

28 INVESTIGATING ANCIENT MAYA SETTLEMENT, WETLAND FEATURES, AND PRECERAMIC OCCUPATION AROUND CROOKED TREE, BELIZE: EXCAVATIONS AND AERIAL MAPPING WITH DRONES

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Between 2014-2017 the Belize River East Archaeology (BREA) project conducted archaeological survey in the areas between the large Maya centers of Chau Hiix and Altun Ha. Unlike the uplands, we have found that settlement in this low-lying coastal zone is situated in relatively isolated pockets of higher ground. These sites are all circumscribed by marginal land inadequate for farming. For this reason, we argue that these sites were heavily reliant on the adjacent wetlands for agriculture, building ditched and drained fields, while also relying on these biologically-rich environments for hunting and aquaculture. Here we report on our 2017 fieldwork, which investigated the sites of Chulub and Crawford Bank located on Crooked Tree island and its adjacent wetland features in the Western Lagoon, which were mapped using drones. Our investigations have revealed a long history of human-wetland interaction, beginning in the pre-ceramic period and continuing through ancient Maya times. Wetland modifications are typically attributed to the ancient Maya. Yet, it appears that preceramic groups were the first to intensively manage these environments. We suggest, particularly in the context of aquaculture and the construction of fish weirs, that these later modifications may represent a continuum of preceramic activity, rather than a break from it by the Preclassic Maya.

Introduction

The BREA project study area encompasses the eastern Belize River watershed between Belmopan and Belize City, a roughly 6000 sq. km area (Figure 1). Over the course of seven years (2011-2017), our investigations of the BREA study area have identified a dense occupation and a long history of settlement in the eastern Belize Valley, extending from Formative to Colonial times, ca. 900 BC-AD 1900 (Harrison-Buck, ed. 2011, 2013, 2015a, 2015b; Harrison-Buck, Murata, and Kaeding 2012; Harrison-Buck, Kaeding, and Murata 2013; Harrison-Buck et al. 2015, 2016, 2017; Runggaldier et al. 2013). In recent years, we have extended our investigations to 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. Altun Ha and Chau Hiix are the two largest sites in this part of the BREA study area. The latter is situated along the Western Lagoon Wetland, the largest inland wetland in all of Belize. Between 2014-2017, BREA conducted archaeological survey in the areas between the centers of Chau Hiix and Altun Ha (Harrison-Buck et al. 2015, 2016, 2017; Norris et al. 2015 [see inset on Figure 2]). Unlike the uplands, we have found that settlement in the coastal zone is situated in relatively isolated pockets of higher ground. For

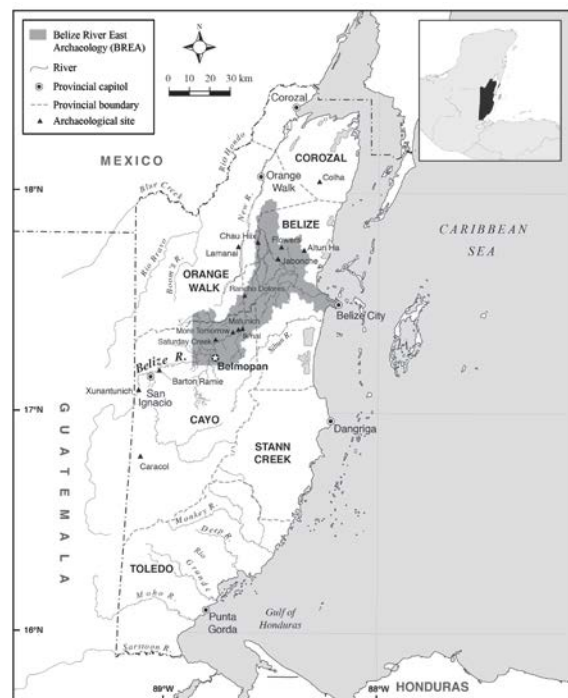


Figure 1. Map of BREA study area (map prepared by M. Brouwer Burg).

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 [refer to Figures 1 and 2]).

