is a collapse layer with the same soil color (10YR 3/1), texture, and light artifact density as Zones 8 and 9. This zone starts below Zone 9 in Square A at a layer of larger chert cobbles and boulders. The zone was largely unremarkable aside from the recovery of a pendent fragment that contained a portion of a glyph. Zone 10 ended after about 10 cm due to hitting a large chert boulder that takes up approximately 70% of the horizontal surface area of Square A. As noted above, these larger boulders are likely the core fill of the basal platform of Plaza C.

Zone 11

Zone 11 is a collapse layer with the same soil color (10YR 3/1), texture, and light artifact density as Zones 8, 9, and 10. This zone starts below Zone 10 in Square A at the top of a large chert boulder. Zone 11 was leveled and ended arbitrarily before reaching the base of the boulder. Excavation of Op. 43 ended at this point.

Conclusions

The presence of large chert boulders exposed at the bottom of Op. 43 suggests that this may represent the core fill of the northeast corner of the basal platform of Plaza C. Based on the information gathered from Zones 8, 9, 10, and 11, including the presence of the glyphic pendent, it seems likely that Plaza C had some form of earlier Classic period occupation. We suspect that further excavation of the structures on top of the basal platform and within the plaza itself would reveal evidence of an earlier occupation. However, the placement and content of the midden itself seems to suggest a later date and does not resemble a “traditional” Classic period trash deposit. The location of the midden deposit suggests that refuse was being cast off the northeast

corner of the basal platform of Plaza C, but the deposit is not substantial nor are the contents varied enough to suggest it was created from any kind of long-term occupation at Plaza C.

The placement and content of the midden deposit, which was dominated by turtle shell (about 50% of which was burned), remains somewhat enigmatic. The abundance of burned turtle shell suggests it could be the result of some kind of short-term visitation and/or feasting event, rather than the remains of full-time occupation. The abundance of turtle shell, fish bones, and marine shell recovered from the midden deposit (Zones 3 and 5) suggests these later occupants or visitors of Ek' Tok relied heavily on marine and lagoon resources for their subsistence. Given that this deposit was placed on architecture that was already in a state of collapse suggests that some later group(s) of people, perhaps Postclassic or Historic period residents or visitors passing through, occupied (at least temporarily) parts of Ek' Tok, including Plaza C. A full ceramic analysis has not yet been conducted and is necessary to confirm the chronology. Some Terminal Classic sherds were identified below the midden deposit and suggest that Group C itself dates to this time period or earlier. As for the timing of the possible feasting event, this is a question that can be better addressed in future seasons through careful analysis of the sherds that were recovered both within and below deposit, as well as further excavations both on and around the exterior of Plaza C to look for similar evidence of later occupation.

Chapter 9

Investigating a Structure in Plaza C at Ek'Tok (Operation 44)

Ryan T. Rybka

Introduction

Operation (Op) 44 is a cultural arrangement of stones, east of Ek' Tok's main pyramid (Group A), and west of the residential Group C. The orientations of the protruding stone cobbles were selected for investigation because of their cardinal orientation, their curved shape, and the absence of a mound on which the stones rest. On the surface, there is a line of stones that extend approximately 4 meters in a cardinal north-south orientation; at the southern-most extent of the linear stones, the orientation changes to the west in a curving pattern for approximately two meters, at which point the orientation returns to a cardinal north-south linear alignment.

Locating historic Spanish construction in Belize is difficult, particularly without any documentation. Pendergast (1993) offers three clues to aid in their identification. The first is to focus on cleared field terrains, which are the best terrain to identify colonial structures. Furthermore, these cleared fields are particularly attractive for present-day farming, which is how Ek'Tok' is presently utilized. The third clue specifically addresses identifying church construction, in which "the long axis of the platform must almost certainly lie east-west, in accordance with an apparently universal Spanish-Maya accommodation …" (69). From the surface, the long-axis of Op 44's stones is north-south, not east-west. It is, however, not possible to be certain of the extent and actual alignments from the surface without excavation because many of the stones extend into the ground. Excavation leads to the last hint of identifying historic sites, which is the presence of historic material culture. At Lamanai and Tipu, Spanish occupation sites were identified by the presence of a Spanish olive jar as well as Catholic Church burials and associated religious material (Pendergast 1981). Excavation is therefore needed to assess the extent and orientations of the stones as well as to assess the presence, if any, of historic Spanish material culture.

During the January 2019 season, a test excavation (Operation 44) was carried out to test the hypothesis that the identified all-stone platform feature located in a plaza area to the southwest of Plaza C is evidence of historic-Spanish construction (**Figure 9.1**). The rationale for this hypothesis is based on the above-mentioned variables, namely the stone's cardinal orientation and the flat (off-mound) topography. Necessary evidence to asses this hypothesis is the presence of historic-Spanish material culture.

Operation 44 consists of six cardinally oriented squares (A-D), all of which are 2 m squares that comprised the entire 4x 4-meter Operation (**Figure 9.2**). Square A is in the

northwestern corner; Square B is in the northeast corner; square C is in the southwest corner; and square D is in the southeast corner. The placement of these squares was chosen to address the hypothesis that these surficial stones articulate a historic structure, possibly a church, and so are positioned to include the inside and the potential outside of the structure. These stones are oriented in a linear fashion (north to south) in squares B and D, curve to the west at the southern-most extent of squares D and C, and are again oriented north-south in Squares A and C.

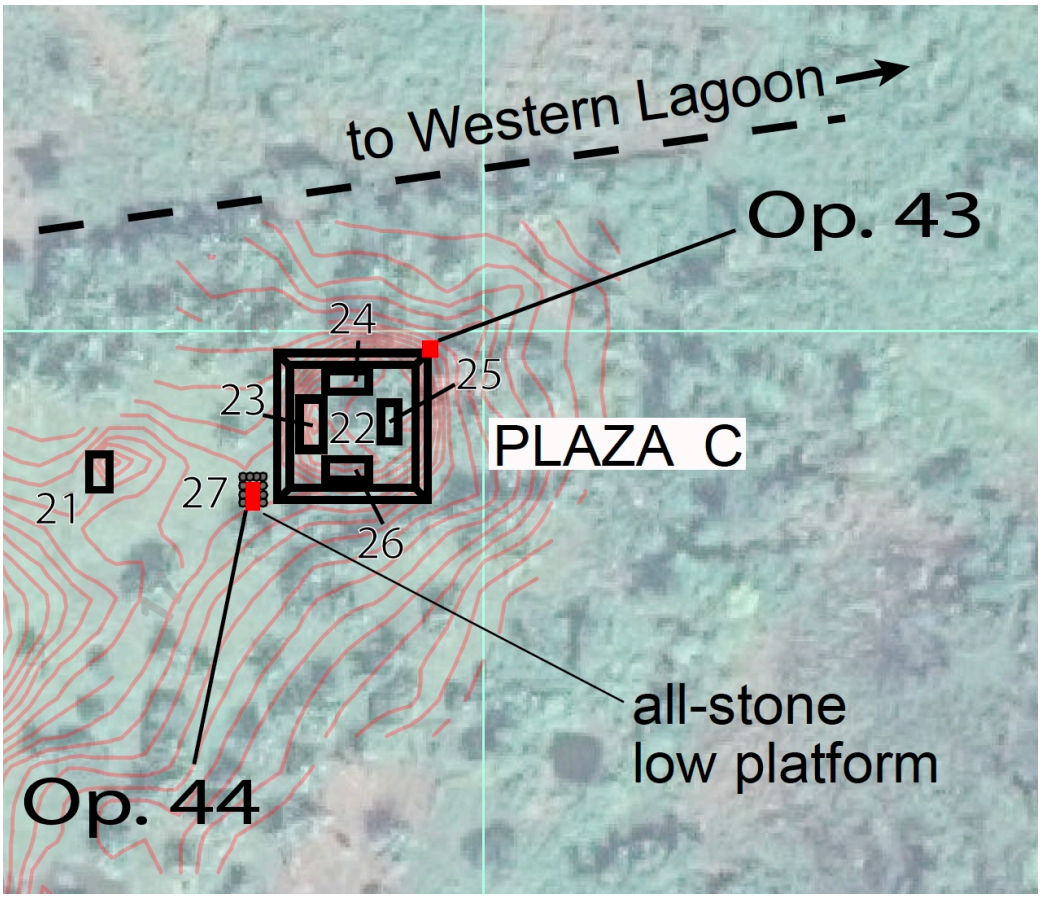

Figure 9.1 Location of Operation 44 at Ek'tok.

Objectives

1. Test the hypothesis that this stone cobble assemblage is evidence of historic Spanish construction.

Description of the Research and Methods Used

• Using a total station, a 4X4 meter grid was created over the stone assemblage feature.

• Four 2meter square units (A-D) were articulated with nails and string.
• Squares B-D were excavated in zones with shovels and trowels.
• All material was screened through a ¼ inch screen
• The datum for Op 44 is 42 cm above ground surface and 16 cm north east of the north east corner of OP 44.

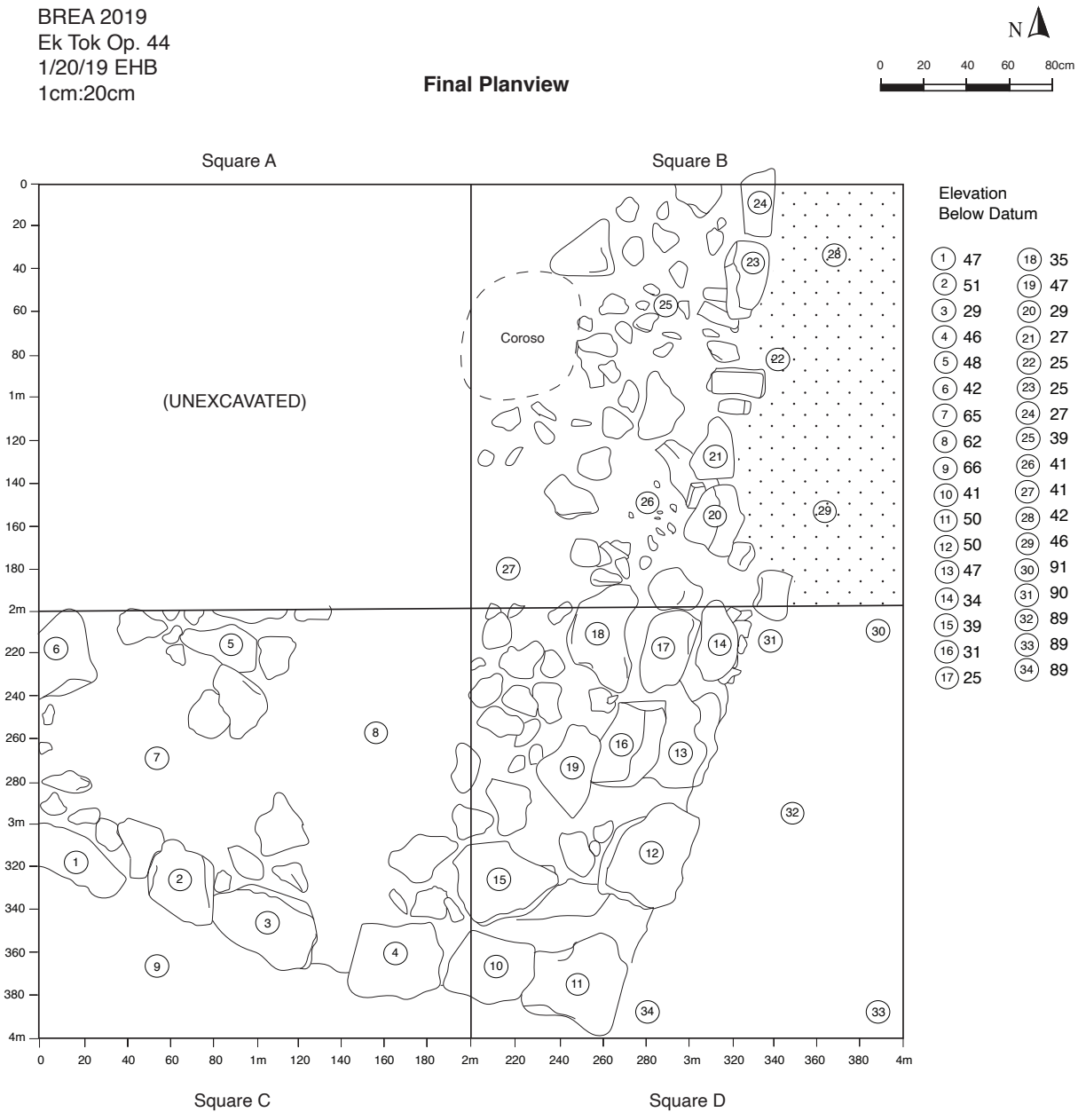

Figure 9.2 Final planview of Operation 44 (drawn by E. Harrison-Buck, digitized by K. Titus).

Excavation of Operation 44

The goal of Operation 44 is to test the hypothesis that the visible stone assemblage is evidence of historic-Spanish construction.

Zone 1 (Square A-D)

Zone 1 (~0-6cmbs) is the top ground surface of Op 44 and is present in squares A-D. The soil matrix is compact organic silt with grass and roots present; the Munsell color is 10 YR 3/1. Large cobbles, thought to be structural stones, exist in all four squares, with the highest density in squares B and D. The stone feature extends in a north-south linear patter in squares B and D; the stones curve to the west in square C, and continue north in a less-well articulated linear path in square A. Square A was not excavated because it possesses the least amount of visible cobbles present at the surface. Zone 1 ends at the at the stratigraphic extent of the organic turf surface.

Square B had an artifact count of approximately 30 artifacts, which included solely non-pottery ceramics. Square D had a higher density of artifacts with approximately 70 artifacts, which included animal bone, debitage, and non-pottery ceramics. Square C had the largest artifact count of approximately 80 artifacts, which included animal bone, debitage, and non-pottery ceramics.

Zone 2 (Square D)

Zone 2 (~6-23cmbs) is only present in square D. Zone 2 is interpreted as the collapse of a structure. This zone consists of small cobbles ~15 cm in diameter. It is composed of chert and limestone cobbles that are hypothesized to have collapsed east of larger structural stones that run north to south in Square D. This zone has a heavy artifact density with approximately 500 artifacts, which include animal bone, non-pottery ceramic, rims, and body sherds. The silty soil has a Munsell color of 10 Y/R 2/1.

Zone 2 ends at what is interpreted as a ground surface, which was identified by a change in soil, a marl limestone rich silty clay, and a decrease in artifact density. The structural stones at the base of zone 2 demarcate an inside and an outside of this stone structure. **Figure 9.2** visually demonstrates what is meant by inside and outside of the stone structure. All material collected or described east of the structural stones in squares B and D, and south of the structural stones in square C is categorized as being outside of the stone structures. All material collected or described west of the structural stones in squares B and D, and north of the structural stones in square C is described as being inside of the stone structure.

Zones 3, 4, 5, 7, and 8 are organized to separate the material from inside the stone structure and outside the stone structure, as described. Zones 3, 5, and 8 are located outside of the stone structure, and zones 7 and 4 are located within the stone structure. It is important to

note that Zone 6 is conspicuously absent. Zone 6 was intended to be the zone beneath Zone 1 in square B, but Square B was never excavated below zone 1, which is why there is a gap in the zone sequence.

Zone 7 (Square C)

Zone 7 (~6-13cmbs) is located inside the structural stones in Squares C, directly under Zone 1 (top soil). Zone 7 is interpreted as collapsed material. Small limestone pieces are present throughout the silty clay soil. The Munsell color is 10 Y/R 2/2. Zone 7 has a low artifact density with only 10 artifacts consisting of non-pottery ceramics and animal bone.

Zone 8 (Square C)

Zone 8 (~6-13cmbs) is interpreted as collapse outside of the structural stones. It is located outside structural stones directly under Zone 1 in Square C. There are small limestone pieces present throughout the compact silty clay marl soil. The artifact concentration is low with approximately 20 artifacts consisting of only non-pottery ceramics.

Zone 3 (Square C and D)

Zone 3 (~23-30cmbs) is present in squares C and D and is interpreted as a floor surface outside of the structural stones. Zone 3 is located underneath Zone 2 in square D and underneath Zone 8 in square C. The soil deposit is composed of a marl limestone rich silty clay with a Munsell color of 10 Y/R 3/2. In square C, the artifact density is low, with an estimated artifact count of approximately 50 artifacts composed of animal bone and non-pottery ceramics. In Square D, the artifact count is heavier with approximately 250 artifacts, composed of only non-pottery ceramics.

Zone 4 (Square C)

Zone 4 (~30-34cmbs) is interpreted as the floor surface inside of the structural stones. It is composed of limestone-rich silty clay soil with a Munsell color of 10 Y/R 3/1. Zone 4 is stratigraphically located underneath Zone 7 in square C. Zone 4 has a medium artifact density, with approximately 100 artifacts composed of animal bone and non-pottery ceramics.

Zone 5 (Square D)

Zone 5 (~34-45cmbs) is interpreted as construction fill. Zone 5 begins at the base of the large structural stones in square D, beneath Zone 3. It has the same soil texture, color, and compactness as Zone 3, 10 Y/R 3/1 silty clay, but has fewer artifacts and cobbles. Zone 5 ends arbitrarily due to time and the lack of soil change. Zone 5 is interpreted to be underneath the marl floor. It has a medium artifact density, with approximately 50 artifacts containing only non-pottery ceramics.

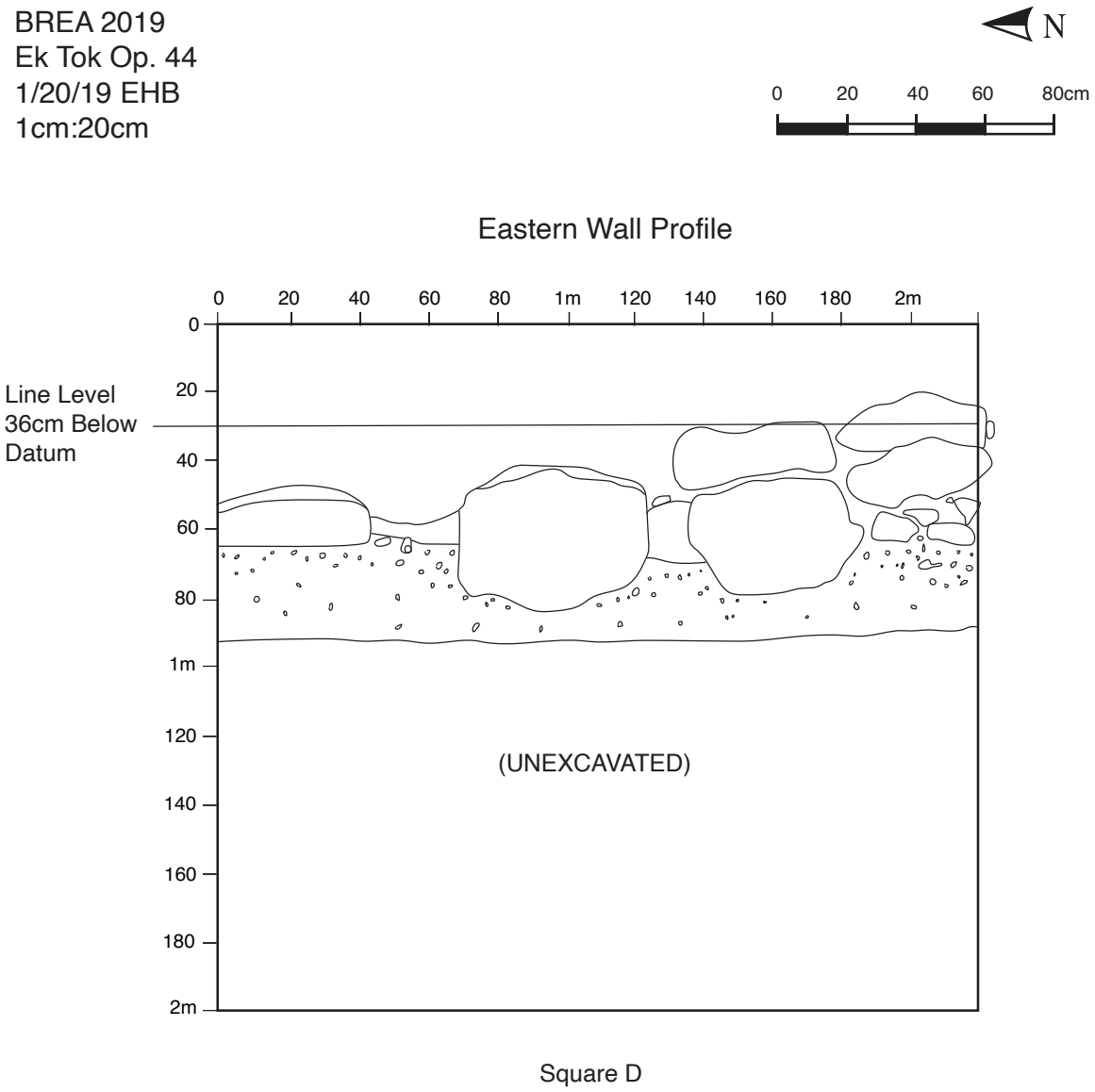

Figure 9.3 Final Planview the Eastern wall of square D in Operation 44 (drawn by Eleanor Harrison- Buck, digitized by K. Titus).

Interpretations and Conclusions

The lack of any historic Spanish artifacts rejects the hypothesis that Op 44 is evidence of historic Spanish construction. The initial hypothesis was quickly threatened by the abundance of Mayan, non-pottery ceramics, particularly in square D. Instead of a Spanish historic construction, the evidence suggests Mayan construction. Figure 9.3 is the final eastern wall profile of square D, depicting the relationships among Zones, 1, 2, 3, and 5.

Underneath the topsoil (Zone 1), Zone 2 shows evidence of architectural collapse with the highest artifact density mixed with limestone cobbles. Underneath this collapsed material is

evidence of a floor (Zones 3), which is seen by the soil (a marl limestone rich silty clay soil) on which the high artifact density rested. Excavation continued underneath this floor surface in Zone 5, which is interpreted as silty clay construction fill with a decrease in artifact density.

