

FROM THE SEA TO THE SMOKER: A HISTORY OF SEA TURTLE  
EXPLOITATION ON ST. GEORGE'S CAYE, BELIZE

by

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## TABLE OF CONTENTS

	<b>Page</b>
ACKNOWLEDGEMENTS .....	iv
LIST OF TABLES .....	viii
LIST OF FIGURES .....	ix
ABSTRACT .....	xii
CHAPTER	
1. INTRODUCTION .....	1
2. METHODOLOGY .....	12
3. THE HISTORY OF SETTLEMENT AND GROWTH OF TURLTLING IN BELIZE .....	16
Geography, Ecology, and Settlement.....	16
The Early Settlement and the Turltlers of the Miskito Coast .....	22
The Sea Turtle Industry of British Honduras.....	28
Recent Turltling in Belize .....	39
4. A BACKGROUND OF ARCHAEOLOGICAL INVESTIGATIONS ON ST. GEORGE’S CAYE.....	42
The St. George’s Caye Archaeology Project .....	42
A Method for Excavation Below the Water Table .....	46
Intrusive Investigations.....	50
Stable Isotope Analysis.....	57
5. LOCATING HISTORIC DOCKS AND CORRALS WITH ARCGIS .....	59
6. OFFSHORE TESTING ALONG THE ST. GEORGE’S CAYE COAST .....	68
TC1 .....	71
TC2 .....	76
TC3 .....	79

TC4 .....	82
7. THE DISTRIBUTION OF DEPOSITED FAUNAL REMAINS ACROSS ST. GEORGE'S CAYE.....	89
8. DISCUSSION AND CONCLUSION .....	103
LITERATURE CITED.....	109

## LIST OF TABLES

<b>Table</b>	<b>Page</b>
1. List of Identified Taxa .....	91
2. Proportions of Faunal Class by Location.....	95
3. Proportions of Faunal Remains by Location .....	96

## LIST OF FIGURES

<b>Figure</b>	<b>Page</b>
1. Map of Belize.....	2
2. Bill of fare from a British Regiment catered party on the Miskito Shore.....	4
3. 1764 map of St. George’s Caye.....	6
4. Depiction of a turtle “crawl” in Key West, FL.....	7
5. Belize \$5 bill.....	7
6. Current satellite imagery of Belize coastal waters.....	17
7. Map of logwood extraction sites and export routes.....	22
8. The Miskito Coast of Nicaragua.....	23
9. Tasbapauni Miskito turtlemen hauling in a green turtle.....	26
10. 1786 Convention map with areas labeled “turtle grass”.....	29
11. Advertisement listing logwood and tortoise-shell.....	37
12. Paths of historic hurricanes that have hit Belize.....	43
13. Excavation unit on the Fuzy property with white fill sand in upper layer.....	45
14. Honda trash pump in use at the St. George’s Caye Cemetery.....	47
15. Pump intake hose with the vertical synthetic pipe.....	48
16. Pump intake hose with sheet metal support.....	50
17. The St. George’s Caye cemetery.....	51
18. Faunal remains (upper right) in association with historic bottle glass.....	52
19. Previously excavated area along the rear/west cemetery wall.....	54

20. Feature 1.....	55
21. Results of the stable isotope analysis for the St. George’s Caye cemetery .....	58
22. 1945 map of St. George’s Caye .....	61
23. 1978 aerial map of St. George’s Caye showing hurricane channels.....	62
24. Current satellite imagery of St. George’s Caye .....	62
25. Overlay of current satellite imagery and 1764 map of the Caye .....	63
26. Model created in ArcGIS to convert shape file to KML .....	64
27. Predicted locations of historic docks (red) and turtle corrals (green) over satellite imagery .....	65
28. Final map with historic docks and turtle corrals indicated .....	66
29. Offshore testing sketch map with OT numbers indicated.....	69
30. Offshore test results .....	70
31. Testing the location of TC1 .....	72
32. Testing OT1 (foreground) and OT2 (top).....	73
33. Sea turtle bone recovered from OT1.....	74
34. Partial ceramic footed vessel recovered from OT1.....	74
35. TC2 location.....	77
36. Colloid silty clay with mangroves along the seawall.....	78
37. TC3 location.....	80
38. Coral stone and brick recovered from OT24 .....	82
39. TC4 location.....	83

40. OT12 excavation alongside dock.....	84
41. Material recovered from OT13 .....	85
42. OT15 & 16 location .....	87
43. Green turtle humeri .....	93
44. Sea turtle long bone heads with butcher marks .....	98
45. OT1 faunal remains.....	100
46. OT3 faunal remains.....	101
47. Sea turtle phalange.....	102

## **ABSTRACT**

Historic literature frequently mentions the exploitation of sea turtles throughout the Caribbean by indigenous populations and early settlers alike. Large and abundant, these animals provided a readily accessible protein source for European and African populations as they traveled and inhabited coastal and island settlements. An exploration of documents held by the Belize Archives and Records Service reveals that sea turtle capture and sale was once a sufficient contributor to Belize's coastal economy. Commonly called "turtlers", 25% of the population was involved in the capture and sale of sea turtles by the late 18<sup>th</sup> century. Offshore reconnaissance during the 2014 field season of the St. George's Caye Archaeology Project located and recovered sea turtle remains from at least two of four turtle corrals that were documented on a 1764 map. An analysis of the faunal material recovered from the island since 2009 indicated that 74.6% of the number of identified specimens comprised at least two different species of marine turtle. Turtle species varied in their preference by people as a food item, the method of capture used, and their role in the economy. The analysis of the distribution of turtle bone across the island has given us insight into which species were held in the respective corrals.