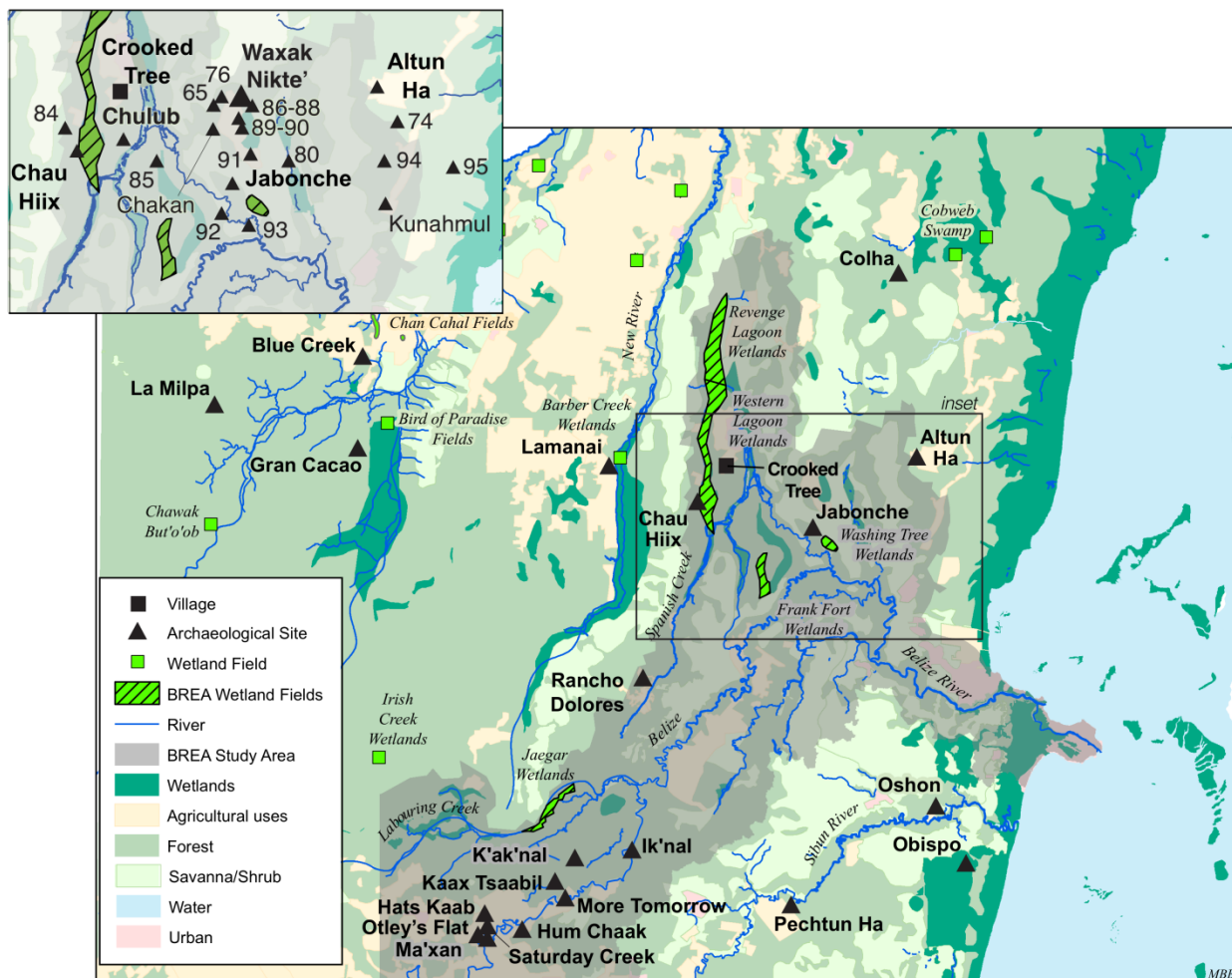


Figure 2. Map of the BREA study area with inset showing sites in the lower Belize River Watershed (map prepared by M. Brouwer Burg).

The areas around Jabonche and other neighboring sites, such as Chulub, Chakan, Waxak Nikte', and Kunahmul are surrounded by marginal land inadequate for farming (Figure 2). 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).

The results of our fieldwork in 2017 build on a long-term, interdisciplinary research project involving a human-wetland study. During the 2017 field seasons, BREA focused on mapping these wetlands using unmanned aerial vehicles (UAVs), otherwise known as drones, revealing numerous ditched fields and drainage canals that

we believe were constructed by the ancient Maya. BREA also conducted an excavation in one of the pond features thought to possibly function as a fish weir in the Western Lagoon Wetland that connects to one of the east-west canal features. This sizeable canal feature extends from the site center of Chau Hiix eastward across the Western Lagoon, cutting through the southern end of Crooked Tree island just south of the site of Chulub. During the January 2017 field season, BREA mapped the site of Chulub and performed several test excavations at this site. In addition, during the summer 2017 field season, our team identified what appears to be an extensive pre-ceramic site running along the eastern shoreline of the Crooked Tree island and we performed one test

excavation of this pre-ceramic site at Crawford Bank. Below, we summarize these finds.