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Figures:

Figure 9.1 Planview Map #1 showing arrangement of structural stones in square D before excavation (map prepared by Ryan Rybka).
Figure 9.2 Final Planview of Operation 44, squares A-D (drawn by Eleanor Harrison- Buck).
Figure. 9.3 Final Planview the Eastern wall of square D in Operation 44 (drawn by Eleanor Harrison- Buck).

Chapter 10

Excavations of a Spanish Olive Jar Scatter at Ek'Tok (Operation 45)

Adam R. Kaeding

Introduction and Objectives of Operation 45

The detailed mapping of Ek'Tok began with the dual pyramids at the ceremonial center identified as Plaza A (see Murata and Kaeding, Chapter 3). The initial mapping effort extended to include additional plaza groups, including Plaza B to the north and Plaza C west (see **Figure 3.2**). Between Plaza A and Plaza C is a prominent basal platform (Structure 16) containing a tall, near-pyramidal structure (Structure 17) that closes the western end of a large sunken plaza ringed by smaller structures (Structures 18-21). The top of Structure 17 features visible stone alignments likely indicating the foundation of a superstructure. During the initial mapping of the site, an olive jar sherd was recovered from the top of Structure 17. No other Contact or Colonial Period artifacts have been recovered from Ek'Tok. Based on the olive jar sherd, Operation 45 was designed to investigate the potential for additional contact or colonial period artifacts to be recovered from Structure 17 (**Figure 10.1**). This exploratory effort exposed more of the Olive jar fragments on the surface and after the excavation of three zones Operation 45 was terminated.

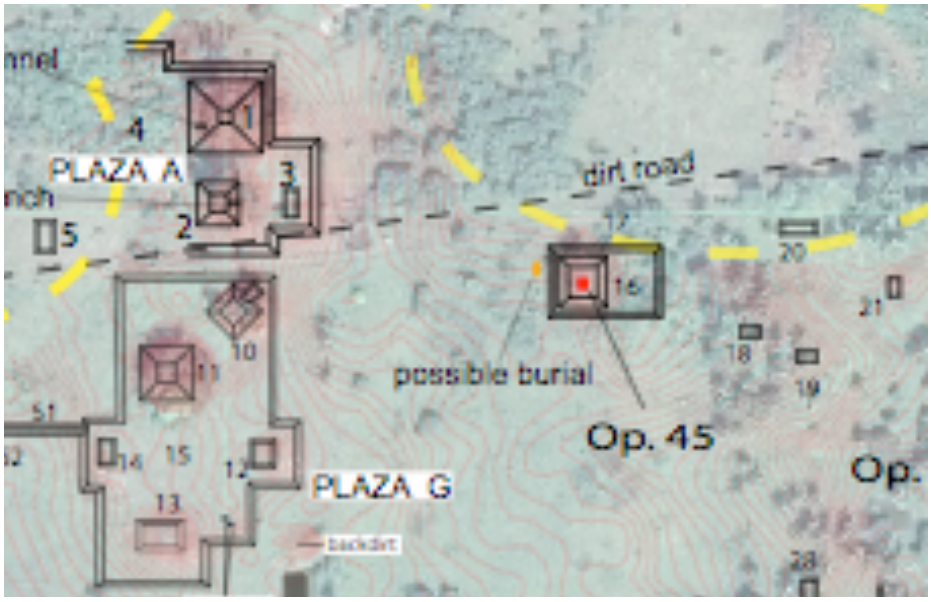

Figure 10.1 Location of Operation 45 on Structure 17 at Ek'tok.

Operation 45

Operation 45 was laid out as a 2 x 2 m unit intended to cover the extent of where historical artifacts were expected based on where the original olive jar sherd was recovered. The unit was split into two 1 x 2 m squares (A and B) in order to facilitate more focused targeting of areas of increased interest. Any further investigation of the colonial period archaeological signature or Structure 17 more generally will be conducted as a different operation. Based on observations noted during and following the excavation of Zone 1, Zones 2 and 3 of Square A were not excavated. Below Zones 1-3 are described.

Zone 1

The topzone of Squares A and B were removed as Zone 1. This layer was generally a 5-cm thick layer of 10YR 4/3 sandy clay. Additional historical ceramic pottery sherds (olive jar) were identified within this zone, but at a light density.

Zone 2

Collapse material and cobble fill surrounding the observed remnants of the potentially intact architecture/foundation brace was removed as Zone 2. The removal of this zone generally reached around 6 cm in thickness. The soil matrix surrounding the cobble fill was a 10YR 4/1 sandy clay. Zone 2 continued to yield a light density of historical ceramic (olive jar) sherds.

Zone 3

During the excavation of Zone 2 a void in the density of cobbles was revealed. This was interpreted as a possible intrusive pit and excavated separately as Zone 3. The distribution of historic ceramic (olive jar) sherds seemed to possibly indicate higher density of these artifacts surrounding the potential pit (**Figure 10.2**). Zone 3 extended roughly 8 cm deep. The apparent increase in density of historical ceramic sherds appears to have been confirmed during the excavation of the 10YR 4/1 sandy clay fill (**Figure 10.3**). The excavation of Zone 3 did not, however, provide compelling evidence regarding the nature of the feature. Following the excavation, it seems more likely that this observation reflects more recent bioturbation versus an intentionally excavated pit. Accordingly, it seems unlikely that the characterization of Zone 3 informs any consideration of contact or colonial period artifact distribution.

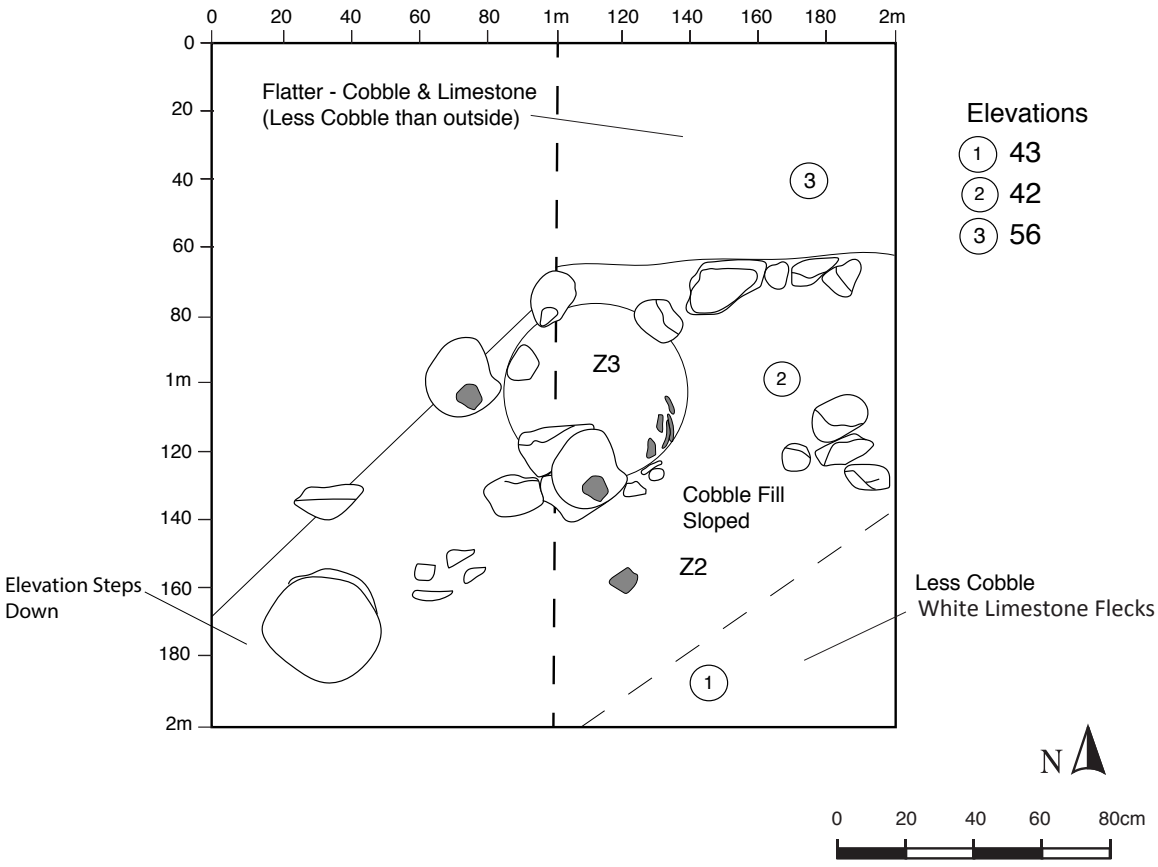

Figure 10.2 Operation 45 top of Zone 3 showing colonial olive jar sherds shaded in gray (drawn by A. Kaeding, digitized by K. Titus).

Interpretations and Conclusions

The olive jar sherds from Operation 45 add to the small Spanish colonial assemblage so far recovered archaeologically from throughout the BREA survey area. This operation provided further insight regarding potential distribution patterns for this category of artifact. It suggests that at least some activity potentially took places the earlier colonial period which conforms with data recovered from nearby Chau Hix. However, this preliminary investigation has not provided clarity regarding whether Spanish colonial artifacts may be restricted to effectively a surface

distribution or whether there is potential for intact subsurface colonial desposits. Additional investigation around the top and base of the Structure 17 may help further that understanding.

BREA 2019
Ek Tok Op. 45
1/18/19 AK
1cm:20cm

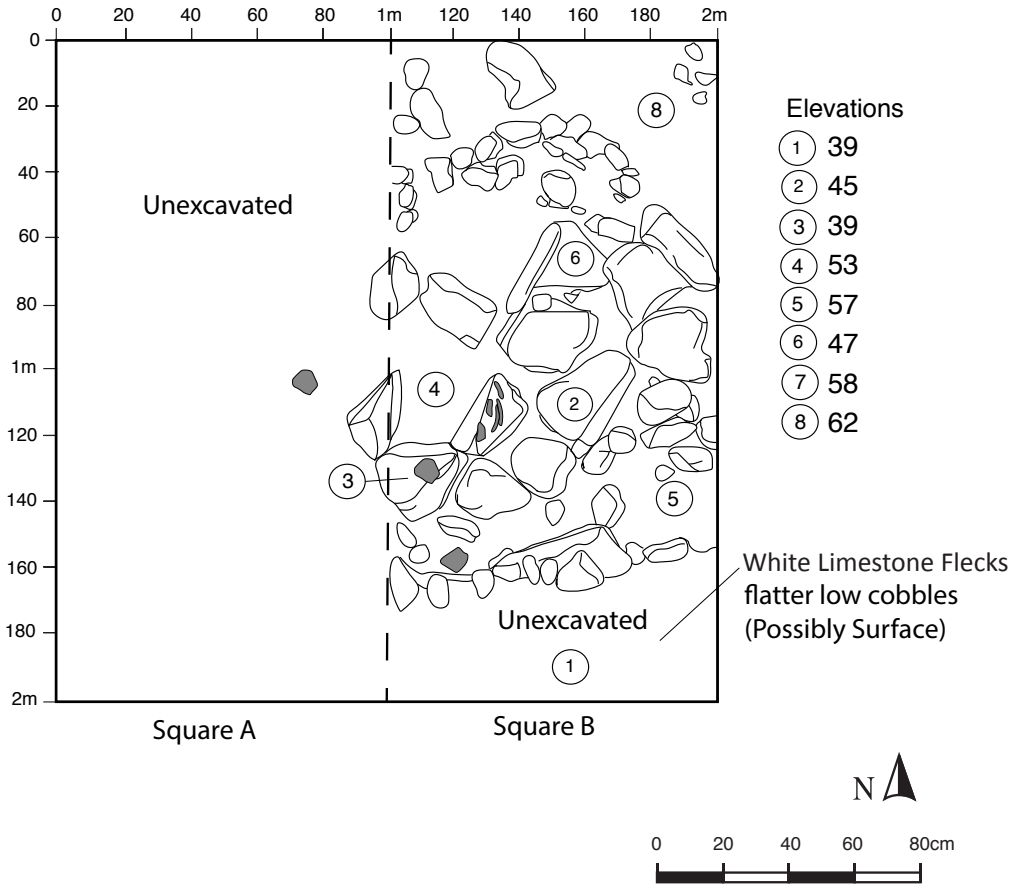

Figure 10.3 Operation 45 end of excavation showing colonial olive jar sherds shaded in gray (drawn by A. Kaeding, digitized by K. Titus).

Chapter 11

Geoarchaeology Investigations in the Western Lagoon (Operations 46, 47, and 48)

Samantha Krause, Timothy Beach, and Sheryl Luzzadder-Beach

Brief Introduction

During the 2019 season, we began geoarchaeological excavations focused around agriculturally and hydrologically relevant zones within the Western Lagoon, targeting areas previously recognized by scholars as landscapes modified by Maya activity. In addition, we collected sediment cores from nearby perennial wetlands to aid in our ongoing understanding of paleoenvironmental and paleoclimatic changes within the surrounding pine ridge area. The 2019 season's geoarchaeological team consisted of Dr. Tim Beach and Dr. Sheryl Luzzadder-Beach of the University of Texas at Austin, Dr. Samantha Krause of Texas State University, undergraduate researcher Emely Hernandez of Sewanee, and research team associates from the village of Crooked Tree. Geoarchaeological investigations around Crooked Tree Lagoon occurred in the month of June, and focused specifically on excavations of possible canal and field expressions within wetland zones, as well as spot water sampling for geochemical testing.

The Western Lagoon study site is located on the coastal plain of Belize, in the southern portion of the geographic and cultural region named the Maya Lowlands. The modern climate of Belize is tropical, and the average summer temperature generally ranges between 31˚C to 22˚C, and winter temperatures range between 28˚C to 18˚C (King et al. 1992). The annual precipitation patterns are typically wet/dry, with a rainy season between from December to May and a pronounced dry season from April to January (Gamble and Curtis 2008). There are a few major regional precipitation drivers that control rainfall regime in Belize, included the annual migration of the Inter Tropical Convergence Zone (ITCZ) and subtropical high pressure, the positioning and strength of the easterly trade winds, and tropical storms like hurricane events (Boose et al. 2004; Beach et al. 2018).

The geological framework in this region is predominantly Quaternary limestone and dolomitic limestone (Perry et al. 2009) as well as Holocene coastal sediments (High 1975). The main source of chert within this region is concentrated in the chert-bearing zone, which encompasses a large portion of Northern Belize (Wright et al. 1959), most of this chert bearing zone occurs to the north and east of the study area, but pockets of chert bearing soils and chert nodules have been mapped in the Crooked Tree area (Cackler et al. 1999).

Soils in the region have both autochthonous components from their bedrock and vegetation and allochthonous components from Saharan dust and volcanic inputs (Cabadas et al. 2010; Bautista et al. 2011; Tankersley et al. 2016). In depressions, Histosols form where the

water table is nearly perpetual and Vertisols form where the water table is below the surface and soils formed for a few thousand years (Solís-Castillo et al. 2013). Within in many depression soils in this region is a facies change from a stable soil surface aggraded sediments often called "Maya Clay" lying above a paleosol. Scholars first started using 'Maya Clay' for phyllosilicate clays dating to the Maya period from 4,000-1,000 years BP in lake sediments, sandwiched between earlier and later organic sediments (Beach et al. 2015). The term 'Maya Clay' refers to fine grained sediment, often montmorillonitic, commonly with abundant cultural materials and elevated phosphorus, deposited as early as 4000 years BP due to human induced erosion, perhaps coupled with regional drying (Jacob 1995).

The hydrology and geography of the Crooked Tree Lagoonal system is poorly understood. Through this lowland area, lagoons, streams, rivers and wetlands form an extensive and hydrologically complex network of surface and groundwater resources. Wetlands, both perennial and seasonal overly alluvial deposits of calcareous clay, siliceous sand, organic peat, and wetland soils (Ferro et al. 1999). The modern river drainage system that contributes to the wetlands in this region is the Belize River, Spanish Creek and Black Creek, all of which carries a high sediment load from the Maya Mountains and drains E-NE (Ferro et al. 1999). The wetlands include Calabash Pond, Revenge, Western Crooked Tree and Southern Lagoons, and Spanish Creek. Western Lagoon is strongly seasonal, and currently drains completely during the dry season. As the wet season progresses, contributing rivers and creeks back up, and both Black Creek and Spanish Creek drainages push water into Western Lagoon (Pyburn 2003).

A combination of field survey and remote sensing efforts conducted by researchers working within the region has revealed large swaths of human modified wetlands, including features such as raised and drained fields, canals, dams, reservoirs, and other agricultural features. In the Crooked Tree system, linear features first reported by Pyburn in 2003 and later expanded on by Harrison-Buck in 2014, extend 600-800m east-west across the lagoon and may have served to regulate annual floodwaters in the system. A major effort for the 2019 field season was to reconstruct the timing, formation, and possible use of linear features across the lagoon.

Objectives

The wetlands within the Crooked Tree lagoonal system hold key research promise for a variety of compelling reasons, and may help to answer questions regarding Maya landscape modification, hydrological engineering, subsistence strategies, and cultural resilience/response to environmental changes. The analysis resulting in this project will provide robust information on hydrologic and geographic landscape patterns as well as human use of wetlands during critical cultural periods. The excavation and coring efforts carried out in this pilot project will further answer questions about agricultural strategies and resource depletion, as well as provide new proxy evidence for paleoenvironmental change in these landscapes.

The goals of these excavations were to collect a sequence of soils samples from archaeological contexts, as well as to collect soil samples from each horizon to determine wetland geomorphology, natural soil development, and soil chronosequences. We will then compare the 2019 field season's soil collection to excavations of possible fish weirs from previous seasons, which helps us to better quantify extent, duration, and intensity of human modification within this wetland over time. From these excavations, we collected 204 soil samples for soil chemical, isotopic, and ecological analysis from three test units (Operations 46-48). These soil test units were placed along canal and field expressions, in order to better understand the stratigraphy of the soils from low to high zones within the lagoon. Soil samples were collected in five centimeter increments along the walls of excavation units, and charcoal was sampled for subsequent AMS dating.

Description of the Research and Methods Used

Water Quality Sampling

Groundwater sampling around the Crooked Tree area provides another season's worth of data to our ongoing record of groundwater quality and change across the landscape of Belize. This information is valuable in regards to ancient Maya agricultural systems and land use strategies (Beach et al. 2015). Water samples were collected using acid washed high-density polyethylene (HDPE) bottle for general chemical analysis and ICP-MS testing. These tests are being performed during the 2019-2020 academic year at the University of Texas at Austin, and will provide detailed information about the quality and makeup of the groundwater within the lower Belize River watershed, which we can use to better understand the hydrology and geology of the overall region, and how this hydrology relates to long term land use decision making and human-environment interaction within the region.

Soil and Geomorphic Excavations

Three operations were conducted in the Western Lagoon in the 2019 field season—Operations 46, 47, and 48. We sampled each operation for further geoarchaeological analysis in the laboratory setting. We described soils, mapped features, and collected a soil sample -every 5 cm down profile in each excavation. Each sample was collected using a cleaned trowel and bagged in a plastic zip-lock bag, and was subsequently weighed and shipped to the Soils and Geoarchaeology lab at the University of Texas for analysis. Tests that will be performed during the 2019-2020 calendar year include pollen and phytolith analysis (Jones 1994), ICP-MS, Melich II extractable phosphorous (Cook et al. 2006), magnetic susceptibility (Maher 1986), grain size, microcharcoal analysis, and loss ignition (Dean 1974). These multiproxy lines of evidence will

provide us with information regarding form, function, duration, and intensity of human modification within the Western Lagoon.

Operation 46 at Western Lagoon Site 2

Squares A, B, and C

Western Lagoon Site 2 Op 46 was a 1.5 m x 6m long unit divided into three contiguous squares (A, B, and C), although portions remained unexcavated. This operation served to investigate an E-W running linear low feature in the central portion of the Western Lagoon. This linear feature runs a length of approximately 500 meters east-west, and is approximately 15-20 meters from north to south. Site 2 Op 46 A (333895E 1960689N Zone 16N) was a 1.5x2m excavation oriented N-S on a topographic high north of the E-W linear feature. Site 2 Op 46 B (UTM 333895E 1960670N Zone 16N) was a 1.5x2m excavation oriented N-S on a topographic low in the center of the E-W linear feature. Site 2 Op 46 C (UTM 333895E 1960658N Zone 16N) was a 1.5 x 2m excavation oriented N-S on a topographic high south of the E-W linear feature. Each excavation was terminated once the water table was reached. The purpose of this excavation was to determine if there were stratigraphic dissimilarities between these slight changes in topography, and to determine if subsurface features reflected natural changes or anthropogenic modification.

Site 2 Op 46 A and C, both placed on a micro-topographic high, had similar soil stratigraphy. From 0-15 cmbs, the A horizon was a gray clay (Glay 5/N, gray) with many fine roots. Below this from 15-30cmbs we interpret a Bky horizon with increased clay, a distinct columnar structure, and a thick band of calcium/gypsum accumulation, probably due to seasonal water table rise and fall. Below this from 30 to 100cmbs the soil strata transitions to a darker buried A horizon with some small shells, calcium carbonate concretions, and redox oxidation and depletion along the ped faces. Below this from 100 to 130cmbs, the soil abruptly transitions into a C horizon of saturated glay material. Below 130cmbs we were forced to terminate excavations due to breaching the water table.

Site 2 Op 46 B had a slightly different sequence of soil stratigraphy. From 0-15 cmbs, the A horizon was a gray clay (Gley 1 5/N, gray) with many fine roots. Below this the Bky horizon was not as pronounced as the slightly more elevated excavations, thought streaks of carbonate were observed from15 to 20cmbs. Below this redoxmorphic features along the ped faces were prominent as the soil transitions to a darker matrix (Gley 1 4/N dark gray, transitioning to 10YR 3/1 very dark gray) with higher water content. We terminated the excavation after reaching the water table at around 110 cmbs.

Figure 11.1 Soil stratigraphy at Site 2 Op 46 Square B (Photo by S. Krause).

Figure 11.2 Soil stratigraphy at Site 2 Op 46 Square C (Photo by S. Krause).