## 1. INTRODUCTION

With any profession, there is a mode of life, behavior and a range of activities that accompany it, the combination of which creates a unique lifestyle, and by effect an identity. The more heavily we are involved and invested in these activities, the greater influence they have over our attitude, worldview, our priorities and our interactions with the world we live in. For this thesis, I chose to explore sea turtle capture, the lifestyle of those involved in it, and its impact on the growth of the colonial era settlement that is Belize today through the study of historic documents and the material recovered from archaeological investigations on St. George's Caye. The country's eastern coastline creates a boundary for the Caribbean Sea. Scattered along this coast are many cayes, small islands that were the locations of some of the country's earliest colonial settlements (Campbell 2003; Thomson 2004). The small, crescent shaped island of St. George's Caye lays roughly eight miles east of Belize City (see Figure 1). This island was the central hub, and first capital of the historic settlement that grew to become the country of Belize (Campbell 2003; Everitt 1986; Thomson 2004).



Figure 1. Map of Belize (Elverson 2013)

In George Henderson’s 1811 account of the settlement in Belize, referred to as “the British settlement of Honduras” or “British Honduras”, he described a social environment in which labor “almost exclusively” ruled the lives of settlers. He described a landscape of people, divided according to their pursuits of labor that would lead them in “widely different directions”, where they would seldom have any interaction with people of different professions, and would only make contact maybe once over a period of many months (Henderson 1811). Hunting for sea turtles occupied its own distinct profession among the colonial settlers of Belize (Bolland 2003; Henderon 1811), and in such an environment, it is easy to imagine that these people could have developed social traits that set them apart from others.

“Turtler” is a term that was frequently used by historic chroniclers and

contemporary scholars alike to refer to individuals who find their livelihood in turtling, the capture and trade of sea turtles. The meat diet of colonial settlers in Belize consisted of domesticates brought from Europe as well as many indigenous animals that included in addition to sea turtles: West Indian manatee, monkey, inland turtles, parrots, wild hogs (warree), armadillo, iguana, deer, rabbit, peccary, and a large variety of marine and riverine fish, among others (Henderson 1811) (see Figure 2). Turtling will take the focus of this research project, as it was a specialized form of subsistence activity and heavy contributor to the early settlement's economy. Of all of the indigenous fauna exploited by the early inhabitants, sea turtles are by far those most abundantly represented by the faunal bone recovered from St. George's Caye. Frequently mentioned in historic accounts, turtling provided a substantial food source for Belize's early colonial inhabitants as well as a specialized mode of employment, and by effect, a unique lifestyle that grew to hold a prominent position in the country's early economy before its steady decline into obscurity.

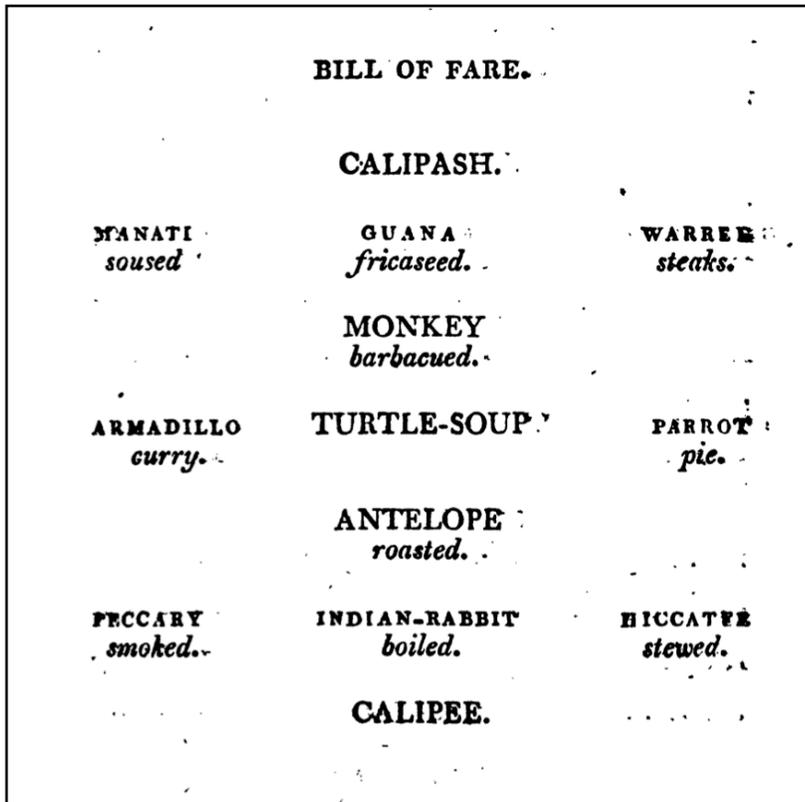


Figure 2. Bill of fare from a British Regiment catered party on the Miskito shore (Henderson 1811)