Ancient Maya Occupation and Human-Wetland Interactions

Drone Mapping of the Western Lagoon Wetlands

Our efforts to investigate the perennial wetlands in the BREA study area continued in 2017. Examining satellite imagery publically available on Google Earth, BREA detected a large network of water features in the form of ponds or wells connected to a series of long, linear canals in the adjacent Western Lagoon wetlands, which we believe were constructed by the ancient Maya. During the summer 2017 season, we carried out an expansive mapping project of the wetlands using drones. We have shown elsewhere that drone mapping is a very efficient and cost-effective means of mapping large-scale archaeological landscapes (Harrison-Buck, Brouwer Burg et al. 2015; Harrison-Buck, Willis, and Walker 2016; Willis and Walker 2015).

One of the largest and longest canals in the Western Lagoon wetlands extends east from the site center of Chau Hiix and stretches across the Western Lagoon wetlands and bisects the southern tip of Crooked Tree island just south of Chulub (Figures 2 and 3). The geospatial mapping with drones offered an efficient and cost-effective means of mapping a huge area of the wetlands in a short amount of time. In less than a week, our drone operator Mark Willis mapped over 10,000 acres of the Western Lagoon wetlands that is an area over 40 km². To put this into perspective, the aerial extent mapped is equivalent to 75% of Manhattan (Figure 3a). A close-up of the longest canal extending from Chau Hiix across the Western Lagoon wetlands reveals the channel and other subtle topographic details that the drone was able to detect (Figure 3b).

Wetland Features in Western Lagoon (Operation 34)

We carried out one small test excavation of a pond feature positioned along the axis of this main linear channel in the Western Lagoon wetlands (see Figure 3b). Operation 34 was a small 1 x 2 m unit placed on the western edge of

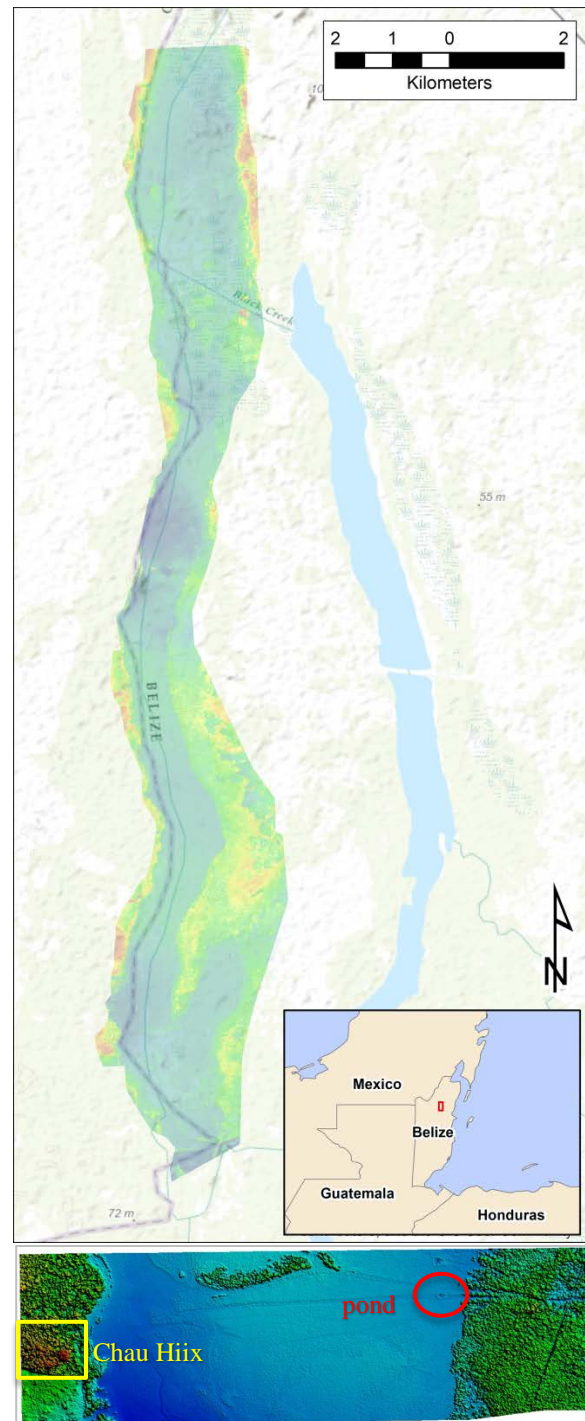


Figure 3. a. Area of Western Lagoon Wetlands mapped with drones; b. close-up of the southern area showing linear canal extending east from Chau Hiix bisecting a pond feature on the eastern side of the lagoon (maps prepared by M. Willis).