Operation 47 at Western Lagoon Site 3

Western Lagoon Site 3 Op 47 (UTM (333849E 1959612.72N Zone 16N) was a single excavation trench oriented N-S across a long linear feature that traverses from the eastern to western margins of the southern region of the Western Lagoon. This linear feature is at least 1km in length and terminates at the site of Chau Hiix on the far western margin, and is associated with similar features to the north and south. The excavation unit was a length of 1.5m x 6m, and begins on the south side in a micro-high and runs north into the lower portions of the linear feature. The purpose of this excavation was to determine if there were stratigraphic

dissimilarities between slight changes in topography, dissimilarities between the northern and southern portions of the lagoon, and to determine if subsurface features reflected natural changes or anthropogenic modification.

Figure 11.3 Example of redoxmorphic features along the ped faces and along root pathways within the upper vertic soil sequences (Photo by S. Krause).

Western Lagoon Site 3 Op 47 was relatively unique in stratigraphy. On the southern portion of the excavation, the top 40 cm were composed of an A horizon of gray clay matrix (Gley 1 5/N, grey) with some carbonate inclusions. This A horizon exhibits slickinside characteristics with depth. Below this the soil increases in organics and red streaks of oxidation (2.5YR 3/6 and 4/6, dark red and red), especially following root pathways. At 90cmbs, this transitions to laminations of partially decomposted peat (10 YR 2.1, black), carbonates, marl, and shell. These laminations generally occur from 90-96cmbs across the excavation. Below this is a sharp transition to carbonate sediment prolific with small shells. On the northern (lower) portion of the excavation, which represents the portion of the unit that lies within the linear feature, was composed of an A horizon of gray clay matrix (Gley 1 5/N, grey) with some carbonate inclusions from the surface to 55cmbs, which transitions into a denser clay with some slicknside characteristics with depth. Below this are discontinuous layers of lighter, courser material, and peaty, organic rich that are deposited in bands to a depth of 85cm. Below this to a depth of between 130 and 140cmbs the stratigraphy again transitions to carbonate sediment (10YR 8/1

white) prolific (over 50%) with small shells. This basal layer of possible lacustrine material is saturated at a depth of about 140cmbs across the entire excavation unit.

Figure 11.4 Soil stratigraphy at Site 3 Op 47, southern wall excavation (Photo by S. Krause).

Operation 48 at Western Lagoon Site 4

Western Lagoon Site 4 Op 48 was a single excavation unit oriented N-S along a linear feature in the northern region of the Western Lagoon that extends approximately 700 meters NNE-SSW along the lagoon. We placed our excavation unit close to the eastern end of this feature. The purpose of this excavation was to determine if the northern portion of the lagoonal system was similar stratigraphically and hydrologically to previous excavations, and if there were stratigraphic dissimilarities between slight changes in topography between the linear

feature and the surrounding surface.

Western Lagoon Site 4 Op 48 shared stratigraphic similarities with Western Lagoon Site 2 Op 46. We interpret the first 10-15 cm of this excavation as a gray clay A horizon with many fine roots and organics (Gley 1 5/N, gray). Below this the subsoil (15-40cmbs) is defined as a Bky with prominent carbonate and a lighter matrix. Below this the soil transitions to a dark Ab horizon from 40-57cmbs in the southern portion of the unit and from 40-80cmbs in the northern (lower) portion of the unit. From 70cmbs to at least 100cmbs, the soil transitions abruptly to a reduced blue/grey and waterlogged C horizon of almost pure clay, as well as silt and sand sized gypsum and calcite crystals (Munsell colors range from 2.5Y 8/1 white to Glay 2 6/1 and 5/1 both bluish gray). The northern (lower) portion of this excavation unit had a relatively thicker and lower Ab horizon than the southern portion, which transitioned to a C horizon much higher within the excavation.

Figure 11.5 Soil stratigraphy at Site 4 Op 48, northern wall excavation (Photo by S. Krause).

Interpretations and Conclusions

In general, soils within the Western Lagoon display typical Vertisol characteristics for the first 40-50 cm, and then transition to a buried organic rich, more Histic soil below before reaching the water table. Each excavation yielded at least one undifferentiated ceramic body sherd or possible chert lithic, usually between 75-100cmbs, which suggests that soil sequences within the lagoonal system are linked to Maya occupation within the region. Further radiocarbon dating and laboratory analysis will provide more direct evidence of Maya use and manipulation over temporal scales.

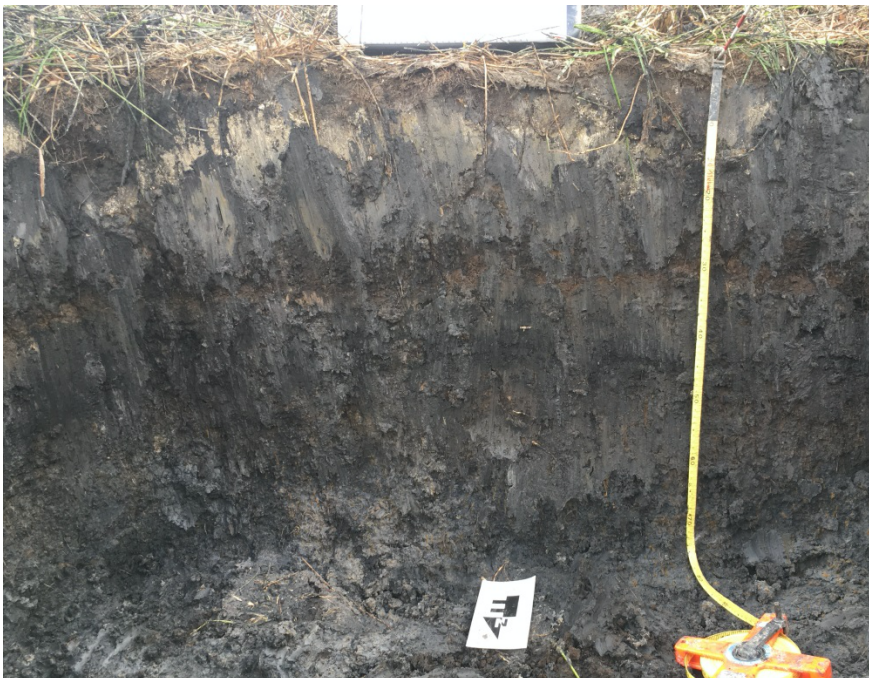

Figure 11.6 Soil stratigraphy at Site 4 Op 48, southernn wall excavation (Photo by S. Krause).

The most notable stratigraphy is within the Western Lagoon Site 3 Op 47, which transitions from a seasonally wet/dry Vertisol, to a thick layer of decomposed peat, charcoal, shell, to possible layers of lacustrine sediment. This may represent a transition from first an older perennially wet environment, to a marsh or swampland, to the strongly seasonally wet/dry environment that occurs in the lagoon today. This hydrologic change may be linked to long term human environment interaction and regional climate shifts. Further radiocarbon dating, geochemical and isotopic analysis will reveal the timing of this transitional event from perennial to seasonal inundation.

The data that will be acquired from these excavations will highlight the unique geologic and hydrological context of the Crooked Tree Lagoon, and can provide insight into how soil and water resources were manipulated. This further supplements our broader work on local human-landscape interactions within central Belize. The vast modifications that are still visible on the landscape today mark the importance of this region regarding resources. Intensive geochemical analysis of the soils within these agricultural systems is critical to the continued understanding of ancient human interaction with these areas as a source of goods, materials, and arable land. The geochemical analysis of soils near and on archaeological sites has recently yielded a variety of results for geoarchaeologists (Cook et al. 2006). The objectives laboratory work during 2019-2020 will be to carry out a suite of soil tests includes but is not limited to: pollen and phytolith analysis (Jones 1994), and carbon isotopic analysis to understand vegetation communities and agricultural patterns (Webb et al. 2007; Beach et al. 2009) geochemical analysis to understand

enrichment/depletion patters of phosphorus and other key elements as an indicator of past human activity, (Hutson et al. 2009, Cook et al. 2006), particle size analysis and percentage of organic matter to elucidate sediment origin and geomorphic processes, (Dean 1974), and micro and macro charcoal analysis to understand fire regime and possible drought patterns (Anderson and Wahl 2016).

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Chapter 12

Investigations of a Pocket *Bajo* at Chulub (Operation 49)

Astrid Runggaldier, Eleanor Harrison-Buck, and Samantha Krause

Introduction

This chapter adds excavation data from summer 2019 to a series of prior investigations carried out at the site of Chulub, beginning in the summer of 2016 with reconnaissance followed by mapping and excavations in January 2017 (Flanagan 2018; Harrison-Buck 2018; Shelhamer and Craig 2018; Murata, Kaeding, and Gantos 2018). In the BREA Project, the site of Chulub has been the center of several research foci for the following reasons: a) the site's configuration and location on the southern end of Crooked Tree island; b) its integration of ancient Maya architecture alongside a series of wetland features referred to as pocket *bajos*; and c) the site's potential to address questions concerning a range of Maya subsistence practices and adaptive strategies, namely during periods of long-term drought.

This north-south aligned settlement is small and easily accessible in the dry season, just south of Crooked Tree Village on the southern end of the island. The site is located in a mostly cleared cattle pasture bordered on the west side by bush and on the east side by the Crooked Tree Lagoon (see Murata, Kaeding, and Gantos 2018:Fig. 5.6). The waters of the lagoon reach the edge of the site in the rainy season and the raised water table inundates a series of depressions, referred to as pocket *bajos*, found interspersed between the structures. During reconnaissance, the survey team noted that these depressions correlated directly with dispersed structures north of the only formal residential plaza unit at the site (**Figure 12.1**). It was speculated that the depressions may be either modified natural depressions or artificially created pond-like features and that the configuration of the structures suggested primarily a production locale (Murata, Kaeding, and Gantos 2018:70-74). Given the unusual configuration of the site, it was decided that Chulub warranted more detailed topographic mapping in January 2017. The presence of pocket *bajos* presented unique features in that up until now they have not been identified anywhere else in the BREA research area.

By definition, pocket *bajos* measure less than 2 km^2 and are karstic depressions that cut into bedrock and are seasonally inundated during the rainy season, but become desiccated in the dry season (Dunning et al. 2015:95). Some of the largest Classic Maya sites, such as Tikal, are situated at the edge of pocket *bajos*. Despite the high clay content in the soils, the carbon isotopic studies from these karstic depressions have led scholars to suggest these low-lying areas were used for maize cultivation and that neighboring reservoirs may have been used for irrigation during periods of drought (Dunning et al. 2015:118). Grauer (2020:81) compares the pocket *bajos* found at the site of Aventura in northern Belize to the *rejolladas* of northern

Yucatán and suggests that in addition to specialized farming, pocket *bajos* also may have been used for water gathering and quarrying activities (Grauer 2020:8; citing Munro-Stasiuk et al. 2014). Based on our own finds from excavations at Chulub, we suggest the additional possibility that some pocket *bajos* also may have been used for seasonal aquaculture, including the storing of turtle and other wetland fidelic taxa.

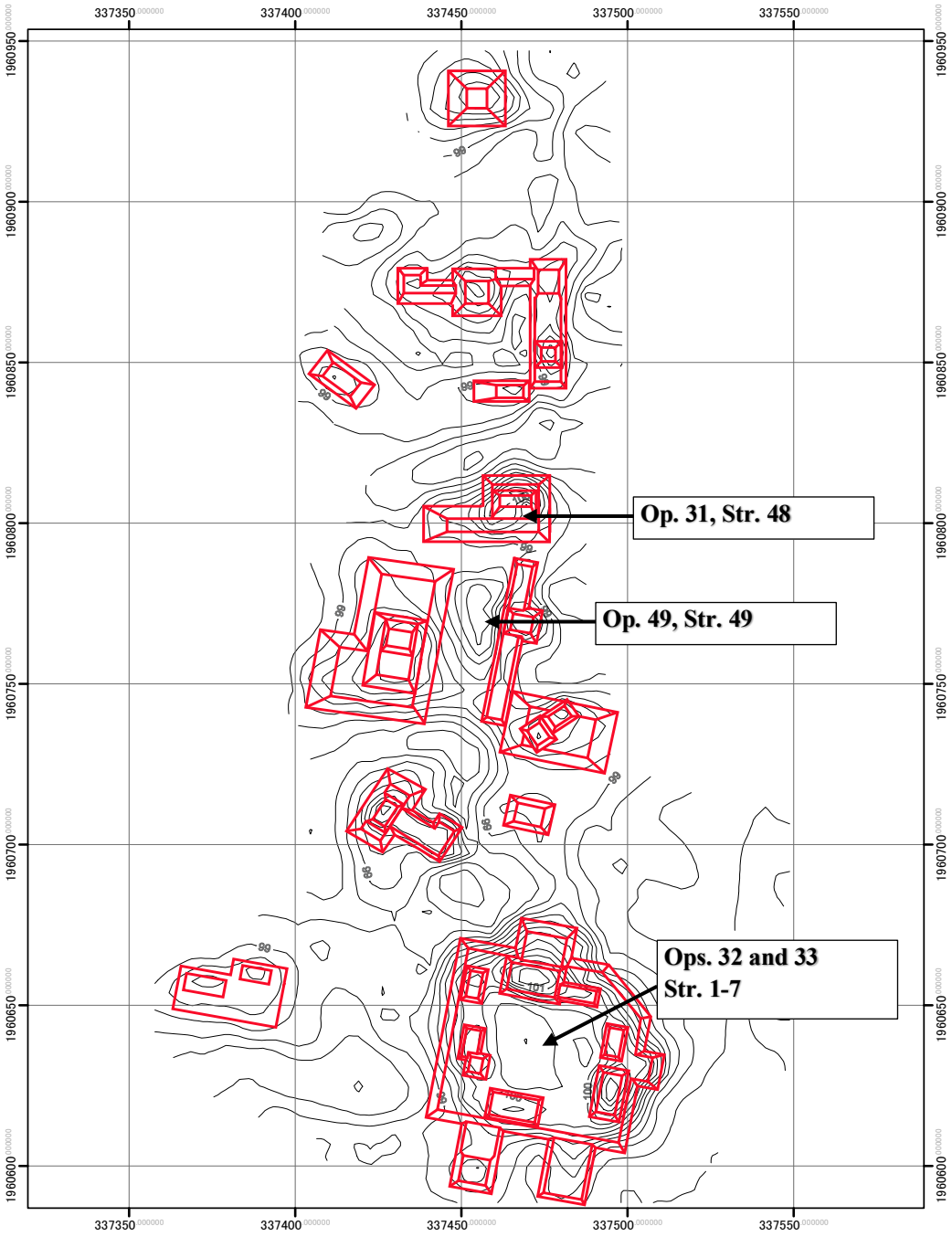

Figure 12.1 Map of Chulub showing locations of excavations to date. (Image adapted by A. Runggaldier based on map by S. Murata and A. Kaeding).

Objectives of the Op. 49 Excavation

In previous excavations at Chulub, Operations 32 (Harrison-Buck 2018) and 33 (Shelhamer and Craig 2018) focused on architecture and middens in the formal plaza group defined by Structures 1-7 in order to establish the nature of this settlement and its history of occupation. Operation 31 tested one of the structures (Str. 48) to the north of the plaza group, that appears to be associated with a north-south linear depression and may constitute a production-oriented structure, rather than a residential locale (Flanagan 2018). Excavation of Operation 49 was aimed at further exposing the east side of the same linear depression. While Op. 31 was located almost entirely on mound and exposed a terrace wall that showed the lower edge of the mound surface, Op. 49 was positioned to expose just the western edge of a nearby mound (Str. 49) and fully cross-cut the associated depression down to its lowest point (**Figure 12.1**). Because the pocket *bajo* was completely dry in June 2019, we were able to extend the western end of our excavation of Op. 49 into the deepest part of the depression.

Our excavations in 2019 aimed to further our understanding of the function of these features and their relationship to Maya production and subsistence practices. In particular, we wanted to determine if these features were all natural or artificially modified in some way. For instance, at Aventura in some cases the soft bedrock was cut to create steps that led down into the pocket *bajos* (Grauer 2020:85). In terms of function, we aimed to cross-examine the idea that these features may have been adapted for water management and/or aquaculture at a time (the Terminal Classic and Postclassic periods) when drought episodes may have made settlements in an environment like that of the Crooked Tree lagoon system more resilient than those in uplands with greater scarcity of water and water-based resources.

The following four research objectives guided our excavations:

1. To determine the transition between Str. 49 and the depression feature, recovering evidence of architectural construction, if any.
2. To identify the chronological timeframe of the final occupation of this structure and any earlier phases of occupation through both ceramics and charcoal samples.
3. To collect any associated faunal remains from Str. 49 and the adjacent pocket *bajo* to identify wetland taxa and assess any changing procurement patterns from Classic to Postclassic times.
4. To collect soil samples for geological and radiometric analysis from the lower reaches of the depression feature to assess the function and extent of artificial construction/modification of these features.

To address our main research objectives, the excavation of Op. 49 employed both recovery of archaeological materials and recovery of soil samples, the analyses of which are currently ongoing. Below we describe the methods and findings from our excavation of Op.49.

Description of Operation 49 and of the Excavation Methods

Op. 49 is a cardinally-oriented unit that measures 6 m east-west by 1.5 m north-south and was divided into three sub-units 2 m east-west x 1.5 m north-south, referred to as Square A, Square B, and Square C, beginning at the west end and moving east (**Figure 12.2**). The operation thus slopes from the upper part of the mound (Sq. C) to the bottom of the depression on its west side (Sq. A), encompassing both upper and lower aspects of the structure-to-water feature relationship that this excavation aimed to explore. While in January 2017, when Ops. 31, 32, and 33 were excavated, all depressions throughout the settlement were filled with water, in June 2019 during a particularly dry season, when Op. 49 was excavated, the depressions were dry allowing for the excavation to reach bedrock without becoming inundated.

The placement of the unit started with Square A at the bottom of the water feature, then progressed east towards the structure, encompassing in Square B the interface of water-logged and drier sediments that appears as micro-relief of cracking clay mounds and depressions typical of *gilgais*. These result from the repeated contracting and expanding of clay soils that define the nature of a gilgai – a shallow water hole that can be only a few meters wide and, while originally identified in Australia, occurs globally typically in subtropical environments with alternating wet and dry seasons (Hallsworth, Robertson, and Gibbons 1955; Hallsworth and Beckmann 1969; Paton 1974). Square C included the upper section of the unit east of the gilgai-clay formations, and onto the section of the mound that remain drier year-round by draining west into the linear depression or pond feature. Around the fairly level bottom of the depression (Sq. A) the vegetation is primarily "pokenoboy" palm (*Bactris major*), which grows in wet and waterlogged soils, in contrast with the upper part of the excavation (Sq. C), which is covered in pasture grasses (**Figure 12.3**).

The methods of excavation comprised both archaeological (by Runggaldier and Harrison-Buck) and soil science approaches (by Krause), and were chosen specifically to test hypotheses about these water features that were developed in previous BREA investigations at this site. The excavation unit was divided into three squares (A, B, and C) that bracketed different aspects of the mound and adjacent depression: Square A fit entirely within the flat bottom of the depression that is inundated for the greater part of the year and that was covered in pokenoboy palm; Square B was on the rising slope towards the mound and encompassed the transition from depression to mound, or from wet to dry layers, marked by the micro-relief of cracked clay clumps typical of gilgais; and Square C encompassed the portion of the unit on the mound above the depression, and presumably built up by human activity. The mound continues upslope to the east of Square C, where constructed layers are likely bound by a terrace wall like the one excavated in 2017 in Op. 31 (see Figure 9.8 in Flanagan 2018:147). The excavation of Op. 49 did not encompass architectural construction (terrace walls and basal stones of structures most likely built of perishable materials), but it did uncover several layers that resulted from human activity – in

particular a broad scatter layer of trash that included primarily ceramics, numerous faunal bone fragments, and a number of charcoal samples or other evidence of burnt discard.

The profile drawing in **Figure 12.4** depicts the north cross-section of all three squares in the unit and outlines the identified depositional layers and excavated zones, which are described in further detail below. All measurements were taken from a datum (Datum A) located at the top/east of Op. 49, 29 cm above ground level. The sequence of zones was recorded as a single series between the layers excavated to reconstruct the archaeological stratigraphy (Squares B and C), and the layers excavated to recover soil samples for analysis (Square A). Thus some of the zones, while given different numbers depending on their location and goals for each square, are depositionally equivalent. Ongoing analysis on the ceramic, faunal, and ecological assemblage will further define the depositional sequence and help to clarify our understanding of the use and formation of these depression features referred to here as pocket *bajos*.

Zone 1 occurs in all three squares and is the humic layer. Zone 2 and Zone 3 are equivalent earthen layers with a bit of limestone and cultural materials mixed in; this layer occurs in all three squares, with Zone 2 designated in Square A and Zone 3 designated in Squares B and C. Zone 4 is a midden layer rich in ceramics, which also includes other materials, such as faunal bone, charcoal and ash, that was found in Squares B and C. In Square A and in the eastern half of Square C this accumulation of discard is less rich in ceramics and was designated Zone 5 in Square A, and Zone 7 in Square C. Zone 6 is the bedrock across all three squares, characterized by a soft marly surface (mixed with Zone 5 in Square A) and a harder more compact limestone bedrock in Squares B and C. The bedrock is a pitted and undulating surface and in the depressions were pockets of trapped cultural material. The latter constitute Zone 8 in Squares B and C, which designates the fill in these depressions. The undulating bedrock surface slopes downward from the top of the mound in the east to the bottom of the pocket *bajo* in the west of the unit (see **Figures 12.3** and **12.4**).

Description of the Archaeological Phases Identified through Excavation

Zone 1

Zone 1 is a dark, organic, humic layer approximately 10 cm thick and expanding across the unit, with vertic clay (expanding and contracting) concentrated in the west half of the unit, in Sq. A and to the east edge of Sq. B, where the gilgai-related clay micro-relief defines the interface between water feature and mound (**Figure 12.5**).