the pond. Apparently, the pond feature still had standing water the week prior so we timed the excavation perfectly at the very end of the dry

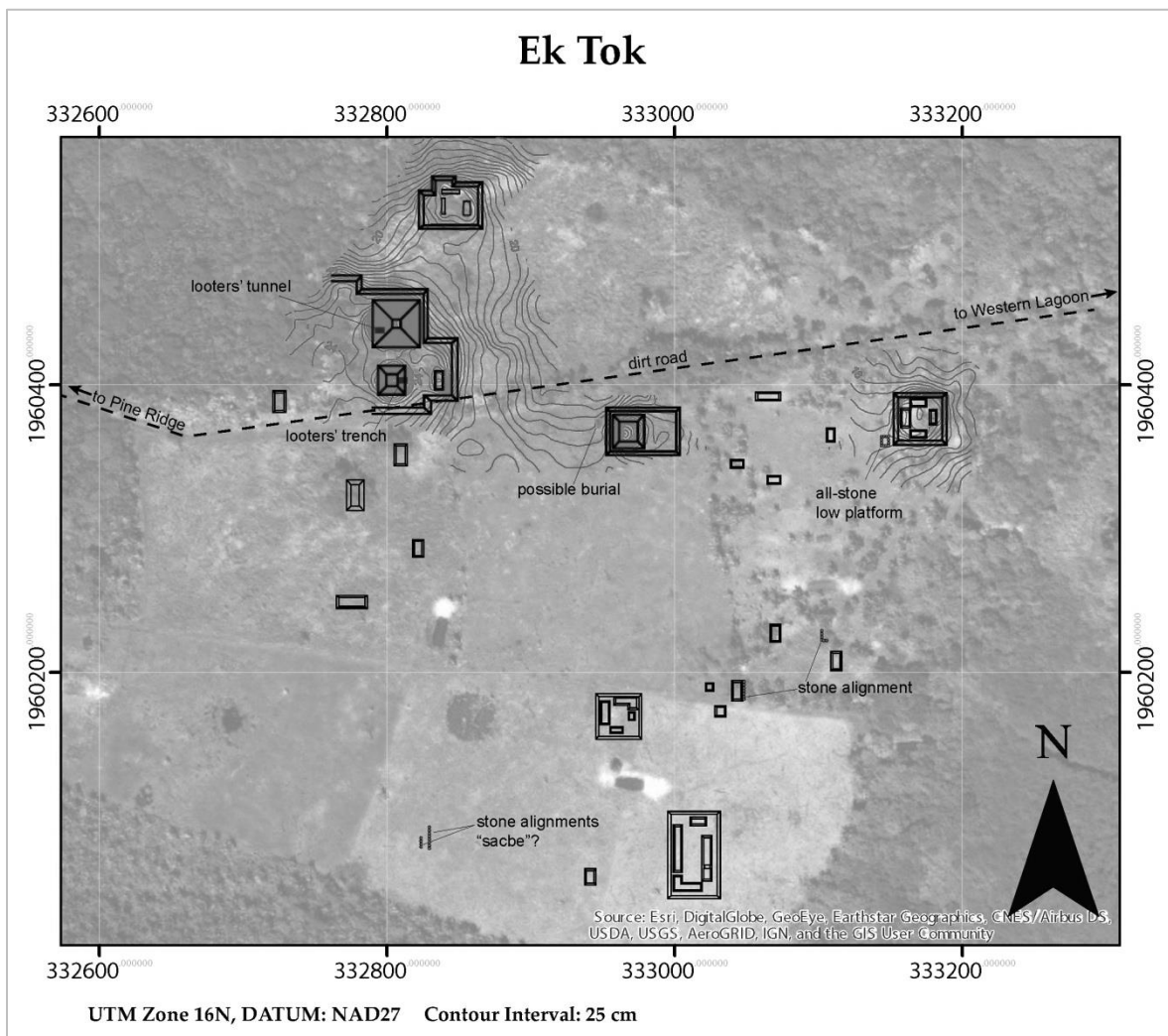


Figure 4. Map showing portions of Ek Tok site center (map prepared by S. Murata and A. Kaeding).

season and the unit did not become inundated until we were almost a meter in depth. We hypothesized that this feature may have been used as a fish weir by the ancient Maya. However, aside from a piece of chert debitage, our excavations yielded virtually no other cultural material, only mud and organic material.

Mapping the Sites Adjacent to the Wetlands: Ek Tok and Chulub

During the 2017 January and summer field seasons, we continued the survey, mapping, and excavation of select Maya sites located adjacent to the wetlands in the lower reaches of the BREA study area. Using a Total Station and GPS, we devoted three weeks in January 2017 to mapping the site core of Ek Tok, located on the

western shores of the Western Lagoon, the perennial wetland discussed above (Figures 2 and 4). The survey and mapping has allowed us to record detailed topographic information for the site core and more accurately tie in the site to our existing GIS map of the BREA study area. Ek Tok is located about a kilometer and a half north of Chau Hiix. Several sacbes or roads were identified during reconnaissance that radiate out from Ek Tok, including one that extends to the south and may in fact link up with the Chau Hiix site core. Further reconnaissance is needed to confirm this and is planned for future field seasons. Ek Tok is a sizeable satellite center, comprising several pyramidal structures and three discrete plaza groups, as well as numerous isolated mounds.

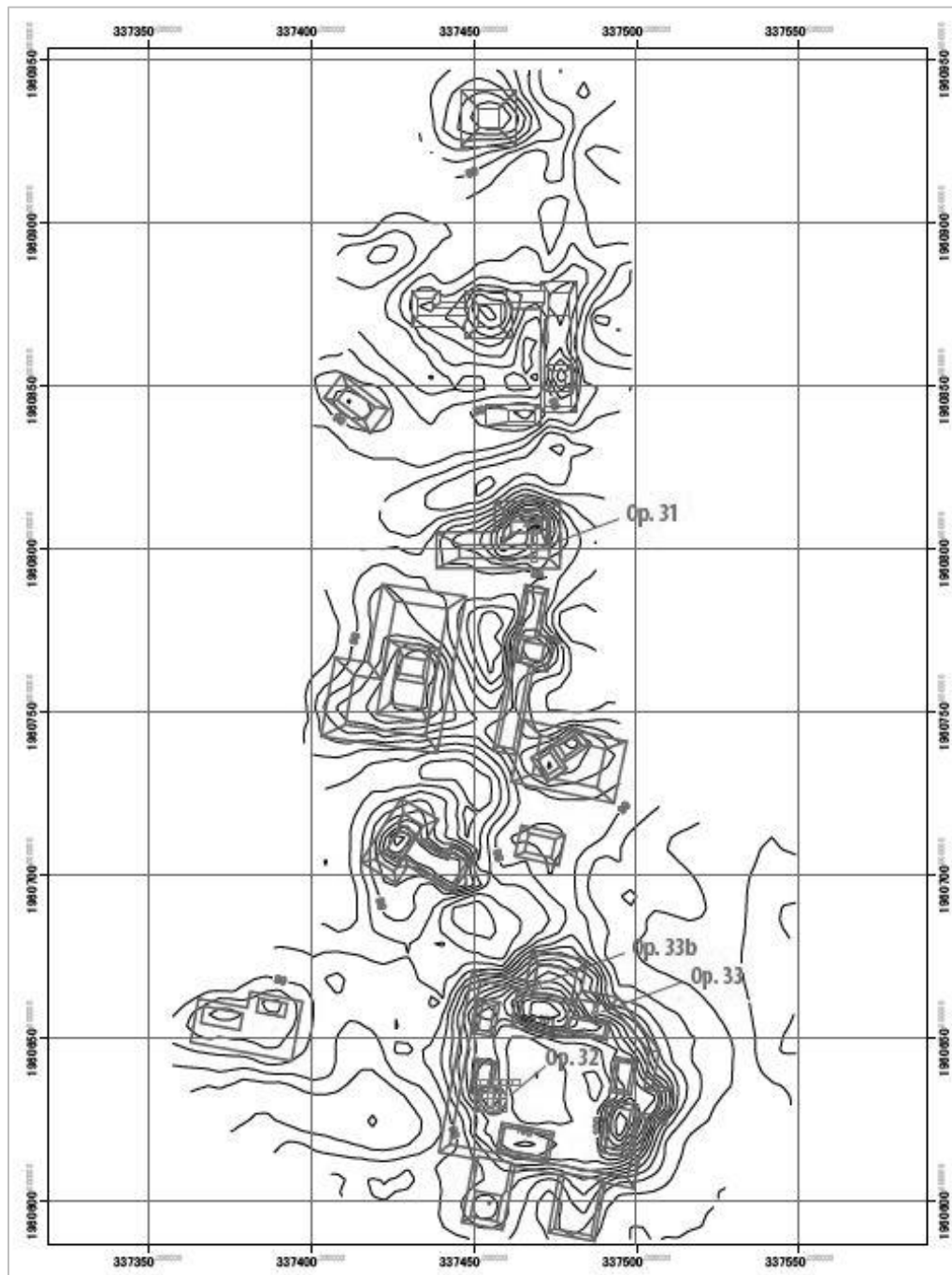


Figure 5. Map of Chulub (map prepared by S. Murata and A. Kaeding).

During the January 2017 season, we focused most of our attention on mapping Chulub. This modest-sized Maya settlement is located on the southeastern end of the Crooked Tree island near the shore of the Crooked Tree Lagoon, a seasonal wetland (see Figure 2). Our survey team mapped with a Total Station the site

center of Chulub, which consists of a main plaza group and other outlying mounds that were associated with a series of pond and canal features that appear to link to the nearby lagoon (Figure 5). These outlying mounds oriented toward the water features may not be residential, but rather, production-oriented (see further



Figure 6. Artifacts from Chulub: a. polished axe head; b. arrow point; c. net weights (photos by E. Harrison-Buck).

below). The area around the site center is a cohune ridge suitable for farming, but circumscribing the site is a fringing wetland forest inadequate for farming. For this reason, the inhabitants of Chulub likely relied on the lagoon and nearby wetlands for additional sources of food, such as turtles and fish, and may have built the canal and pond features to facilitate aquaculture and other production and processing activities.