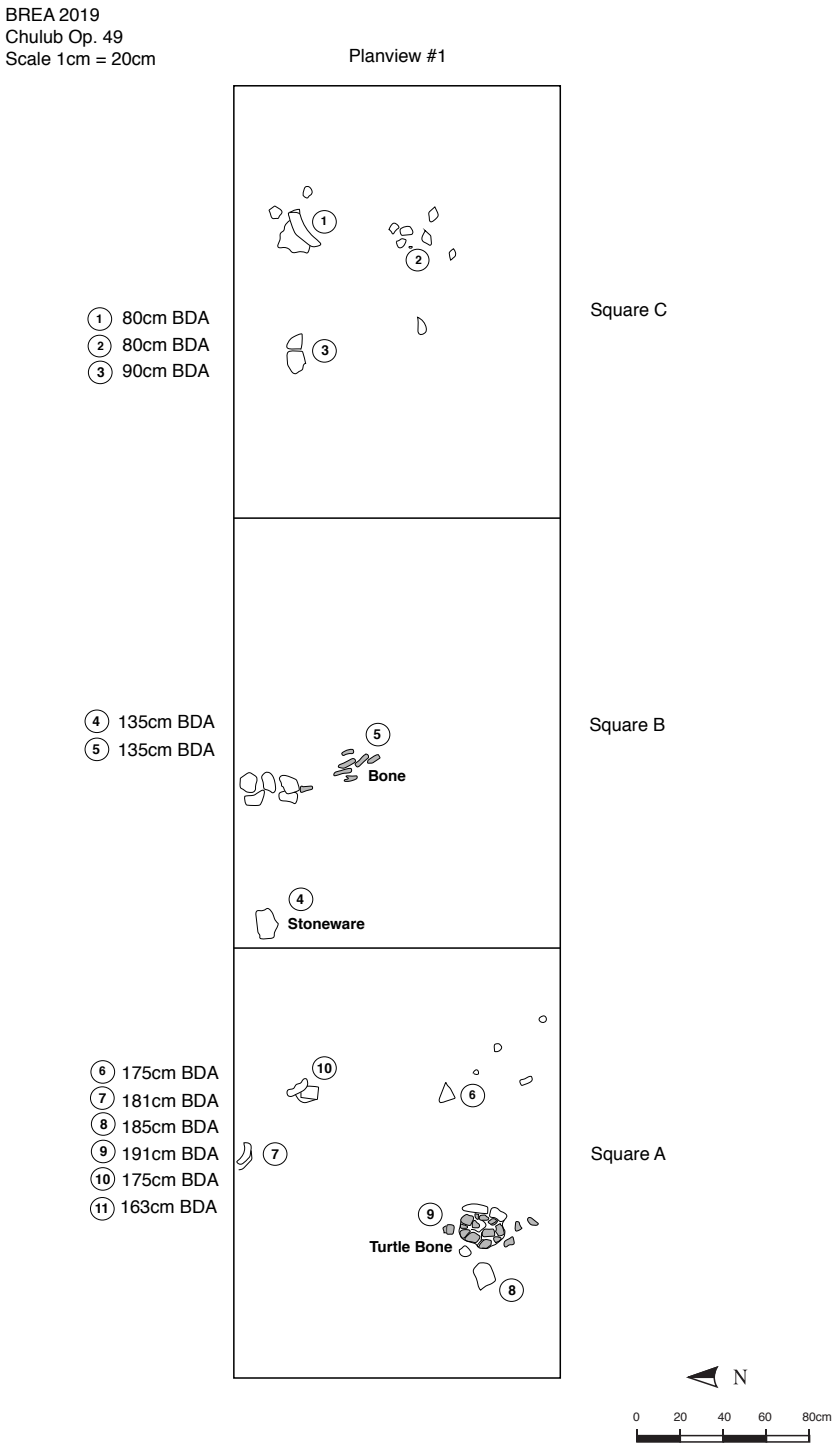

Figure 12.2 Plan view of Operation 49 showing the placement of Squares A, B, and C, with Zone 2 in Square A and ceramics, stone, and bone in the upper layer of Zone 3 in Squares B and C. (Drawing by A. Runggaldier, digitized by K. Titus).

Figure 12.3 Layout of Op. 49 encompassing pasture soils (left, east, upslope) and the dry-season exposed base of a depression or water feature. (Photograph by A. Runggaldier).

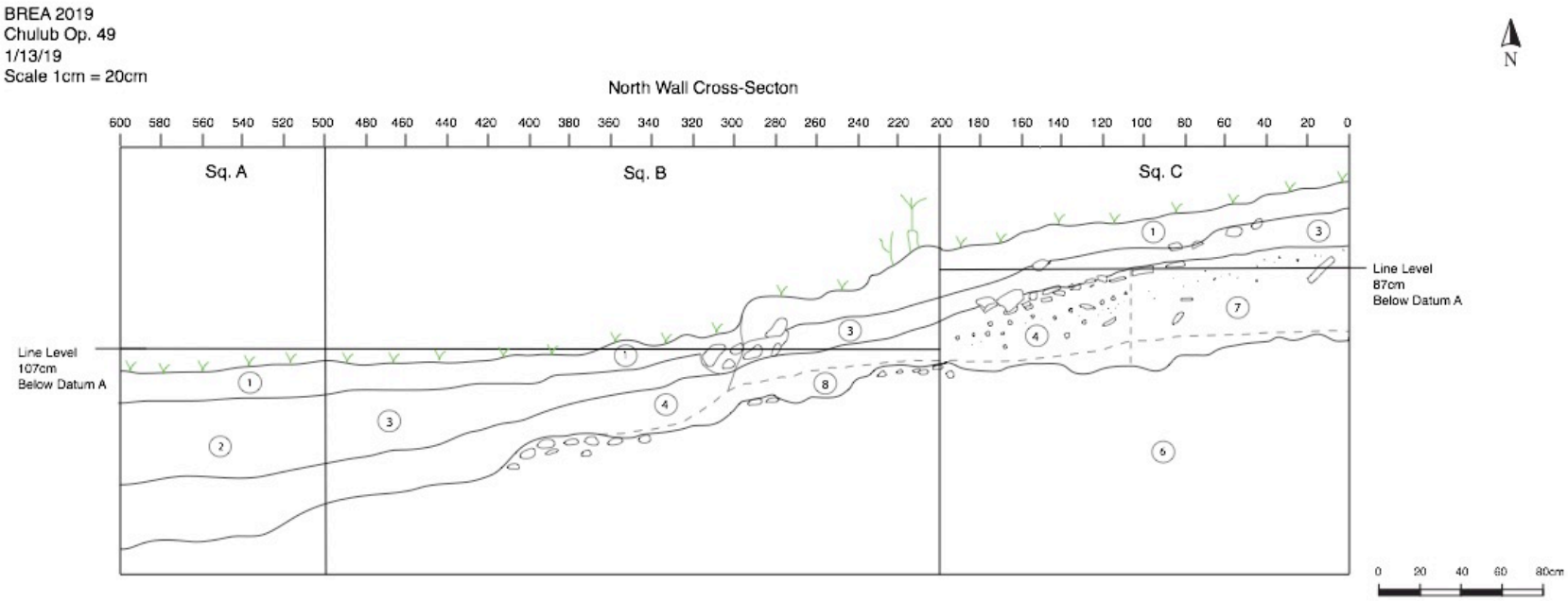

Figure 12.4 Profile looking north, showing sequence of Zones 1-8.
(Drawing by A. Runggaldier and E. Harrison-Buck and digitized by K. Titus).

Figure 12.5 Removal of Zone 1 from Sq. A and B showing *gilgai*-related clay clumps at interface between water feature and mound. (Photograph by A. Runggaldier).

Zone 2

Zone 2, directly under Zone 1, was identified only in Square A, where it was separated from Zone 1 because it comprised a mix of natural A horizon/soil and small pebbles or decomposed limestone flecks as well as some chert and ceramic artifacts, primarily in the east half of Square A, adjacent to Square B. For further details on Zone 2 refer to the section on the excavation of samples for soil analyses. In terms of archaeological zones, or depositional layers resulting from human activity, Zone 2 in Square A is equivalent to Zone 3 in Squares B and C.

Zone 3

Zone 3 underlies Zone 1 in Squares B and C and comprised a mix of soil with a few tumbled stones (limestone and chert) presumably from further east atop the structure mound. These are visible in the cross-section north profile drawing of Squares B and C (see Figure 12.4).

This zone terminated with several artifacts at the bottom of the layer at the interface with what was defined as Zone 4 (a midden, see below). Several of the artifacts were collected as part of cleaning and defining the base of Zone 3 and the surface of the midden deposit below. While depositionally they belong to the activities that led to the creation of the midden below, Zones 3 and 4 were separated to allow for any further chronological differentiation of materials, should the midden have resulted in a deep deposit.

Zone 4

Zone 4 was identified as a midden layer sloping downward from east to west, with a scatter of large rim sherds, many severely weathered ceramic sherds, and a considerable amount of animal bone (**Figure 12.6**). The midden scatter begins roughly along a north-south line in the middle of Square C, underneath a few stones exposed and removed in Zone 3 (see profile for Square C, **Figure 12.4**). The midden extends across the rest of Square C and Square B, although primarily in its eastern half. The largest concentration of ceramic and other materials in Square C is bounded on its west side by a somewhat linear edge that may mark a water line and be the result of materials moved by water action at the interface of the depression and mound (**Figure 12.7**). This linear edge is directly below the area that was characterized by gilgai features of expanding and contracting clay clumps indicative of changing wet-dry conditions (see **Figure 12.5**).

It is interesting to note that Shelhamer and Craig (2018:178-179) considered whether water action could have compromised depositional layers of a deposit recorded as a midden in Op. 33a at Chulub. According to local informants, flooding will occasionally inundate the low-lying areas surrounding this elevated plaza group, with high water creating a kind of island effect. Shelhamer and Craig (2018:178) note, "the location of this site in a wetland area with perennial flooding leads us to question if natural water processes could have affected the deposition of this layer" (Shelhamer and Craig). They conclude "the lack of any significant amount of faunal remains and relatively shallow depth [of the deposit] leave it unclear if this truly represents a trash heap" or was a post-depositional accumulation of material culture that formed around the edge the plaza's basal platform as a result of periodic flooding (Shelhamer and Craig 2018:178). Taking these observations into consideration, we acknowledge that for Op. 49 water action may have contributed to the formation of this deposit and that the seasonal inundation of the pocket *bajo* likely over time created the linear edge noted along the western side of Zone 4 in Square C (**Figure 12.7**). However, we interpret this deposit as a midden given that the scatter looks clearly tumbled from the top (east) of the mound toward the bottom (west side) of the pocket *bajo*, as if trash were being swept downslope, away from the living surface of a residence or some kind of activity area (see **Figure 12.6**). In addition, the contents of the deposit include a high concentration of faunal remains, charcoal, and ceramics, which lend further support to its identification as an *in situ* trash heap that accumulated over time.

Figure 12.6 Surface of Zone 4 midden scatter across Squares B and C. Note the contrast of the dark color of the humic and vertic soils of Zone 1 and Zone 4 directly above Zone 4 and visible in the south profile to the right. (Photograph by A. Runggaldier).

In the eastern half of Square C, the Zone 4 midden was not identified to the east of a line of stones that was roughly defined in Zone 3 above, which may represent tumbled stones from the nearby platform (Str. 49) to the east. Despite the lack of clearly defined architecture, the west (Zone 4 midden) and east (Zone 7 earthen layer) sections of Square C were designated as different zones. The matrix of the Zone 7 earthen layer, described further below, was also slightly lighter in color, owing to the presence of a higher percentage of limestone and marl flecks – color differences that are visible in the photograph in **Figure 12.6** (Zone 7 is in the background, beyond the midden).

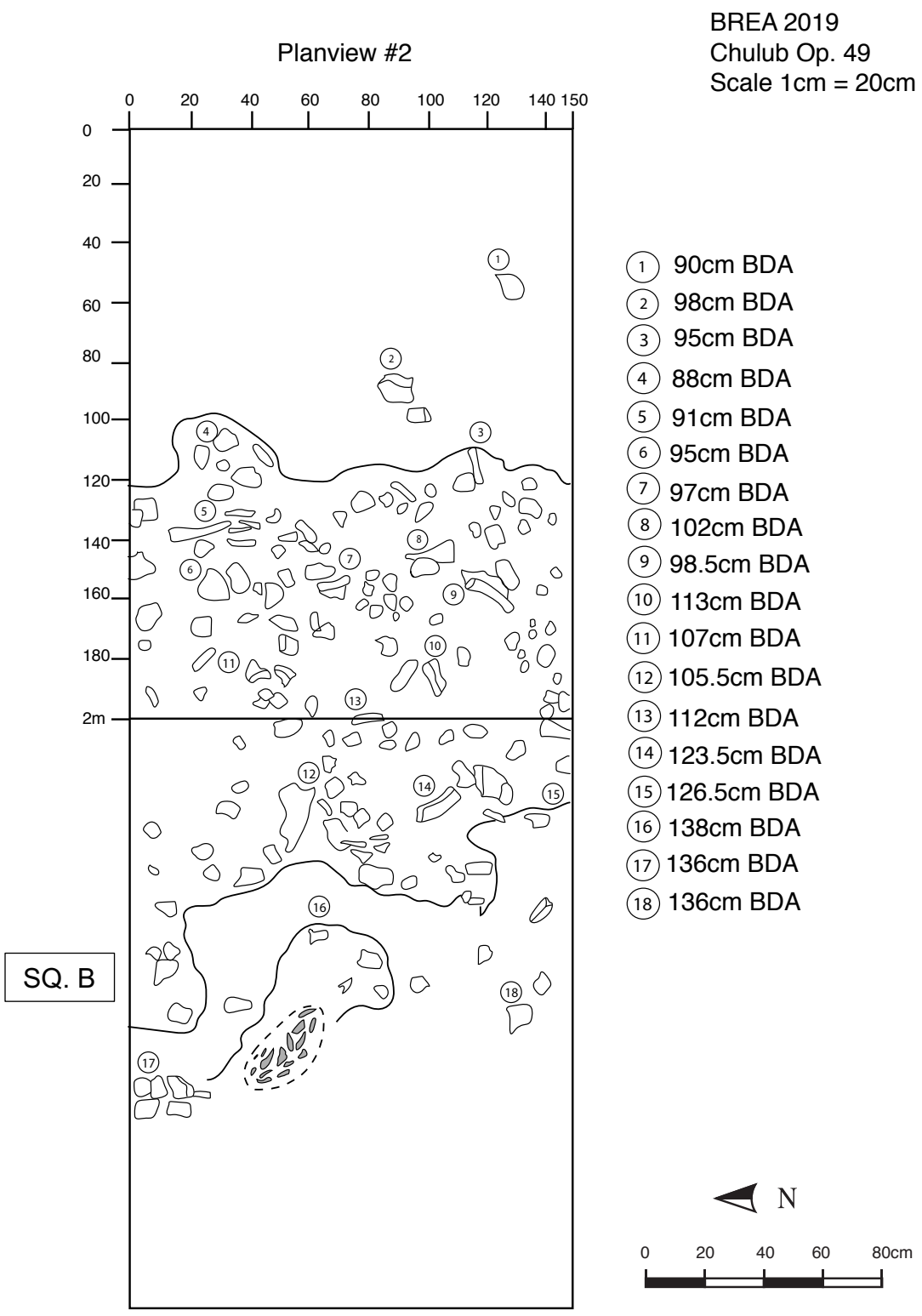

Figure 12.7 Plan view of Operation 49 showing the surface of the Zone 4 midden scatter in Squares B and C. The depths below Datum A (BDA) of point-plotted sherds show the slope of the scatter. (Drawing by A. Runggaldier, digitized by K. Titus).

Zone 5

Zone 5 is a layer that was identified as part of the excavation for soil samples in Square A, and constitutes the surface of bedrock in this part of the unit and the matrix directly above. It is a natural surface of gently undulating limestone that is relatively soft and mixed in with the layer above, comprising soil, limestone flecks and marl, and ceramic artifacts and faunal remains. Depositionally, the matrix of Zone 5 is the extension of Zone 4, but in Square A it includes a much lower density of artifacts than in Squares B and C. It does, however include some ceramics with turtle bone, one concentration of which in the southwestern quadrant of Zone 5 can be seen in **Figure 12.8**. This is a relatively complete plastron of a turtle and is currently part of ongoing faunal analyses. Further study will be able to determine if the turtle bones are charred, which would be consistent with other examples recovered from Chulub and other sites in the BREA study area. Burned bone points to a possible consumption practice of cooking turtles in their shell (see Phillips, Chapter 15).

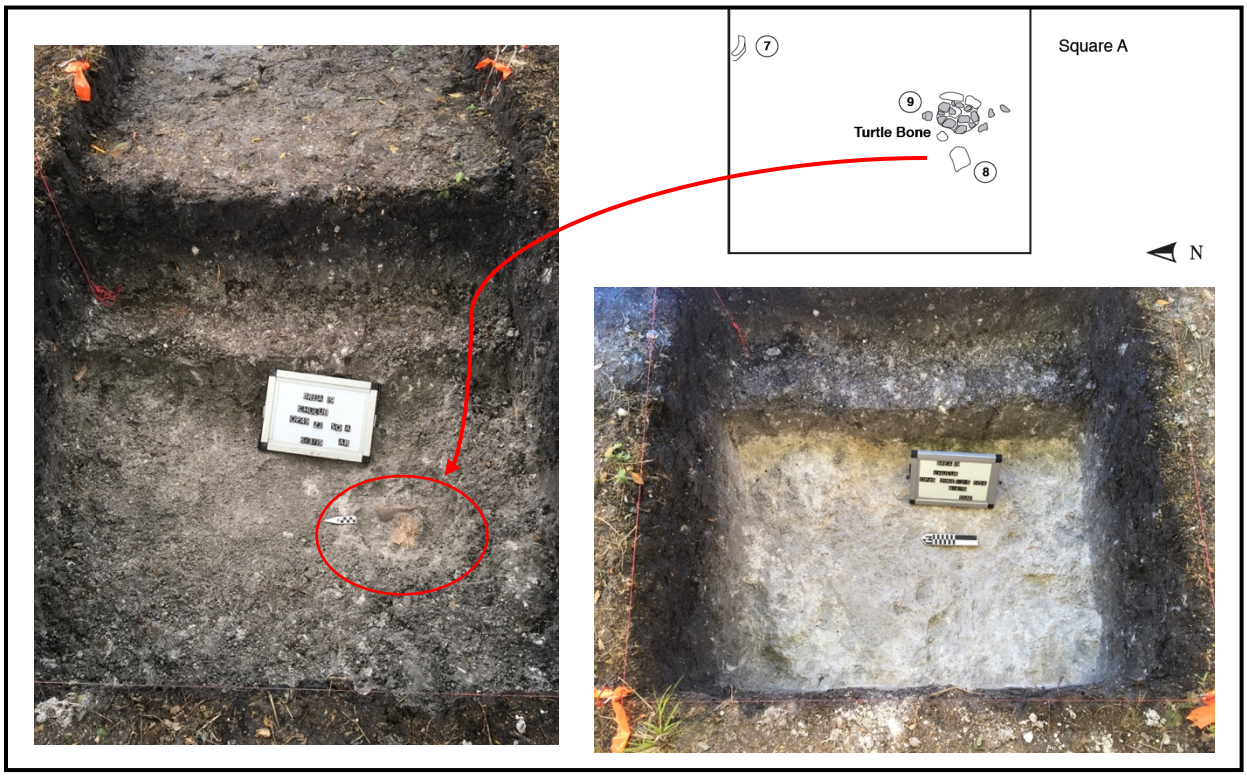

Figure 12.8 Image to the left is Zone 5 in Square A (matrix directly above bedrock) with articulated turtle shell and ceramics. Image to the right shows exposed bedrock below. (Photographs by A. Runggaldier; drawing by A. Runggaldier, digitized by K. Titus).

Zone 6

Zone 6 is the bedrock surface across the bottom of the entire unit in Squares A, B, and C. The lens of dense midden material in Zone 4 that was found in the eastern half of Square B and in Square C almost directly overlies this bedrock surface (see **Figure 12.9**). Here where the bedrock is directly underlying the Zone 4 midden material, the bedrock is harder, more compact, and a brighter white limestone. Part of the ongoing analyses of the soil samples recovered in Zone 5 will determine if the softer bedrock and marl-rich matrix found in the lowest part of the pocket *bajo* is the result of limestone decomposing into marl from extended exposure to water and waterlogged layers in this area. In contrast, in Squares B and C the uneven surface of the bedrock revealed only a few pockets and areas of soft matrix below the Zone 4 midden, and above the Zone 6 bedrock surface. These pockets were filled with a fine gray clay matrix, designated as Zone 8 (see further details below). The uneven surface of the bedrock slopes gradually upward to the east where it meets the western edge of the Str. 49 mound (see **Figure 12.3** and profile in **Figure 12.4**). Here, in the eastern end of the unit in Square C a thick earthen layer (Zone 7) with less midden material overlies the Zone 6 bedrock (see below).

Figure 12.9 Surface of Zone 6 bedrock in the foreground below Zone 4 midden in Sq. C. (Photograph by A. Runggaldier).

Zone 7

Although the separation between Zones 4 and 7 was somewhat difficult to discern, Zone 7 was defined only in Square C (see **Figure 12.4** profile). Zone 7 comprises an earthen layer

with much less material culture east of where the midden deposit in Zone 4 begins (see plan view in **Figure 12.7**). Along that north-south line were several small limestone cobbles (10-15 cm in diameter) in Zone 3 below the humic layer, so the area was separated off as a possible fill layer and may represent an informal (exterior) living surface associated with the west side of Str. 49. While the undulating bedrock surface appears to be a natural formation, at least a portion of the roughly 45 cm thick earthen layer of Zone 7 that overlies the undulating bedrock appears to be culturally constructed (see eastern cross-section of Square C in **Figure 12.10**). Zone 7 may represent a natural earthen layer that was further built up as a prepared exterior surface at the time Str. 49 was constructed. Faint traces of this living surface comprising a linear concentration of while marl specs appears visible in the top left photo of the east wall profile of Square C (see **Figure 12.11**). The Zone 4 midden materials appear to have been swept off of this surface, downslope into the pocket *bajo*.

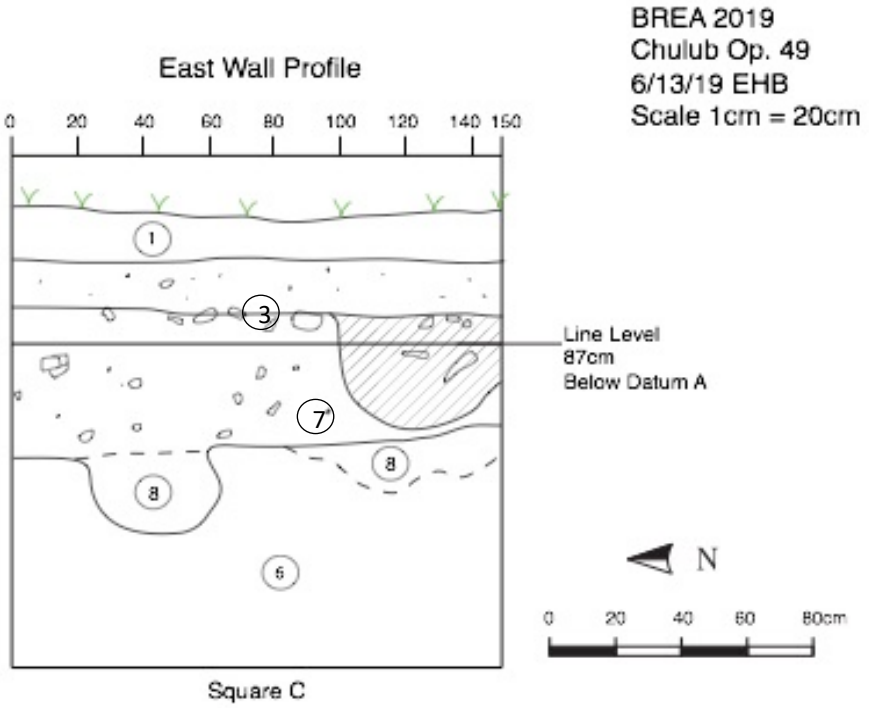

Figure 12.10 Profile view of the east section Operation 49, Square C. Charcoal and ash from the shaded area in the southeast corner provided carbon samples discussed in Zone 7. (Drawing by E. Harrison-Buck, digitized by K. Titus).

A pit feature cutting into the Zone 7 surface was noted in the southeast corner of Square C, visible in the east wall profile (see cross-hatched feature in **Figure 12.10;** also visible in **Figure 12.11**). This feature was not readily identifiable at the time of excavation and therefore was not separated into a new zone. The pit may have later been capped as it contained a similar matrix with inclusions as the Zone 7 surface, but the fill of the pit is a darker color with a higher

concentration of charcoal and ash. Several macro samples of carbonized wood from this pit feature were collected. Radiocarbon assessment of these samples could provide a date for the use of Zone 7 following its construction and prior to the deposition of Zone 3, which seals the Zone 4 midden deposit.

Figure 12.11 Zone 6 (bedrock) and Zone 8 (clay-filled depressions) in Square C before and after excavation. (Photographs by A. Runggaldier).

Zone 8

Zone 8 are a series of depressions or pockets cutting into the uneven bedrock surface described in Zone 6. The fill of these depressions was excavated from the bedrock surface as

Zone 8 and comprised a fine gray clay matrix (2.5Y 5/1) with a fairly dense concentration of very small eroded ceramic sherds and a few bone fragments in the largest of these – an oval depression in the middle of Square C (**Figure 12.11**). The presence of cultural materials in this zone may indicate that the past inhabitants built up the Zone 7 earthen surface and may have been utilized the bare bedrock as an earlier activity surface (see Zone 6). Analysis of the ceramics from Zone 8 may offer insight into any potential earlier occupation at this level.

Description of the Excavations to Recover Samples for Soil Analysis

Samantha Krause collected a series of soil samples from the deepest point of the pocket *bajo* on the western side of Square A explicitly for geological and radiometric analyses. This testing will allow us to address our research objective to assess the function and extent of artificial construction/modification of these features. Square A contained three distinct archaeological zones that correlate with soil structure changes as well as archaeological deposits.

Zone 1 is a dark, organic clay layer approximately 10 cm thick. Zone 2, directly under Zone 1, is composed of a mix of natural A horizon/soil and small pebbles of decomposed limestone, chert and ceramic artifacts, primarily in the east half of Square A, adjacent to Square B and concentrated at the edge of the structure. Zone 2 lightens with depth, as the natural soil sequence transitions from a dark gray A to a lighter A2 horizon, to an even lighter weakly developed C horizon with increasingly high shrink swell clay content (probably smectite) and characteristic slicknslide ped faces. This typical Vertisol development suggest that the soil formed under typical seasonal wet/dry cycles that are common for this region.

Zone 5, directly under Zone 2 in Square A, is composed of sterile limestone bedrock upon which the A and A2 soil horizons are developing. This limestone layer begins at approximately 75 cm below the surface of the unit. The transition from the C horizon to the limestone appears to be a naturally occurring soil sequence typical of the region.

We sampled at least 100-200 grams of soil every 5 cm from each soil horizon throughout Square A. Each soil was collected with a cleaned trowel and placed within a Ziploc bag that was shipped to the Soils and Geoarchaeology laboratory at the University of Texas at Austin for further geochemical and paleoecological analysis. The data that will be acquired from these excavations can provide insight into how soil and water resources were manipulated within the context of the site of Chulub. This further supplements our broader work on local human-landscape interactions within central Belize. The laboratory work at UT will carry out a suite of soil tests that includes but is not limited to: pollen, phytolith, and carbon isotopic analysis to understand vegetation communities and agricultural patterns as well as geochemical analysis to understand enrichment/depletion patterns of phosphorus and other key elements as an indicator of past human activity. We will further use particle size analysis and percentage of organic matter to elucidate sediment origin and geomorphic processes, and micro/macro charcoal analysis to understand fire regime and possible drought patterns. Further analytical assessments

described above will answer the pending questions over whether these depressions, which today are seasonal water features, were also used for access to and storage of water in the ancient past, beyond the regular wet and dry cycles of the subtropical seasonal patterns of this region. Further testing is necessary, but preliminary observations made in the field indicate a lack of organic material, sediment, or redoximorphic features at or near the bottom of the stratigraphic sequence, which suggest that the pocket *bajo* may not have held water or moisture year round or for extended periods of time during the ancient Maya occupation at Chulub.

Discussion and Preliminary Interpretations

Virtually all of the research objectives set out for this operation were accomplished. Our first objective, which sought to define the transition between Str. 49 and the pocket *bajo*, was achieved through careful study of the cross-section of Square C, which suggests that the Zone 7 earthen layer likely represents an exterior living surface just outside of Str. 49. Our excavations situated just west of Str. 49 did not expose any *in situ* stone walls, such as the terrace construction found in Op. 31 north of the pocket *bajo*, but the excavation did expose a large portion of the eastern half of the pocket *bajo* itself. Here, we discovered a rich midden deposit sloping down from Str. 49, lining the interior of the pocket bajo. The deposit offers great insights into the chronological use of this feature, directly addressing our second major research objective. A number of large charcoal samples were collected, which await future analysis. However, a cursory inspection of the ceramics suggests that the use of this feature and nearby Str. 49 date primarily to the Terminal Classic period (ca. AD 830-950), similar to other material recovered from Ops. 31 and 33 at Chulub (Flanagan 2018; Shelhamer and Craig 2018; for further discussion of the ceramics see Harrison-Buck, Clarke-Vivier, Phillips, and Runggaldier 2020:265-266). A high density of jar forms is suggestive of water collection and storage at this locale. Ceramic evidence suggests that the final phase of occupation may date to the Early Postclassic (AD 950-1200), a time period also well-represented in the excavations of Op. 32 in the main plaza at Chulub (Harrison-Buck 2018).

Archaeological materials from Op. 49 included a wealth of faunal material and informed our third research objective, which was to assess any changes in subsistence and procurement patterns from Classic to Postclassic times. Op. 49 revealed a rich faunal assemblage that suggests a preponderance of water-related species (turtle and fish) in keeping with the primary taxa recovered from other excavations at Chulub (for further details see Phillips, this volume; see also Harrison-Buck, Clarke-Vivier, Phillips, and Runggaldier 2020:262-267). Like the materials recovered from other midden debris elsewhere at Chulub, including the main residential compound, some of the faunal remains from Op. 49 showed evidence of burning, especially with the turtle shell, which may be linked to consumption and cooking practices (Phillips, this volume). This line of evidence suggests that a combination of both production-focused and

residential activities occurred in the dispersed settlement associated with the pocket *bajos*, as well as with the structures associated with the formally arranged plaza group to the south.

Our fourth and final research objective was addressed in the collection of soil samples for geological and radiometric analysis in an effort to assess the function and extent of artificial construction/modification of the pocket *bajo* features. These data are currently being analyzed. The forthcoming study will quantify not only the extent of human modification, but the duration and intensity of this feature's use over time. The close integration of human activities with the wetland resources at this time may have been an adaptation in response to long-term drought, and may have contributed to making communities like that of Chulub perhaps more resilient than those in upland locations (see also Phillips, Chapter 15). It is possible that the site was established in the Terminal Classic and Postclassic periods precisely to take advantage of the natural features that provided more reliable water-related resources, like fish and turtle, when a lack of rainfall impacted traditional maize cultivation. Analysis of soil samples from Op. 49 along with a series of cores from the area will examine changes in the paleoclimate of the wetlands from Classic to Postclassic times (see also Krause et al., this volume).

Ongoing studies will help to reconstruct past climate, as well as the potential range of activities taking place in this wetland locale. The recovery of articulated turtle shell in the pocket *bajos* found directly associated with pre-Hispanic cultural material may suggest these features were used for aquaculture and/or food preparation in the past. In 2019, one of the local members of the BREA team, Cardinal Baptiste, described the traditional Creole practice of creating small ponds near residences for storing live turtles caught in the lagoon for consumption at a later date. During the dry season, when the lagoon waters are low, turtles are relatively easy to find and capture. During the wet season, when lagoon waters are deep, turtles are harder to capture because they can dive deeper and are more difficult to see and to reach. Capturing turtles in the lagoon during the dry season, and storing them live through the wet season in small ponds proximate to a residence ensures a steady and accessible supply of food sources. It is possible that a similar seasonal aquaculture practice was in use in the ancient past, perhaps becoming increasingly important during a period of long-term drought. These depressions, whether they held water year round, or only during some portion of the year, may have served as similar kinds of retention ponds associated with nearby residential structures. The recovery of several faunal remains of turtles from the archaeological contexts, including a relatively articulated turtle shell in Zone 5, Square A near the bottom of the depression in the matrix above bedrock, suggests that live turtles may have been kept there.

Concluding Thoughts

The interpretations presented here are preliminary and are dependent on further analysis of the archaeological assemblage and the geological samples recovered. Nevertheless, several points can be made based on the location and layout of the layers identified in our excavations,

our field observations of the fauna and other material noted in the midden deposit, and a preliminary assessment of the ceramic chronology: 1) Although no deliberate construction or modification (like at Aventura) is readily identifiable in the bedrock, the pocket *bajo* appears to be directly associated with an ancient Maya living surface (Zone 7) that connects to Str. 49; 2) The high percentage of turtle in the faunal assemblage not only indicates subsistence practices focused on wetland and lagoon resources, but may also point to the use of pocket *bajos* for aquaculture; 3) At least a portion of Chulub was probably a year-round residential village dating to the Terminal Classic and Early Postclassic periods that relied on seasonal production associated with the pocket *bajos*; and 4) The evidence for freshwater turtles coupled with a large number of jars used for water collection and storage may be an indication that fresh water was plentiful in this locale, despite evidence for long-term drought found elsewhere in the Maya region during Terminal Classic times.

Future analysis of the artifact assemblage and the geological samples will no doubt further refine these and other interpretations proposed herein. Ongoing analysis of all of the faunal remains from Op. 49 led by Phillips will provide critical information regarding the turtle remains from this excavation, as well as other animal species represented in this midden deposit. These studies will inform our understanding of past subsistence practices and the relative abundance of small water-bodied wetland fidelic taxa, which would have likely been impacted by long-term drought conditions. Additionally, laboratory analysis of soil samples will elucidate the nature of the sediments, their origins, and the geomorphic processes that contributed to the formation of these pocket *bajo* features and their potential use(s) in ancient times.

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Section III

Analytical Investigations

Chapter 13

Analysis of the Human Skeletal Remains from an Eastern Shrine at Chikin' Chi'Ha

Gabriel D. Wrobel

Introduction

Excavations conducted by the BREA project in 2016 during two field seasons (January and summer) included work on burial features from the minor ceremonial center of Chikin Chi'Ha (**Figure 13.1**; see Craig et al. 2018 for excavation report). With permission from the Belize Institute of Archaeology, the excavated bones were exported to the Michigan State Bioarchaeology Laboratory, where they are currently curated. Preliminary analyses have focused on creating bioprofiles of the individuals and on confirming the interpretations about *in situ* body positions by the excavators. The results of the analyses presented below include estimates of age and sex, and descriptions of skeletal indicators of diet, disease, trauma, and cultural modifications.

Burial 2 (Square E)

A cluster of bone, labeled Burial 2, was covered by stones and found at the east edge of the Square E excavation (Craig et al. 2018:122). The location within the architecture suggests placement coincided with a new construction event at Structure 1, potentially indicating that the individual was dedicatory. Bones labeled Burial 2 (Zone 30) are mostly cranial fragments and 31 deciduous and permanent teeth, and also include fragments of a cervical vertebra, a few faunal bones, and a human tibia fragment. The fragmentary skull and teeth appear to represent a single individual. Most of the cranial fragments are from the vault and are poorly preserved, so little can be said about features of the skull. Identifiable features include the right orbital margin of the frontal, the frontal crest, both petrous bones, a small fragment of the mandibular ramus, and fragments with meningeal grooves indicating the presence of parietals. The tibial fragment has evidence of rodent gnawing, while none of the other fragment do. Despite the poor preservation of the cranium, the teeth are well-preserved. The inventory of the mixed dentition is listed in **Table 13.1**.

Bones labelled as Zone 27 were likely mislabeled in the field and instead belong to Zone 30. These are highly fragmentary but all appear to be from the tibia and fibula of a subadult. I was unable to determine whether the fragments were from a specific side, or whether the fragments represented one or both legs. While the tibial fragment found among the cranial fragments of Zone 30 did not articulate with any of the other tibia fragments, similar rodent gnawing marks are present on several of the mislabeled leg bone fragments, suggesting a similar origin. It thus seems evident that a rodent burrow penetrated into the space occupied by the lower body.

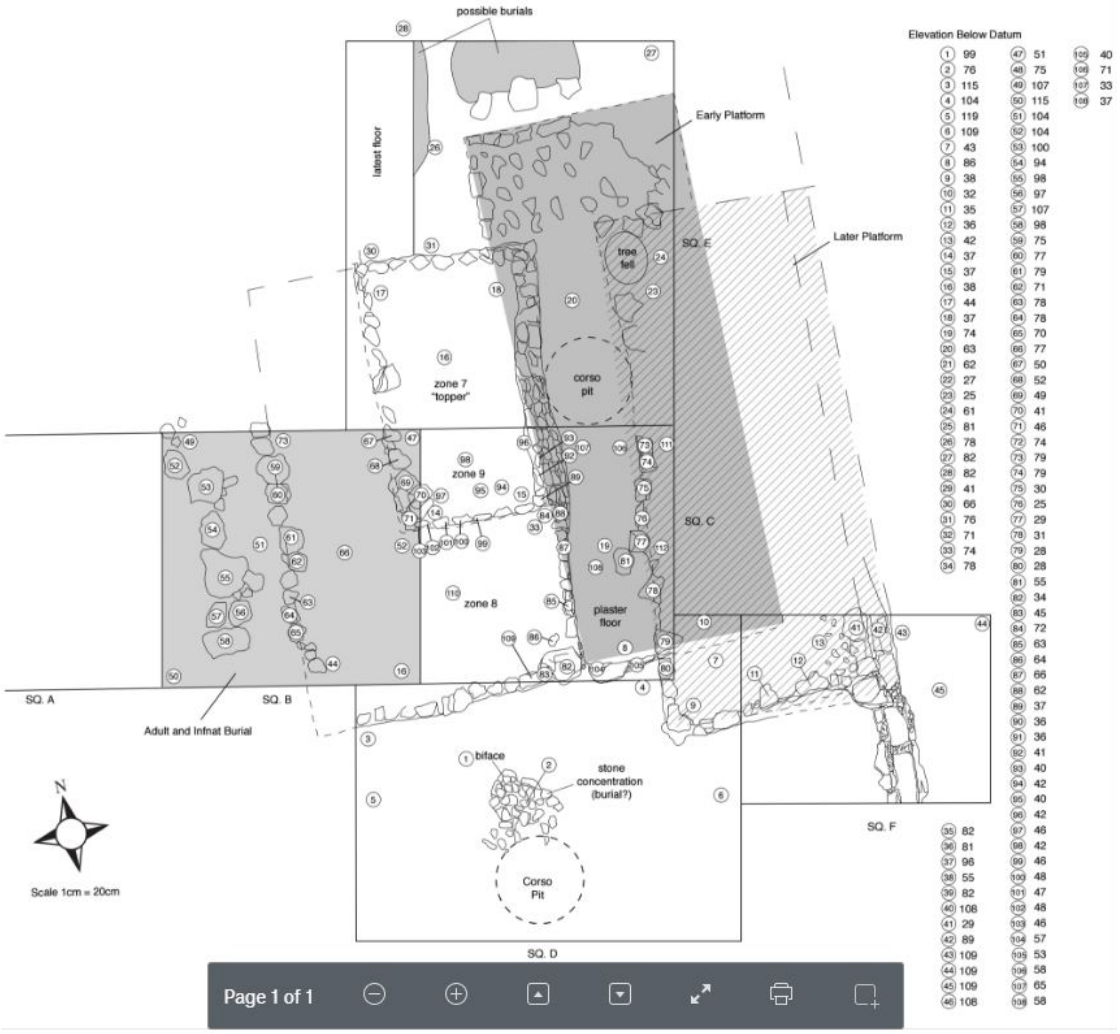

Figure 13.1. Plan of Op. 30 excavations showing significant zones associated with Phase III (drawn by E. Harrison-Buck, digitized by M. Brouwer Burg) (reproduced from Craig et al. 2018: Fig 8.7).

All of the remains from Square E are consistent with a younger age. The formation stage of the teeth, based on root development of permanent teeth and the presence / absence of specific deciduous teeth, indicates an age around 8 years +/- 2 years

(Ubelaker 1999). The crowns of the permanent teeth are all completed (minus the 3rd molars, which are not present because they typically begin to develop later in childhood around 9 years), but none of the roots are completely formed. Some fragments of the cranium appear to be relatively thin, consistent with a young age. The leg bones are also small, thin, and porous – clearly those of a child instead of a small adult. Because the remains are from a subadult, no sex estimate is possible.

The poor preservation and incomplete nature of the bones precluded a full assessment of pathologies. The permanent incisors and canines have very faint hypoplasias, indicating multiple mild disruptions during growth and development. Small caries and dental calculus are present on several of the deciduous teeth. There is no evidence of pathology on the fragments of the cranium or legs.

Adjacent to and at the same elevation as Burial 2 along the northern profile of Sq. E, another possible burial was noted in Zone 31 (Craig et al. 2018: 122). This consisted of small flecks of bone found underneath a cluster of stones and within a dark stain. The proximity to Burial 2 suggests that these were deposited at the same time. Following its initial identification, this feature was not excavated further and no bone was collected.

Table 13.1. Inventory of teeth from Burial 2 (Zone 30)

leftmaxI1	rightmaxI1		
leftmaxI2	rightmaxI2	leftmanI2	rightmanI2
leftmaxC	rightmaxC	leftmanC	rightmanC
leftmaxP1	rightmaxP1		
leftmaxP2	rightmaxP2	leftmanP2	rightmanP2
leftmaxM1	rightmaxM1	leftmanM1	rightmanM1
	rightmaxM2	leftmanM2	rightmanM2
leftmaxdc		leftmandc	
	rightmaxdm1	leftmandm1	rightmandm1
	rightmaxdm2	leftmandm2	rightmandm2

Burial 1 (Square B)

Prior to a significant construction event on the eastern shrine structure, several individuals – a primary adult individual and three infants – were interred within a pit that was cut into the cobble surface of the Phase I building (**Figure 13.2**). Based upon their proximity to one another within the same pit, it seems likely they were buried around the same time. Furthermore, it is interesting to speculate about the relationship between the adult individual and the infants, all of whom appear to be less than a year old. Specifically, these may have been dedicatory.

Figure 13.2. Phase II burials (reproduced from Craig et al. 2018: Fig. 8.13).

Burial #1

Burial #1 (Zone 33) is an adult primary interment, placed seated in a reclining position with legs flexed and crossed at the feet, arms slightly flexed and resting on his pelvis, and face up and headed east (Craig et al. 2018: 128). A Daylight Orange: Darknight vessel was inverted and placed over the head and an Achote Black (San Pablo Glossware) vessel was placed south of his pelvis over the left arm. These place the date of the burial in the Terminal Classic period (ca. A.D. 800-950).

In general, the preservation of this individual is highly variable, with some bones being very well preserved and other being reduced to dust. The tooth roots were poorly preserved but the enamel was mostly intact. It shows very little wear. The third molar roots are not preserved, but light wear on the occlusal surfaces suggests they were fully erupted.

The sex of the individual can be confidently estimated as male. The mandible is quite robust with a square gonion and chin. A partial femoral head, while not complete enough to be measured, is very large, as is the musculature of the femur. Measurements of the femer and tibia (**Table 13.2**) allowed estimation of sex using discriminant function analysis, and clearly indicates the individual is male.

Table 13.2. Long bone robusticity measurements used in the discriminant function analysis.