Excavations at Chulub (Operations 31, 32, and 33)

BREA conducted several test excavations at the Maya site of Chulub, including Operations 31, 32, and 33 (Figure 5). Preliminary analysis of the artifacts from all excavations suggests that Chulub was primarily occupied during the Early Postclassic period (ca. AD 900-1200), with small amounts of material suggesting an earlier Terminal Classic component at the site. Below I briefly describe the results from each excavation.

Operation 32 was placed over an all-stone mound identified on the southwest side of the main plaza group and revealed a poorly preserved rectangular-shaped shrine building. Although an earlier Terminal Classic phase was identified lower down in Operation 32, the final construction phase dates no earlier than the Early Postclassic (ca. AD 900-1200). The preservation was very poor, making it difficult to reconstruct the building's original configuration, but it may have consisted of upright slab construction typical of the Postclassic that has since collapsed. I believe the configuration of this structure may have originally been in the form of a radial shrine with a series of outset staircases, perhaps similar to one BREA investigated at Saturday Creek several years ago, which also dated to the Postclassic (Harrison-Buck and Flanagan 2015).

Two other 1 x 2 m test units (Operation 33a and 33c) were placed on the sides and back of the largest mound in the main plaza in an effort to recover midden (trash) deposits



Figure 7. Crawford Bank Op. 35 (looking east) and three examples of lithic tools found in the excavation (photos by E. Harrison-Buck).

associated with the main plaza group at Chulub. In both excavations, remains of faunal material, including turtle, fish and other wetland taxa were present in the archaeological record. Remains of larger land animals, such as deer, were also identified in large quantities in all excavations at Chulub. Several significant artifacts were recovered, including a small Postclassic arrow head point (Figure 6a). While David Pendergast and others have long argued that these small points were used for hunting birds, Joel Palka has suggested to me (based on his studies of hunting and fishing practices among the contemporary Lacandon Maya in Guatemala) that these points were more likely used for spearing fish.