		Left	Right
Femur			
	A-p diameter of midshaft	28.2	
	Circumference of midshaft	85	
	Subtrochanteric a-p diameter	27.4	27.3
Tibia	Nutrient Foramen a-p diameter	35.3	
	Midshaft a-p diameter	31.3	
		85	

The age of the individual is estimated to be in the young adult range, based primarily on the light wear present throughout the dentition. Wear on the third molars indicates that they were erupted and in occlusion, suggesting an age in the mid-20s.

Pathologies included dental calculus, which was prevalent on most of the teeth. One possible pin-prick caries is present on the occlusal surface of the mandibular left first molar, but no others were evident in the rest of the dentition. No hypoplasias were evident, though the surfaces of most of the teeth are partially covered in calculus. On fragments of the right tibia, there is evidence of a healed lesion; the uneven surface has no evidence of porosity that would indicate active remodeling.

Figure 13.3. Maxillary dentition of Burial 1, showing dental filing and calculus deposits.

The individual had filed anterior maxillary teeth, showing the common corner-notched B4 filing on the central incisors and the straight A4 filing on the lateral incisors and canines (**Figure 13.3** [Romero 1970]).

In close proximity to the primary adult individual were the remains of three infant burials (Burials 1a, 1b, 1c, described below). They were all incomplete, though this is likely due to poor preservation of the delicate remains rather than indicating secondary burial.

Burial 1a

Burial 1a (Infant #1, Zone 13) is an infant found near the primary individual's left knee within the same burial pit, and thus presumably the two individuals were buried at the same time. Relatively little of the deciduous dentition from the poorly preserved skeleton was found. None of the crowns that were recovered were complete and only the incisors were partially mineralized (see **Table 13.2**). The age estimate based on dental formation is approximately 6 months (+/- 3 months). The skeleton is represented only by fragments of the cranium, vertebrae, and ribs.

Table 13.3. Dental inventory of infants found in multiple burial.

	leftmaxI1	rightmaxI1	mandI1	
	leftmaxI1	rightmaxI2	leftmandI2	rightmandI2
	leftmaxC	rightmaxC	leftmandC	
	leftmaxP1	rightmaxP1	leftmandP1	
	leftmaxP2	rightmaxP2		
	leftmaxM1		leftmandM1	rightmandM1
		rightmaxM2	leftmandM2	rightmandM2
	leftmaxM3	rightmaxM3		rightmandM3
Burial 1a (Zone 13)				rightmanddi1?
		rightmaxdi2	leftmanddi2	
			leftmanddc?	rightmanddc?
		rightmaxdm1		rightmandm1
	leftmaxdm2?	rightmaxdm2?		rightmandm2
Burial 1b (Zone 26)		rightmaxdi1		
		rightmaxdi2	leftmanddi2	
	leftmaxdc		leftmanddc	
	leftmaxdm1		leftmanddm1	
			leftmanddm2	

Burial 1c (Zone 23)	leftmaxdi1	rightmaxdi1	leftmanddi1	rightmanddi1
	leftmaxdi2		leftmanddi2*	rightmanddi2
	leftmaxdc		leftmanddc	rightmanddc
			leftmandm1	rightmandm1
			leftmandm2	rightmandm2
		maxI1 (side unknown)		
			leftmandM1	rightmandM1*

*two teeth clearly belonging to Infant #3 were assigned to Zn 33 and labelled "misc. bone from screen and soil samples".

Burial 1b

Burial 1b (Infant #2, Zone 26) is a second infant found to the east of the primary adult. Two Spondylus shell beads were found around the head and may have formed a necklace (Craig et al. 2018: 124). The age estimate based on dental formation is approximately 6 months (+/- 3 months), with almost no perceivable difference in developmental stage compared to *Burial 1a*.

Burial 1c

Burial 1c (Infant #3, Zone 23) is a third infant, also to the east of the primary adult in close proximity to Burial 1b, was found within the wall of the excavation. This infant was the best preserved of all the infants, perhaps due to the slightly more advanced age. The body position appears to be seated with legs flexed (Craig et al. 2018: 124). The estimated age of the individual is 1 year old, based on dental eruption. The first permanent left mandibular molar and a first permanent central incisor have crowns that are unmineralized and approximately 1/3 complete. The deciduous teeth all have incomplete roots.

The only other human remains found within the Square B excavations were fragments of an infant's cranial vault, found along with several faunal bones, within Zone 21, the fill of the burial. Thus, it is likely these fragments belong to one of the three infants, and they were displaced during excavation.

Conclusions

Several further analyses of the Chikin' Chi'Ha remains have been planned. Specifically, isotopic analyses of the teeth and bone fragments will assess aspects of the

individuals' diets and geographic origins, and will provide date for the burials. In preparation for these invasive analyses, all teeth were scanned with a microCT, creating permanent and accurate digital models for future analyses (**Figure 13.4**).

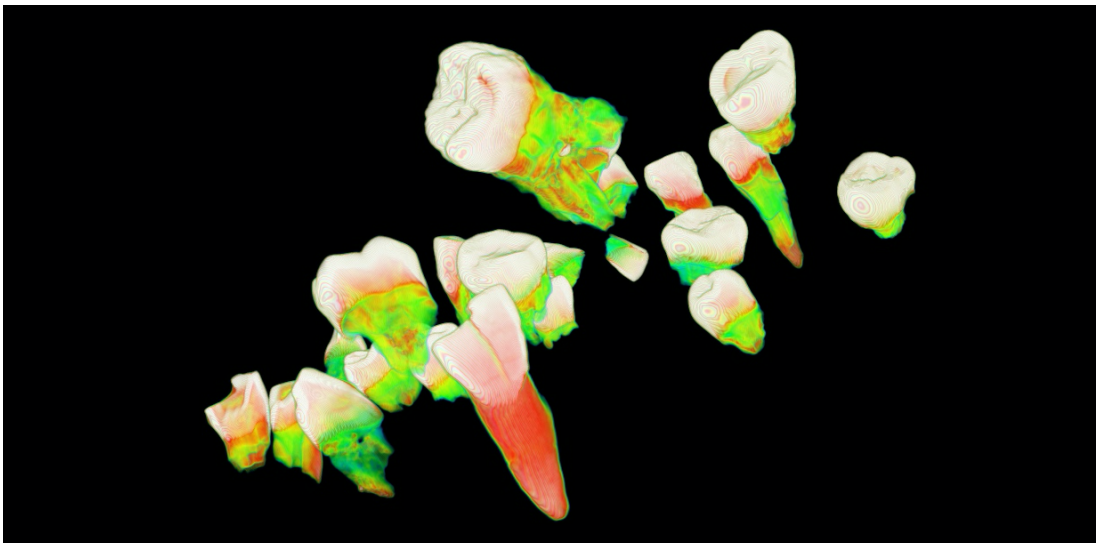

Figure 13.4. Screen shot of three-dimensional microCT images of the dentition of Chikin' Chi'Ha Burial 1.

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Chapter 14

Faunal Analysis from Wetland Sites in the Lower Belize River Watershed: Some Preliminary Findings

Lori Phillips

Faunal analysis was conducted on assemblages from the sites of Chulub and Ek'Tok from February to October of 2019 as part of a larger dissertation project focused on ancient Maya use of aquatic resources. This chapter reports the taxonomic findings and discusses steps necessary for future analysis.

Methods

The complete faunal assemblages from both sites were exported to Washington State University's Department of Anthropology for analysis and followed methods outlined in Phillips 2015. Identification includes taxonomy, element, side, age, sex, natural modifications, and cultural modifications. Taxonomic identification to the genus or species level was attempted when possible, but the majority of faunal elements could only be identified into categories such as Large Mammals (deer, peccary, or tapir sized), Medium Mammals (dog or raccoon sized), Small Mammals (agouti, paca, or armadillo sized), Fish, Turtles, Birds, etc. When preservation permitted, taxonomic identification was aided by Gilbert's *Mammalian Osteology* and Olsen's *An Osteology of Some Maya Mammals* (Gilbert 1990; Olsen 1982), as well as the comparative collection housed within Washington State University's Department of Anthropology. A total of 2298 faunal remains were analyzed with 864 from the site of Ek'Tok and 1433 from the site of Chulub. The number of identified specimens (NISP) was recorded following Lyman's methods and percent NISP (%NISP) was calculated by dividing the NISP of each taxon by the total site NISP (Lyman 2008). NISP was utilized over the minimum number of individuals (MNI) due to the problems associated with determining turtle and fish MNI from fragmentary turtle carapace and isolated fish vertebrae, but the author is aware of the problems associated with this quantitative method of taxonomic abundance.

Results

A total of 1433 faunal remains were analyzed from Chulub Operations 31, 32, 33 and Shovel Test Pit Series #005. Analysis revealed all remains from Operation 33 Square D (n=179)

were modern crocodile (*Crocodylus* sp.), large mammals, or turtles and thus removed from the assemblage (Table 14.1). The three domestic cow (*Bos taurus*) remains from Operation 33 were excavated within Zone 1 of Square C, likely representing modern and not historic period cows. Unidentifiable skeletal fragments comprise roughly 25% of the entire assemblage, while the three largest identifiable taxonomic categories include Testudines, large mammals, and white-tailed deer (*Odocoileus virginianus*). This pattern is also reflected within each Operation with the exception of Operation 33, where white-tailed deer was not identified though it is likely a portion of the large mammal category contains *Odocoileus virginianus* fragments that do not retain identifiable landmarks.

Table 14.1 NISP of Chulub Fauna by Operation.

	Chulub				
Taxa	Op 31	Op 32	Op 33	STP#005	Total
Large Mammal	141	113	16	2	272
Medium Mammal	6	4	18	0	28
Small Mammal	4	10	9	0	23
Odocoileus virginianus	38	13	0	4	55
Bos taurus	0	0	3	0	3
Dasyprocta punctata	0	0	1	0	1
Dasypus novemcinctus	0	0	1	6	7
Reptile	0	1	1	1	3
Testudines	284	28	178	55	545
Aves	0	0	0	0	0
Osteichthyes	2	0	5	2	9
Unidentifiable	120	121	60	7	308
Total	595	290	292	77	1254

A total of 864 faunal remains from Ek'Tok Operations 42 and 43 were analyzed, while faunal remains from Operations 44 and 45 will be analyzed in the next year (Table 14.2). Similar to Chulub, Testudines comprise the largest identifiable taxonomic category at Ek'Tok followed by Aves and bony fish (Osteichthyes; Figure 14.1). The latter two are only found within Operation 43, however, while Operation 42's assemblage contains larger percentages of medium and small mammals. The difference in taxonomic quantities between the two Operations is likely the result of different excavation contexts, with Operation 43 representing a midden associated with Plaza C (see Craig and Shelhamer, Chapter 8) while remains from Operation 42 come from within a residence in Plaza E (see Harrison-Buck, Chapter 7). Unlike

Chulub, unidentifiable skeletal fragments only represent 5% of the entire assemblage. This may be the result of different depositional and/or taphonomic processes between the two sites, but more analyses need to be conducted before a claim is made.

Table 14.2 NISP of Ek'Tok Fauna by Operation.

	Ek'Tok		
Taxa	Op 42	Op 43	Total
Unidentified Mammal	0	13	13
Large Mammal	3	0	3
Medium Mammal	7	2	9
Small Mammal	4	1	5
Odocoileus virginianus	0	1	1
Tayassuidae	1	1	2
Dasypus novemcinctus	0	4	4
Reptile	1	0	1
Testudines	121	568	689
Aves	3	18	21
Osteichthyes	1	69	70
Unidentifiable	12	34	46
Total	153	711	864

Figure 14.1. Example of fish remains from Operation 43. From left to right: catfish neurocrania, fish vertebra, and fish spine.

Demographic Profiles

Information on the age profiles of faunal remains from Chulub and Ek'Tok are on-going, though I present the preliminary results here. Juvenile remains were identified within Operations 31 and 32 at Chulub and both Operations from Ek'Tok (Table 14.3). Within the Chulub assemblages, juvenile white-tailed deer remains were most common, specifically femora and tibia (Figure 14.2). The remaining juvenile skeletal remains are from vertebrae of large mammals, all of which came from Operation 32 and may represent a single animal. Only two juvenile skeletal remains were identified from Ek'Tok, one from each Operation. Both were identified as epiphyseal ends of metapodials from large mammals.

Table 14.3. NISP of Juvenile Faunal Remains.

Provenience	Count	Percentage of Operation	Percentage of Site
Chulub			
Op 31	7	1.2	
Op 32	13	4.5	
Op 33	0	0	
STP#005	0	0	
Total	20		1%
Ek'Tok			
Op 42	1	0.6%	
Op 43	1	0.1%	
Total	2		0.2%

Note: Operation percentages derived from Operation totals in Tables 14.1 and 14.2, respectively. Site percentages derived from Site totals in Tables 14.1 and 14.2, respectively.

Figure 14. 2. Juvenile white-tailed deer (Odocoileus virginianus) femur.

Taphonomic Modifications

Identification of taphonomic modifications is on-going and includes signs of butchery, rodent or carnivore gnawing, and burning. Here, I report on the distribution of burning throughout the two site assemblages.

Burnt bone comprises 5% of the total Chulub assemblage, with Operation 33 containing the most and Operation 31 the least (Table 14.4). Testudines are the majority of burnt skeletal remains (70%) and the remainder of burnt remains are mammals. At Ek'Tok, 23% of the assemblage is made up of burnt bone and is found within both Operations (Table 14.4). Like Chulub, Testudines are the majority of burnt skeletal remains (97%) while the remaining burnt pieces are from bony fish, mammals, or are unidentifiable. When divided by context, both Operation 42 and 43 have roughly the same percentage of burnt bones at 25% and 22%, respectively. All burnt bones fall within Stiner et al.'s (1995:226-227) burn color code of 1 to 3, representing slightly burned and localized to fully carbonized and completely black (Figure 14.3). All three categories indicate low to moderate burning temperatures and may represent evidence of cooking. This possibility will be further explored through the analysis of butchery marks.

Figure 14.3. Example of different burnt bone categories within a single turtle, likely hicatee (Dermatemys mawii), plastron.

Table 4. NISP of Burnt Faunal Remains.

Provenience	Count	Percentage of Operation	Percentage of Site
Chulub			
Op 31	3	0.5%	
Op 32	26	9%	
Op 33	40	14%	
STP#005	9	12%	
Total	78		5%
Ek'Tok			
Op 42	39	25%	
Op 43	158	22%	
Total	197		23%

Note: Operation percentages derived from Operation totals in Tables 14.1 and 14.2, respectively. Site percentages derived from Site totals in Tables 14.1 and 14.2, respectively.

Chronology

Faunal remains from Chulub date roughly from the Terminal to Postclassic Periods based on the analysis of associated ceramic artifacts (personal communication, Harrison-Buck 2019). Ceramic analysis of materials from Ek'Tok are underway, with preliminary analysis suggesting Operation 42 dates from the Late Classic II to Terminal Classic Periods (personal communication, Harrison-Buck 2019). Compared to faunal assemblages from similar time periods such as Laguna de On and the Northern River Lagoon (Masson 2004), Chulub presents a similar distribution of turtles and large mammals being the most abundant but differs by having a lower percentage of fish. No interpretation of faunal remains and chronology will be made for the site of Ek'Tok until ceramic analysis is complete.

Discussion and Conclusions

The results from this analysis support my earlier claims that aquatic species played an important role in the subsistence strategies of the ancient Maya (Phillips 2015, 2018). The author recognizes the abundance of aquatic animals, in the form of turtles and fish, compared to terrestrial animals may be skewed because of the use of NISP. This will be remedied in the future with the calculation of MNI, MNE (minimum number of elements), and potentially meat weight. The presence of juvenile remains at Chulub and their apparent absence at Ek'Tok is interesting as it suggests a possible difference in hunting strategies or availability of juveniles to adults between the two sites and time periods. The difference in fish remains between the two

sites and within the site of Ek'Tok is also of note and suggests fish may have been a more important source of subsistence for those residing in Plaza C than those living within Plaza E or at Chulub. The high percentage of burnt turtle remains compared to other fauna is also intriguing as it may indicate a cooking technique specific to turtles, likely the result of cooking turtles within their shells. Future analyses will quantify the distribution of burnt carapace to plastron, as well as butchery marks, to determine whether burning is localized to either elements. Future analyses will also focus on species specific identifications of fish and turtles using the comparative collections at the Florida Museum of Natural History. Specific attention will be paid towards the distribution of freshwater to marine species to understand whether or not those living at these sites had access to marine food sources.

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Chapter 15

Isotopic and Trace Elemental Analyses of Belize River Valley Clays

Rebecca Philibert, Julia Bryce, Florencia Fahnestock, Alan Jones, David Buck, and Eleanor Harrison-Buck

Introduction

The ancient Maya moved about the landscape and produced and traded artifacts with one another. Tracing the sources of both people and their artifacts can tell us a great deal about local and long-distance interactions in the past. Isotopic tracing has been used to allow scientists to link people and artifacts to specific regions of similar isotopic levels. Strontium isotopes are commonly used for this purpose, but in a region so enriched with carbonates, strontium isotopes can be easily overprinted and therefore less insightful. My research has analyzed clay samples collected from the Belize River Valley for neodymium ($^{143}Nd/^{144}Nd$, often noted as ε_{Nd}), which is an isotopic tracer commonly used in the reconstruction of geological processes and has the promise of being less susceptible to overprinting. Neodymium isotopic results (where ε_{Nd} values range from -9.47 to 2.15) show great promise to place geographical constraints on where the ancient Maya collected clay for their ceramics, which we can use to pinpoint specific clay sources and potentially the trading routes they used. These values have also allowed for a better understanding of the role the Belize River played in transporting these clays as well, tracing an east to west pattern of increasingly negative values.

Objectives

1. Assess the Sr isotope composition of a key archeological site to gain insight if Sr isotopes can reliably trace artifacts in the Belize River Valley.
2. Can Nd studies of clays in the carbonate-rich Yucatán Peninsula provide insight into the origins of Maya ceramics.

Background

Archaeologists have always dealt with the material culture that has been left behind by past peoples (tools, art, cloths, tombs, bones and whole bodies, and the list goes on), but have sometimes struggled to be able to analyze the pieces of a culture that don't leave physical remains. For example, the way an ancient language may have sounded when spoken or deciphering social interactions. While the first continues to mystify many, there has been work in order to explore the latter. In recent years isotopic tracing has become a tool used by scientists

to learn more about local and long-distance interactions that took place in the past. A popular isotope to analyze is $^{87}Sr/^{86}Sr$ which has been used to test water, bedrock, soils, and plants from locations across the Yucatan Peninsula (Hodell et al. 2004). These tests have been used to gain further insight into the Maya history of interactions and human migration across the landscape. However, they have been met with some problematic circumstances. Mainly, the strontium isotopes can be seen as less insightful than other methods because there is a high risk of overprinting when looking at samples taken from the Yucatan because of how carbonate rich the peninsula is. By turning to a method of isotopic tracing that has been used in reconstructions of geological processes for decades, neodymium ($^{143}Nd/^{144}Nd$) isotopic analysis, has the promise of providing more insightful results.

Using neodymium as an isotopic tracer in this manner is still new to the field of archaeology with only some previous studies having used this technique. One such study was published in 2017 where human dental remains were analyzed (Plomp et al. 2017). Increasingly closer to my own work, though, there have only been a couple of studies done on clays and ceramic artifacts from the Belize River Valley. The foremost study on Maya ceramics from this region, conducted by Dr. Julie Bryce and Dr. Eleanor Harrison-Buck (both of University of

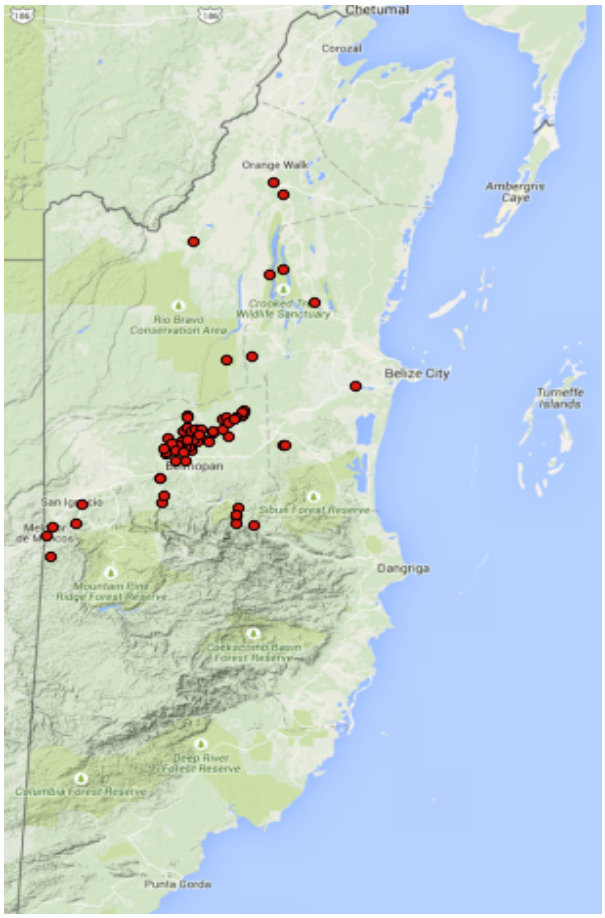

Figure 15.1 Map displaying all eighty-one clay samples collected by Alan Jones (Jones et al. 2015).

New Hampshire) has analyzed twenty-nine ceramics collected by the Belize River East Archaeology (BREA) project. This study combined neodymium testing and stylistic analysis in order to identify "imported", non-Maya, ceramic pieces (Bryce et al. n.d.). This publication is still in prep so the findings have yet to be released. During his undergraduate career, University of New Hampshire (UNH) student, Alan Jones collected just over eighty clay samples from around the Belize River watershed and went through the process of analyzing thirteen of them for neodymium levels (commonly noted in ε_{Nd} notation). The samples he collected came from the BREA project study area, reaching from the Guatemalan border city of Benque Viejo to the west and as far north as Orange Walk (**Figure 15.1**). His findings suggested that there was a weak correlation to the latitude where the samples were collected and that there was little variation among the ε_{Nd} values which suggest that this analysis would be beneficial if trying to identify ceramics that can be classified as "imported", which come from far away locations

Figure 15.1 Map representing the location of the twenty-seven samples tested in this project. Map created by Rebecca Philibert.