Operation 31 was a 2 m x10 m excavation unit positioned on an outlying mound to the north of the main plaza, located adjacent to one of the water features. The goal of the excavation was to better understand the function of these

pond and canal-like features found in between these outlying structures. One hypothesis that we wanted to test was whether these water features, which become seasonally inundated but retain some water throughout the year, were used by the Maya for aquaculture. The excavation revealed an intact terrace wall and yielded a high density of lithic material, including a number of specialized tools, such as polished axes which suggest wood-working (Figure 6b). One possibility is that this area was used for carving dugout canoes and the canal features facilitated the movement of these vessels from the workshop to the open lagoon waters. In addition, our investigations revealed a relatively high density of animal bone compared to the other two excavations. Faunal material included deer, turtle, and fish remains, as well as net weights that may have been used for netting fish (Figure 6c). Although the water feature itself needs to be tested, the fauna

combined with the net weights and lithic material suggest that multiple production activities may have occurred at this locale, including wood carving and the processing of meat and fish.

Pre-Ceramic Occupation at Crawford Bank

The Crawford Bank site is located on the east side of the island on the property of the Crooked Tree Lodge adjacent to the Crooked Tree Lagoon (Figure 7). Operation 35 comprises a narrow 1 x 12 m strip trench with the long axis running east-west so as to bisect a limestone feature running along the shoreline of the Crooked Tree Lagoon. We initially wondered whether the limestone was some kind of historic feature as there were sizeable concentrations of historic artifacts found in this vicinity, including fragments of glass bottles, ceramics, and clay pipes. While most of the material appeared to date to the nineteenth and early twentieth centuries, there were two intact bottles that the owner showed us that were identified as dating to the mid-to-late eighteenth century and were among the earliest historic material we had seen anywhere on the island so we decided to test the feature for historic remains.

The 1-x-12 m unit was initially divided into six 1-x-2 m squares (A-F). We started to remove the thin layer of topsoil that covered the limestone surface and found only a handful of historic artifacts, but a plethora of *pomacea* shell and lithic debitage mixed with a few chipped stone tool fragments. With so much lithic material we started to wonder whether the limestone feature was an ancient Maya feature, but noticeably absent were any Maya ceramic sherds. We decided to extend the excavation unit another eight meters (G-J) to the east in the direction of the shoreline to catch the eastern edge of the limestone feature, which we did in Square J. It was here that we found some of our most exciting finds, including a lithic tool referred to as a Lowe point that is diagnostic of the preceramic period (Figure 7, bottom left).

In addition, we found dense concentrations of freshwater *pomacea* shell in direct association with the lithic tools and debitage identified throughout the excavation. The barbed point noted above was found just

below ground surface in the far eastern end of Square J, closest to the shore of the lagoon. It was lying on or just above a clearly defined gray sandy, occupation surface that was associated with a dense shell midden heap found in the far western end of Square J. Notably, on this gray sandy surface near the barbed point we also found several pieces of slate that appear to be worked.

Through the course of our excavations, it became clear that the limestone feature was likely a natural outcrop, perhaps the remains of an ancient shoreline or a natural bedrock outcrop, although a dense yellow clay matrix appears to run underneath some of the rock outcrop, as seen in Sq. J. We also found in this yellow clay a few more pieces of lithic debitage and at least one tool, which would stratigraphically pre-date the shell midden and barbed point also found in Square J.

Pre-Ceramic Occupation in Belize: Crooked Tree and Beyond

No pre-ceramic occupation has ever been reported from Crooked Tree, but there are numerous sites surrounding the area around northern Belize where similar points have been reported (Lohse et al. 2006:Fig. 2). Similar projectile points with barbed edges, including the so-called Lowe and Sawmill points, were first defined by the Belize Archaic Archaeological Reconnaissance (BAAR) project directed by Scotty McNeish between 1979-1982. Into the 1980s and 90s, their work continued as part of the Colha project. In the decades since the BAAR project quite a bit of new data has been collected on the preceramic period in Belize that have been published more recently. For instance, Lohse and colleagues (2006) published a comprehensive report of finds with a typological framework of diagnostic lithic forms for the preceramic period in Belize. At Crawford Bank, we seem to have most of the assemblage rendered in their typology, including the barbed point, pointed unifacial tools, macroblades and small blades, and hammer stones (see Figure 7; cf. Lohse et al. 2006: Fig. 8). Lohse and colleagues (2006:217) suggest these types date to the Early Archaic (ca. 3500-1900 B.C.).

Over the last decade since Lohse et al. published their article, more preceramic sites have been recorded in Belize, including a series of rock shelters in the Rio Blanco valley of southern Belize investigated by Keith Prufer and his team (2017). Prufer and colleagues have presented a revised preceramic chronology for southern Belize based on a series of preceramic burials and stratified contexts with jute shell middens and barbed points found in these stratified contexts dating as early as 9,000 years B.P. Based on a large series of radiocarbon dates from these stratified deposits they have convincingly argued that the barbed Lowe points date as early as the Paleoindian period, rather than the Early Archaic as has been previously suggested. Prufer and his team (2017:321) conclude that by at least 10,500 BC the exploitation of nearby stone tool resources and the processing of freshwater snail were a major part of the use of the rock shelter.

Similarly, it appears that preceramic groups who visited the Crawford Bank site in Crooked Tree also exploited the local resources, which includes an abundance of *pomacea* shell, which are a plentiful resource in the wetland environments that characterize Crooked Tree. We suggest the procurement and processing of *pomacea* shell represents a major activity for the preceramic groups at Crawford Bank.

The barbed point from Crawford Bank is by far the most diagnostic piece found in our excavation and is arguably our most important find. To date, there have been less than a hundred such points reported from Belize. It bears the strongest resemblance to an example reported from a preceramic site near Ladyville, which is in the BREA study area and not too far from Crooked Tree (Stemp et al. 2016:Fig. 2c). According to James Stemp and colleagues (2016:292-293), the seriated edges of the barbed points suggest they were meant to stay lodged in an animal, rather than be easily pulled out. He concludes that the barbed points would not be conducive for stabbing or thrusting big game animals, but more “advantageous for hunting aquatic prey” (Stemp et al. 2016:293). That the barbed Lowe point from Crawford Bank was found right at the edge of the lagoon shoreline lends support to this interpretation. In fact, the

day we were excavating Sq. J and found the Lowe point, fisherman walked by to hunt fish near Crawford Bank and on their way back stopped by our excavation and showed us their catch. When we showed them the Lowe point, one remarked that they had found a similar point in the middle of the lagoon. This is where one would expect to lose a hafted barbed point if you were using it for hunting aquatic prey, as James Stemp and others suggest.

That said, our excavations were dominated by an abundance of *pomacea* and we were surprised by the utter lack of fish or other small water-bodied faunal remains that would require a barbed spear. It seems almost inconceivable that the early humans coming to Crooked Tree would only gather Mollusca and not take advantage of the other rich and biologically diverse resources, namely fish that are available in the surrounding lagoon and wetlands. It may be simply a matter of preservation. This shoreline is seasonally inundated by lagoon water. That only the shell and lithic materials were found is perhaps because only materials that are more impervious to water have survived. Further excavation farther away from the water’s edge may help to clarify this issue and also hopefully present deeper stratified deposits than we exposed in the Op. 35 strip trench.

Concluding Thoughts

Compared to the ancient Maya civilization, very little is known about the preceramic occupations in Belize. However, early use of wetland environments has been documented in northern Belize. For instance, wetland investigations in the Rio Hondo area by Mary Pohl and Kevin Pope identified early deposits of unifacial tools as well as a barbed Lowe point and suggested an Early Archaic date for these deposits. Although more recent investigations by Prufer and others are bringing into question the traditionally accepted chronology for the preceramic, these data demonstrate that wetland environments have a long history of use and were attractive not only to the Maya, but also to the preceramic groups as well. Pohl and colleagues (1996) suggest that wetland modification with the building of drainage canals in the northern Belize area

began as early as 1000 B.C. (cited in Lohse et al. 2006:223). While scholars have attributed most of the wetland modification to the ancient Maya, it appears that preceramic groups were the first to intensively manage these environments and it may be worth considering these later modifications, particularly in the context of aquaculture and the construction of fish weirs, as perhaps a continuum of preceramic activity, rather than a break from it by the Preclassic Maya.

Jon Lohse and colleagues (2006:221) observe that many early preceramic sites may exist in these “perennially wet environments” but their seasonal inundation “[poses] severe logistical challenges to researchers.” This is certainly the case for Crawford Bank, where the preceramic deposits we uncovered were found along a shoreline that is seasonally inundated by the rising waters of Crooked Tree Lagoon during the rainy season. Fortunately for us, we decided to conduct our 2017 investigations at the tail end of the dry season during the first week of June. The full extent of the site is unknown, but local informants indicate that the limestone outcrop extends the length of Crawford Bank. If the preceramic occupation follows the bedrock outcrop it may well extend for a kilometer or more along the eastern shoreline of Crooked Tree island. In the future, we plan to continue our research on the preceramic of Crooked Tree and the deep history of human-wetland interactions in this area.

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