(Jones et al. 2015). These findings however, are being revisited here as it was later discovered that there was a mathematical error in his calculations.

Materials and Methods

My work aims to revisit and build upon his results. The clays used in this project were twenty-seven of the eighty-one samples he collected throughout a large area in the Belize River valley that is part of the Belize River East Archaeology project (BREA) during the summer field seasons in both 2013 and 2014 (Jones et al. 2015). The twenty-seven clay samples chosen for this project come specifically from in and around the areas where Saturday Creek, Lagoon Creek, and Ten Cents Creek branch off from the River seen on **Figure 15.2**. Once an area had been vetted for accessibility and geological/archaeological context, Jones collected samples that were roughly 200g from 10-15cm down in the soil. The locations he collected samples from were tracked using a Garmin GPS device (see **Figure 15.1**).

During the summer of 2018, I used a map of the area mentioned above that had some of the sample sites marked on it and Google Maps to link the points with their corresponding sample names so that I could choose which samples to test. The samples I selected were chosen after doing some randomized test ε_{Nd} calculations, using some previous information about $^{143}Nd/^{144}Nd$ values that Jones had found during his own project, locating samples that seemed to have ε_{Nd} values that fell between -3 and +1, and finally selecting those and samples around them. For the first batch, there were 14 clay samples that I selected for testing. The second batch comprised 13 different samples. Once they were chosen, 0.400g of each sample was then added to a Teflon vial where they were first treated with 50 drops of nitric acid from a dropper and placed onto the hot plate under a laminar flow hood. Once the nitric acid had dried down, each sample was then treated with hydrofluoric acid which was administered by a lab supervisor and left on the hot plate over night to evaporate off. Once the hydrofluoric acid had evaporated off, the clays then needed to be treated with hydrogen peroxide. This step took up almost the whole summer because some samples reacted strongly to the hydrogen peroxide. This treatment meant adding 100 μg of the hydrogen peroxide to the samples, closing them, and leaving them on the hot plate to react under pressure. Once they had reacted for about one hour, they were reopened and left on the hot plate for an hour to dry down a bit more. These two steps were repeated until the samples began to look clearer and there were no samples reacting to the hydrogen peroxide. Once this point was reached, the samples were then sub-sampled, with cuts of 5-10% being separated for the trace element testing later. The remaining amount of the original samples were then dried down one more time and then dissolved in 3M nitric acid in order to prepare them to be loaded into the EIChroM Industries Sr spec 50-100μm resin columns. Once the columns had been made and cleaned with multiple washes, the samples were each run through a column. During the first two 3M nitric washing steps in after the sample had been added in, a collection beaker was placed under each column to collect the rare earth elements. Once those washes are

done, the strontium was collected with the last washing step of in 5mL of 18 Ω H_2O. in order to concentrate the sample even more, the columns went through their washing steps again and the sample was run through a second time (during this second round, rare earth elements were not collected), again finishing with the strontium being collected with 5mL of 18 Ω H_2O. The collected rare earth samples were then dried down on the hot plate under the laminar flow hood and brought up again in 1N hydrochloric acid. These samples were then loaded into columns of AG 50W-X8 200-400 mesh cation exchange resin and was eluted with 3.5 mL of 1.5 N hydrochloric acid. The collection wash of 8mL of 6N hydrochloric acid for these rare earth elements was sent through. In order to select for REEs and to further concentrate Iron, the samples were then dried down again to then be brought back up in 2N nitric acid. They were then loaded into a second column, this one containing Eichrom TRU spec 100-150μm resin where only the collection wash of 2mL of 0.05 N titrated hydrochloric acid was kept. Under the laminar flow hood, the samples were dried down one more time in order to be brought up in 0.25N nitric acid so they could be loaded into the last column, the one that split the Samarium from Neodymium, that contained Eichrom Ln resin. These last collections were 4.5mL of 0.25 N hydrochloric acid.

The samples were dried down again on the hot plate under the laminar flow hood after which they were diluted (20x) in 2% nitric acid. That prepared them to be analyzed using the Nu Instruments Nu Plasma II ES Multicollector Inductively Coupled Plasma Mass Spectrometer (MC-ICP-MS) that is located in the University of New Hampshire's geochemistry lab in Morse Hall.

Results

The $^{87}Sr/^{86}Sr$ values of the twenty-seven clays that were tested ranged from 0.70946 to 0.76001 (**Figure 15.3**). The most depleted values, the lowest values in this case, came from the clays that were collected along the banks of the Saturday Creek drainage, a tributary of the Belize River in this region (**Figure 15.3**). This range is also much wider than previous studies in the Yucatán, where over two hundred samples were tested for Sr (Hodell et al., 2004). Nineteen of the twenty-seven samples I tested returned values higher than the range that Hodell's results returned. According to a map created by Hodell et al. in order to display the different regions of the Yucatán Peninsula, all of the clays studied in my project belong to the Southern Lowlands region (**Figure 15.4**). There were 86 points studied by Hodell et al. from this region and the minimum value returned from those samples was 0.70693 whereas the maximum was 0.70845.

Another aspect of the Sr results that needed to be monitored was the possible effect overprinting would have on the results. In order to monitor this, the $^{87}Sr/^{86}Sr$ values were plotted against the rubidium (Rb)/Sr value in one graph (Figure 15.5) and the $^{87}Sr/^{86}Sr$ values were plotted against the ε_{Nd} values (**Figure 15.6**). Both graphs have the Sr value of seawater (0.709) roughly noted with red doted lines. **Figure 15.5** should have a distinct positive trend but the

overprinting effect has created a messier trend. **Figure 15.6** should have a distinct negative trend but, again, the effect of overprinting has effected that trend and has even created a secondary horizontal trend (noted with the red arrow).

As for the Nd results, expressed in ε_{Nd}, the values range from -9.47 to +2.15 (**Figure 15.7**). Just as the Sr results showed, the most depleted values, in this case the highest values, came from clays collected on the banks of the Saturday Creek drainage (**Figure 15.7**). Also lining up with the Sr results, the most enriched value (lowest) came from clay sample BP 24, the same clay that returned the most enriched (highest) Sr value. These data also line up with a study that examined an assemblage of ancient Maya ceramics collected from nearby sites (Bryce et al. n.d.). These ceramic sherds were analyzed both geochemically, for ε_{Nd} values, and stylistically, where they were either deemed to have a local Maya style or an imported style, meaning styles less common to the middle Belize Valley. Those that were deemed local returned values around +1 to -2, while those deemed to display an imported style returned values around -7 (Bryce et al. n.d.). Both value ranges were detected when testing the middle Belize Valley clays, as shown in **Figure 15.7**. The sherds deemed local Maya seem to align with the values returned by clays found along the Saturday Creek drainage (**Figure 15.7**). While the imported styles seem to align with values detected along the Belize River (**Figure 15.7**).

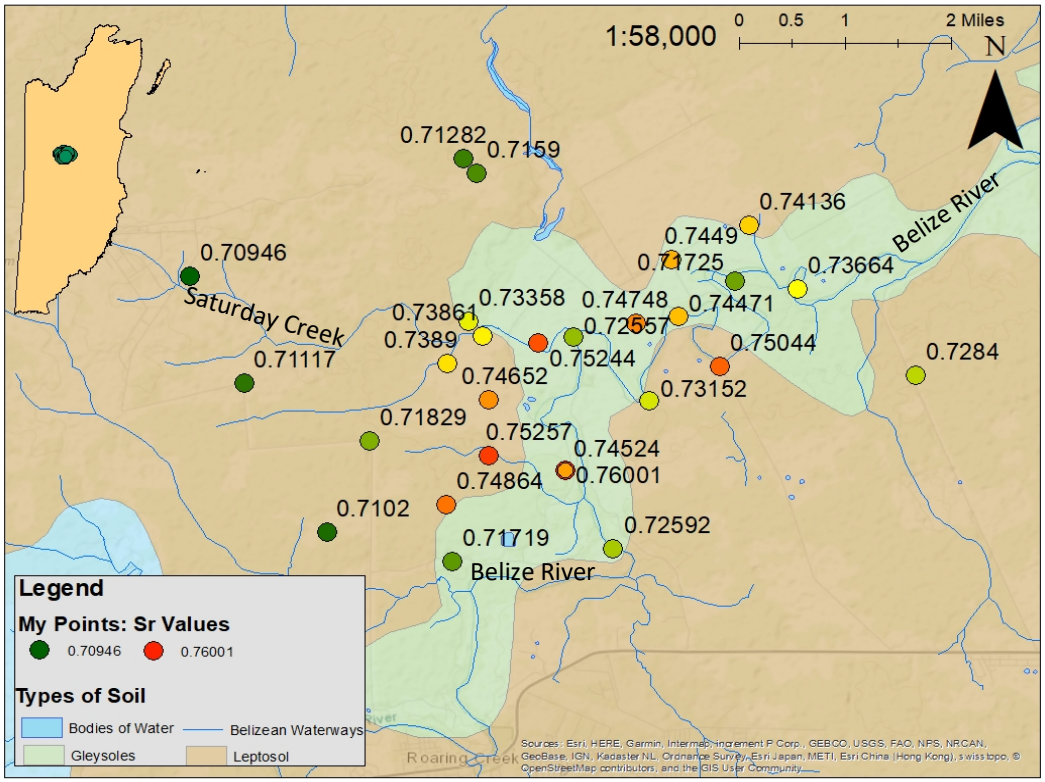

Figure 15.2: Map showing the distribution of the Sr values of the clays in this study. Map created by Rebecca Philibert.

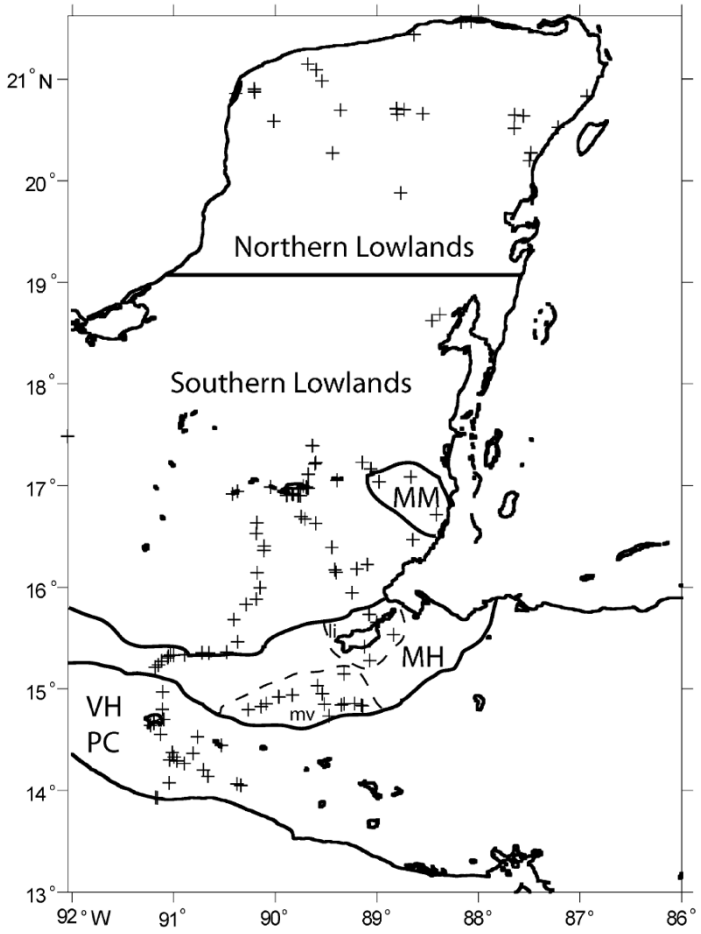

Figure 15.3: This map displays the various regions of the Yucatán, created by Hodell et al. for their 2004 study.

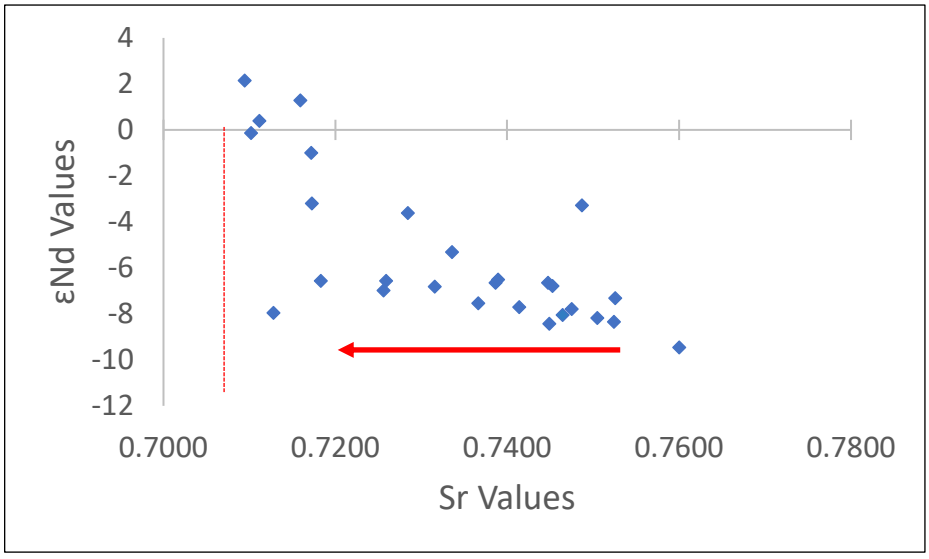

Figure 15.4: Graph comparing the Sr values to the Rb/Sr values to illustrate the effects of overprinting. Created by Rebecca Philibert.

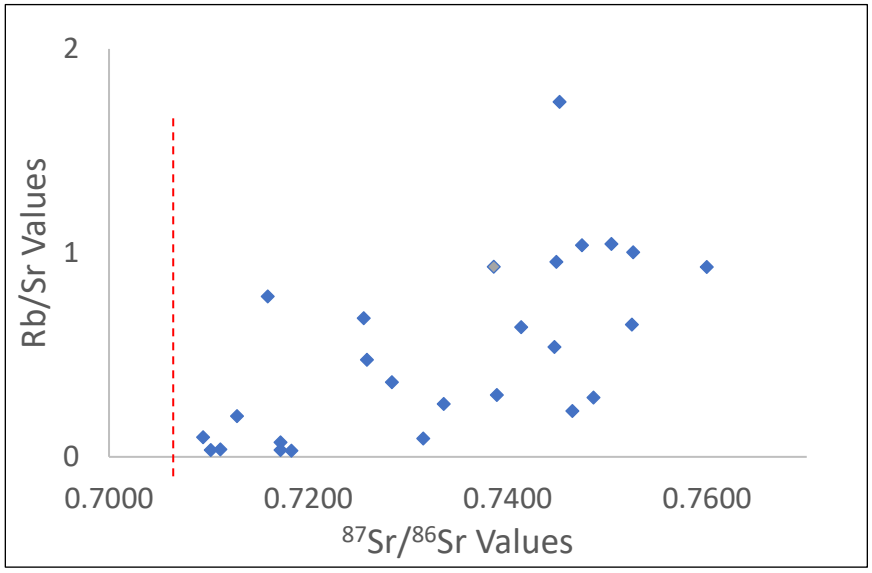

Figure 15.5: Graph depicting the effect of overprinting by plotting the ε_{Nd} values against the Sr values. Created by Rebecca Philibert.

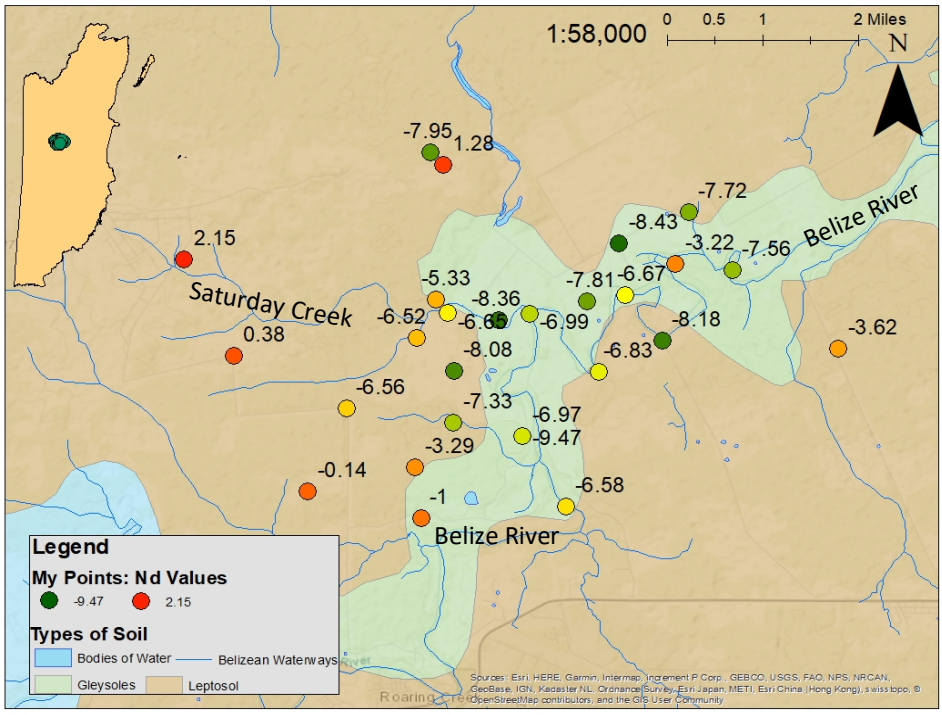

Figure 15.7: Map depicting the ε_{Nd} values of the clays tested in this study. Created by Rebecca Philibert.

Conclusion and Future Research

This study was able to pick up on an unexpected heterogeneity in a small area of the middle Belize Valley that was not identified in previous studies, including one of the largest and

most comprehensive Sr studies to date conducted by Hodell et al. (2004). This heterogeneity was seen both in the Sr dataset as well as the Nd dataset. When these data were compared to the isotopic data from the ceramic study, these data suggest that the Saturday Creek drainage is a likely source for the clays that made up the local ceramics studied (Bryce et al. n.d.). There needs to be more work done, examining the imported styles, before a source area of clay can be known. The contradiction between local sources matching imported styles may be a sign of trade but more work is needed before this connection can be made. The heterogeneity also illustrates that the Sr geospatial framework that archaeologists have been relying on in this region for years now can be unreliable because there was a lack of sampling around rivers and smaller waterways, particularly in the vicinity of the Maya Mountains. The heterogeneity was reflected in the Nd results as well, so moving forward with this new method, care should be taken to expand sampling efforts in order to map out other fine-scale heterogeneities. In the future, further testing is needed to expand upon the ground truthing to avoid surprise heterogeneities like this one, but it is clear that Nd shows great promise as a tracer for the Maya Lowlands. At this time, it is also safe to say that Sr is an unreliable tracer due to the presence of carbonate overprinting and that in their future work archaeologists should reconsider using Sr as a tracer in this region, as it has been proven to be too unreliable. Nd offers a potentially more reliable tracer for sourcing ceramics and possibly other material remains.

Appendix

Locations of the samples used.

Sample ID	Latitude (dec. deg.)	Longitude (dec. deg.)
BREA 2013 Clay 04	17.321	-88.79
BREA 2013 Clay 07	17.329	-88.832
BREA 2013 Clay 24	17.291	-88.771
BREA 2013 Clay 25	17.321	-88.777
BREA 2013 Clay 27	17.312	-88.766
BREA 2013 Clay 29	17.329	-88.754
BREA 2013 Clay 30	17.328	-88.745
BREA 2013 Clay 33	17.346	-88.793
BREA 2013 Clay 34	17.344	-88.791
BREA 2014 Clay 01	17.316	-88.728
BREA 2014 Clay 02	17.324	-88.762
BREA 2014 Clay 03	17.317	-88.756
BREA 2014 Clay 10	17.332	-88.763
BREA 2014 Clay 14a	17.302	-88.778
BREA 2014 Clay 14b	17.302	-88.778
BREA 2014 Clay 15	17.312	-88.789
BREA 2014 Clay 22	17.323	-88.792

BREA 2014 Clay 23	17.304	-88.789
BREA 2014 Clay 24	17.297	-88.795
BREA 2014 Clay 25	17.317	-88.795
BREA 2014 Clay 26	17.323	-88.768
BREA 2014 Clay 27	17.306	-88.806
BREA 2014 Clay 28	17.314	-88.824
BREA 2014 Clay 31	17.293	-88.812
BREA 2014 Clay 33	17.289	-88.794
BREA 2014 Clay 34	17.32	-88.782
BREA 2014 Clay 36	17.337	-88.752

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Chapter 16

Future Directions for BREA

Eleanor Harrison-Buck

The 2018-2019 field seasons yielded tremendously productive results, as these chapters attest. By the end of the summer 2019 season, the BREA project had identified over 2500 mounds representing nearly 100 different sites in the middle and lower Belize River Watershed, which had never been mapped before (**Figures 1.1** and **1.2** [Harrison-Buck, ed. 2011, 2013, 2015a, 2015b, 2018]). In recent years, the BREA project has focused our investigations in the lower half of the Belize River Watershed. Our survey and reconnaissance in this part of the BREA study area has revealed a range of occupation, including preceramic inhabitants, a dense Maya occupation, as well as a strong British colonial occupation with evidence of potential "slave camps" that were occupied by Kriol—enslaved African people originally brought to the former British colony for logging in the eighteenth century. The all new Crooked Tree Museum and Cultural Heritage Center is a testament to this long history, featuring the finds of the Belize River East Archaeology project. The museum's education director, Dr. Sara Clarke-Vivier, has been spearheading a digital tour of the museum that can be found here: https://www.thinglink.com/channel/1197905329736646658/slideshow. This work along with our publications (Harrison-Buck and Clarke-Vivier 2020) are aimed at making this rich and varied history more widely accessible to not only the academy but the wider public.

Our future research for the BREA project will continue to investigate this long history of occupation in the lower Belize River Watershed, paying particular attention to the history of human-wetland interaction in this low-lying coastal zone from ancient to historical times. Historical sites on the Crooked Tree island will continue to be the focus of our investigations, as well as the earlier occupation by the Maya and Preceramic occupants. In this part of the Belize Watershed, we find a number of large tracts of perennial wetlands that attracted peoples for millenia (Harrison-Buck 2014, Harrison-Buck, Brouwer Burg, et al. 2016, Stemp and Harrison-Buck 2019; Willis and Murata 2018). These rich wetland environments were attractive to both the Maya as well as pre-Maya occupants. Investigations in the summer of 2017 revealed archaeological evidence of a preceramic occupation at the site of Crawford Bank on the shores of the Crooked Tree Island (Harrison-Buck, Willis, Murata, and Craig 2018). This and other Preceramic sites in the area may have attracted early hunter-gatherers for not only the rich diversity of plants and animals, but also for the Logwood that grows in abundance in this area and is a useful hardwood for hafting tools (Stemp and Harrison-Buck 2019). This dense *in situ* Preceramic deposit devoid of ancient Maya artifacts, contains a rich and distinctive deposit of preceramic stone tools, including macroblades, constricted unifaces, and barbed spearpoints, and an abundance of freshwater *Pomacea* shell. Lithic use-ware analysis suggests wood-working

activities and finds of a barbed Lowe point (likely hafted to throwing/thrusting wooden spears) suggests spearfishing activities (Stemp and Harrison-Buck 2019). The evidence suggests that these preceramic foragers adapted uniquely to this regional wetland microenvironment, which lacks arable land but is rich with fish, Mollusca, and durable Logwood resources.

In future field seasons, we will continue to build on our prior research, carrying out further survey, mapping, and excavation of select sites in the BREA study and continue to have our base in the village of Crooked Tree. This chapter outlines our future program of research that has three separate but complementary components aimed at documenting these different aspects of human history that are found in the BREA study area: 1) the Preceramic inhabitants; 2) the ancient Maya occupation, and 3) the more recent colonial history. The first component builds on recent finds from the Crooked Tree area and will be the focus of a satellite project, directed by BREA project member Dr. Marieka Brouwer Burg. The second component builds on our long-term research, combining ancient Maya settlement and paleoecological studies and will inform the doctoral dissertation of Ms. Lori Phillips, a BREA staff member and current graduate student who joins the project from Washington State University in Pullman. The third component of the project—the colonial history—will continue our examination of the British colonial period, specifically focusing on the Kriol occupation in this area, documenting their "deep history" through oral histories, historic archives, and archaeological research. This interdisciplinary research will be conjoined with local public outreach and education based at the Crooked Tree Museum and Cultural Heritage Center in Belize, which has been opened since the summer of 2018.

Future Research Objectives

Below I discuss these three primary components of the BREA project individually. Although treated separately below, these three components of the project are not mutually exclusive, but are complementary and inform the course of our fieldwork during future field seasons. For instance, we find that in most cases due to the limited high ground, both pre-Hispanic and colonial occupation overlap and we often find evidence of both during the course of our survey, reconnaissance, mapping, and excavation, even when fieldwork is targeted with specific research goals in mind. Therefore, in many cases data on the preceramic, ancient Maya, and colonial archaeology may be collected simultaneously. Examined together, the results of our work will provide a fuller understanding of the rich heritage and "deep history" of this long-occupied part of Belize.

Future Research on the Preceramic Occupation

Our future research plans to investigate the Preceramic occupation in the lower Belize River Watershed, particularly along the eastern shore of the Crooked Tree island where we have

previously identified the Preceramic site of Crawford Bank (Harrison-Buck, Willis, Murata, and Craig 2018). We have four major research objectives for the future:

1) To create a baseline map of the Crooked Tree area using geospatial and remote sensing technologies, including drone mapping.

2) To conduct a systematic shovel test-pitting (STP) operation along the 11 km eastern shoreline of the Crooked Tree island.

3) To carry out a series of larger test excavations at Crawford Bank and other promising sites along the eastern shoreline based on the results of the STPs.

4) To collect and analyze a representative sample of the lithic raw materials from the area and associated organic remains from excavations for radiocarbon dating.

These research objectives are targeted to determine the aerial extent of the Preceramic occupation, to better understand Preceramic adaptations to this wetland ecosystem, and to refine the chronological understanding of the Preceramic period in ancient Mesoamerica. Remote sensing, surface survey, excavation, and chronometric dating will be used to explore the spatial extent and deep history of human-wetland interaction through time. Wetlands provide evidence of intensive aquaculture and incipient agriculture during the Preceramic, which become core subsistence strategies during the subsequent Preclassic Maya period (beginning ca. 1800-1200 BC). As such, places like Crooked Tree with one of the largest inland wetlands offers a valuable repository of archaeological information that will enrich our understanding of the complexity of Preceramic lifeways in ancient Mesoamerica during a key transitional period from hunter-gatherer Paleo-Americans to emergent farming communities.

The sheer density of artifacts found at Crawford Bank during the brief season in 2017 ensures that further excavations will yield substantial quantities of material remains. Moreover, *in situ* Preceramic contexts are exceedingly rare for this early time period. Importantly, the areas of higher ground on dunes adjacent to the shoreline of the Crooked Tree island will be targeted for excavation. These areas of higher ground provide optimal environments for finding stratified contexts with well-preserved organic material ideal for radiocarbon dating. We cannot overstate the importance of recovering organic material; since there are only a handful of radiocarbon dates from Preceramic contexts throughout Belize, the chronology remains poorly defined and hotly debated (e.g., Iceland 1997; Lohse et al. 2006; Pohl et al. 1996; Prufer 2018; Prufer et al. 2017, 2019).

In addition to determining the chronology and aerial extent of early occupation, the results of the use-wear analysis will shed light on past human-wetland interactions in the Preceramic. Detailed analysis of tool functions using high-power microscopic use-wear analysis provides powerful insights into stone tool use and the range of procurement activities taking place across Preceramic Mesoamerica (see Stemp and Harrison-Buck 2019). The results of these future investigations will be of the utmost value to unraveling this deep history of human-wetland interaction and the nature of early human mobility, subsistence, settlement, and land use in this part of Northern Belize.

Future Research on Ancient Maya Occupation

This second component of the BREA project builds on our prior research, aimed at further documenting the ancient Maya settlement distribution and the use of wetlands through time, particularly during periods of long-term drought. We aim to address how drought impacted settlement and wetland use, if at all, during the Late-to-Terminal Classic transition (ca. AD 700-900). Combining settlement and paleoecological studies, this component of the project is guided by the following three research objectives:

1) to expand our understanding of the history and aerial extent of wetland use and surrounding Maya settlement in the eastern Belize Watershed;

2) to test for evidence of climate change, specifically examining changes in faunal remains from a series of targeted excavations of trash deposits (middens); and

3) analyze soil samples and cores to reconstruct the paleoclimate.

These three primary research objectives will build on the previous investigations we have carried out elsewhere in the BREA study area, such as Jabonche, Chulub, and the Western Lagoon wetlands (Craig and Harrison-Buck 2018; Harrison-Buck 2015; Krause et al., this volume; Runggaldier et al., this volume; Shelhamer and Craig 2018; see also this volume;). Paleoenvironmental studies of perennial wetlands have demonstrated that these are ideal environments for revealing evidence of drought through marked changes in faunal species and provide a context in which to review the paleoecological record in direct association with the cultural contexts (Emery and Thorton 2012, 2013; Phillips, this volume; for other examples see Beach et al. 2009; Dunning et al. 2012). As part of our future research, we plan to analyze the faunal remains from midden deposits at sites like Chulub and Ek'Tok located adjacent to the wetlands to study the presence of swamp-fidelic taxa and compare Late and Terminal Classic contexts (**Figure 16.1**). Our aim with this research–which forms the basis of Lori Phillips' dissertation—is to test a hypothesis proposed by Emery and Thorton (2012, 2013) that suggests aquatic taxa from small water bodies, like perennial wetlands, diminish in the Terminal Classic period at most sites when compared to the Late Classic period and can serve as a local index of drought directly associated with cultural contexts.

Emery and Thorton (2012, 2013) relied on Neotropical animal ecology researchers to determine habitat preferences for the range of taxa identified in the zooarchaeological collections. In the summer of 2014, we conducted a similar study of the microenvironments and range of habitats found in and around the BREA wetlands. Specimens of mollusks, fish and other water-dependent taxa were collected from around the Western Lagoon Wetlands and a study of their local habitat preferences was carried out (Van Dam et al. 2015). As part of our proposed future research, our zooarchaeologist, PhD student Lori Phillips, will rely on this habitat study and comparative reference collection to classify all faunal remains recovered in wetland and settlement excavations by species and habitat preference.

Figure 16.1 Satellite image showing linear features in Western Lagoon Wetlands.

To better understand the aerial extent of wetland use and associated settlement, BREA has devoted the last several years to surveying the eastern half of the Belize River Watershed (Buck and Murata, this volume, Murata and Kaeding, this volume; Murata et al. 2018a, 2018b; Willis and Murata 2018). Although higher ground with arable land is not as abundant as it is in the uplands, our survey has revealed that settlement in the lower Belize Watershed is densely packed with large numbers of mounds in the relatively small pockets of higher ground that exist (**Figure 16.2**). Over 1000 mounds were identified at roughly 25 sites in the lower half of the Watershed. By contrast, the same number of mounds comprises around 60 sites that we have identified thus far in the middle reaches of the BREA study area. The ancient Maya communities, such as Chulub, Ek'tok, Jabonche, and Waxak Nicte' are surrounded by marginal land inadequate for farming. For this reason, I have argued that these Maya settlements relied more heavily on the wetlands for agriculture, building canals, dams, ditched and drained fields (visible in satellite imagery), while also relying on these biologically-rich environments for hunting and aquaculture (Harrison-Buck 2014).

Unlike the uplands, settlement in the low-lying coastal zone of the lower Belize River Watershed is situated in relatively isolated pockets of higher ground, which includes the sizeable secondary center of Waxak Nicte' (**Figure 16.2** and **16.3**). During the spring of 2015 and summer of 2016, the BREA survey team identified areas of dense settlement that appears to represent the hinterlands of Waxak Nicte' located around the northern end of the village of Biscayne on either side of the Northern Highway (Norris et al. 2015; Murata et al. 2018). The main ceremonial center contains at least one pyramidal structure that has been badly looted and gutted for road fill. However, the site appears to continue to the south and was sketch-mapped by our team in summer 2016 (**Figure 16.3a**). In future seasons, our survey team will ascertain the full extent of Waxak Nicte' and begin mapping the site with a Total Station.

Limited high ground in this area may have restricted site placement and might explain why Waxak Nicte' is located so far from Black Creek, which is 5 km to the west. Natural springs and *aguadas* may have provided freshwater, but Mexico Lagoon, situated roughly 2.5 km to the east, is a brackish water body. It could be that the placement of Waxak Nicte' was due in part to its close proximity to Mexico Lagoon where BREA has identified a string of 11 mounds that appear to represent a saltworks site between 1-2 km northeast of Waxak Nicte' (**Figure 16.3**). Murata and colleagues (2018b:49) identified this string of mounds running from the northwest to southeast and noted how each of the 11 earthen mounds share similar characteristics, including red, loess-like sediment and an amorphous shape that lacks any sign of stone characteristic of Maya platform construction. They describe these features as consistent with mounds identified at the site of Wits Cah Ak'al located adjacent to a brackish lagoon in the Sibun Watershed, which Murata (2011) suggests were the remains of both salt and pottery production (Murata et al. 2018:49).

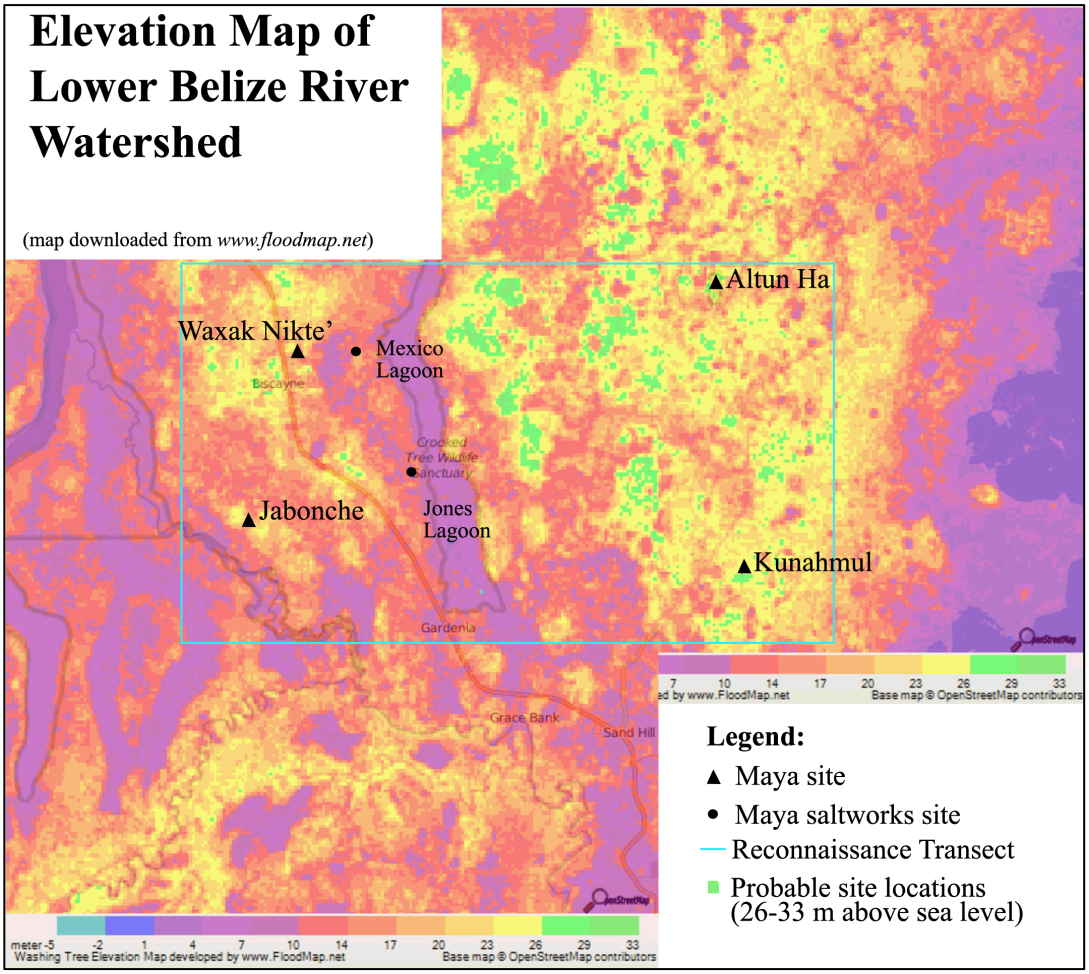

Figure 16.2 Map of the lower Belize River Watershed (around Washing Tree/Biscayne/Rockstone Pond), showing high ground (in green) with larger Maya sites and saltworks demarcated (courtesy of https://www.floodmap.net/).

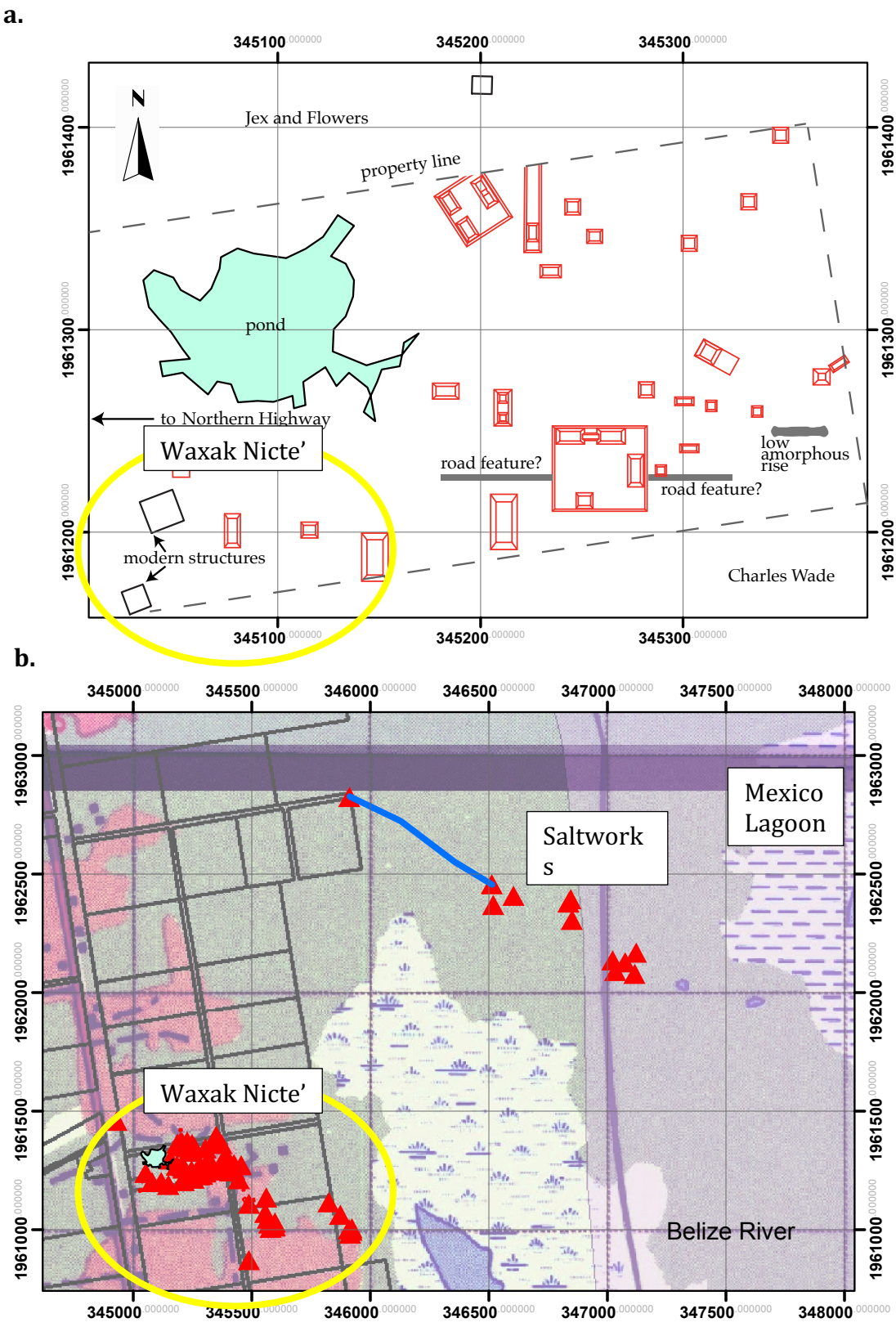

Figure 16.3 a. Sketch-map of Waxak Nicte' with possible road feature noted; b. Saltworks with yellow circle marking a portion of Waxak Nicte' site (Murata 2018:Fig. 4.4 and 4.6).

Future Research on the British Colonial Period and the History of Kriol Occupation

Ancient Maya settlement in the vicinity of Crooked Tree has been the focus of archaeological research over the years (Andres 2009; Andres and Pyburn 2004; Harrison-Buck 2015, Harrison-Buck, Brouwer Burg et al. 2016; Harrison-Buck, Clarke-Vivier, Phillips, and Runggaldier 2020; Harrison-Buck, Craig, and Murata 2017; Harrison-Buck, Willis, Murata, and Craig 2018; Pyburn 2003). However, relatively little investigation of colonial sites has been conducted in this area. Our future research will expand on the colonial period investigations that BREA began in the middle reaches of the valley, beginning in 2011, and has continued moving down river over the years (Harrison-Buck, Murata, and Kaeding 2012; Harrison-Buck, Craig, and Murata 2017; Harrison-Buck, Clark-Vivier, Kaeding, and Phillips 2019; Harrison-Buck, Houk, Kaeding, and Bonordon 2019). Our future investigations aim to cross-examine oral histories alongside archival and archaeological evidence in an effort to reconstruct the colonial history and settlement in this area. For instance, we know that Crooked Tree was one of the earliest Kriol villages in Belize and was initially established during the British colonial period as a logging camp that housed enslaved Africans. As of now, the BREA investigations of the Baptist Church represent the only historic sites in and around Crooked Tree to have been investigated or documented archaeologically (Kaeding et al., this volume). Based on the preliminary evidence, the area has a wealth of information concerning early Kriol history and will shed light on Belize's colonial past, which we aim to investigate through archaeological survey and the aid of archival research and interviews with local informants in future field seasons.

Kriol ethnicity is defined as descendants of Europeans and enslaved African people who were originally brought to Belize, a former British colony, during the eighteenth century for the logwood and mahogany industries. As one of the oldest Kriol villages, members of the Crooked Tree community serve as stewards of a valuable repository of colonial archaeology and also hold a wealth of local knowledge in the form of oral histories. In the future, we will continue to work in partnership with the Crooked Tree Museum and Cultural Heritage Center and the local Kriol communities in the lower Belize River Watershed to more fully document this rich, but understudied history. Our future objectives for this research component are three-fold:

1) Conduct additional oral history interviews, archival research, and archaeological investigations to further document the history of the Kriol culture in the context of British colonial period archaeology.

2) Expand our shovel test-pitting operations and test excavations around the Crooked Tree area in order to identify archaeologically other historical sites recorded in our oral history interviews with locals.

During our future field seasons, we plan to conduct oral history interviews, archival research, and historical archaeological investigations that will serve to guide us in our future shovel test-pitting operations in and around the village of Crooked Tree. With permission from the Crooked Tree Village Chairman, we plan to carry out a series of shovel test pits and several

larger excavation units in and around the village locations to corroborate local oral histories on the dating and use of different areas of habitation. Our plan is to carry out a series of shovel test pits to isolate areas with the highest densities or distinct patterns of material culture. These areas will be the focus of several larger excavation units for broad horizontal exposure. Like our previous historical investigations in Crooked Tree, we expect to see a density of historical material possibly mixed with a light density of prehistoric artifacts, both ancient Maya and preceramic material perhaps in some but not all areas of excavation. Tracing this history provides greater appreciation for the importance and preservation of the archaeological past, often found right in one's very own "backyard" in Belize.

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