Archaeological investigations have occurred on St. George's Caye from 2009 up to the present. The majority of archaeological research there has focused on the small island's historic cemetery. This has included the exploration of the skeletal collection (Springs 2012) and interment styles (Elverson 2013). Additional research has concerned cannons, ghosts, coins (Garber 2010, 2011, 2013), and smoking implements (Elverson 2013). Additionally, much of the historic research on the early settlement has concerned its logging industry (Campbell 2003; Everitt 1986; Smith et al. 1992; Thomson 2004;). For this thesis, I decided to investigate the settlers' role in the large-scale exploitation of sea turtles that took place through the country's early settlement and its growth into the nation that it is today. Through historic and archaeological research methods, I will explore the role of this practice in the early settlement of St. George's Caye, its place as

an industry in the settlement's early market economy, the cultural aspects and strategies related to the activity.

The capture of sea turtles, called "turtling", has been recognized as a major secondary economic activity behind the logging industry in Belize's early history when it was known as "British Honduras" (Thomson 2004). Belize was heavily involved in sea turtle capture, consumption and trade until the population declined to their endangered status (Campbell 2003; Craig 1966; Everitt 1986; Searle 2001; Smith et al. 1992).

Turtling has been called "the most important form of colonial fishing" and a large quantity of turtle was exported from Belize at least as early as the mid-1800s (Craig 1966). Little is known about the involvement of some of St. George's Caye's earliest inhabitants in this industry, aside from a 1764 map that depicts four "turtle corrals" along the coast (see Figure 3).

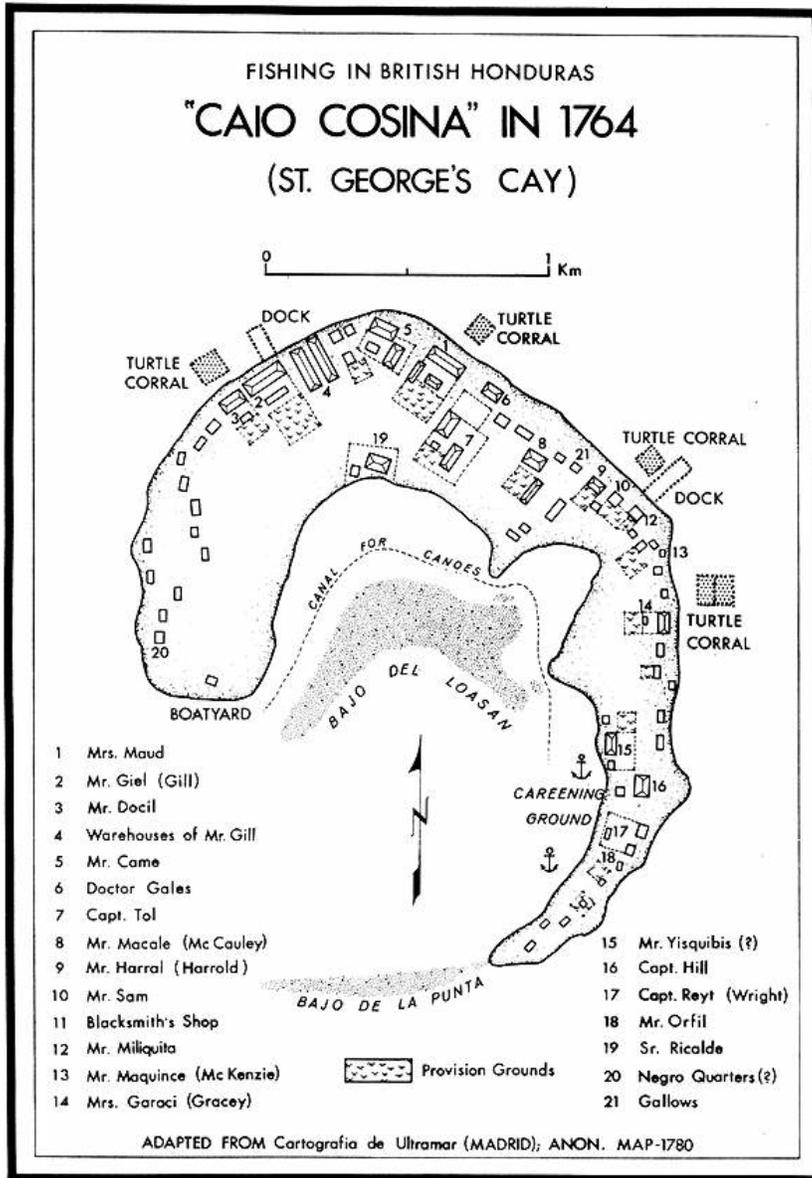


Figure 3. 1764 map of St. George's Caye (Craig 1966)

These corrals, known also as "crawls" or "kraals" are squared enclosures erected in shallow water that were used to hold live sea turtles (Barnett 2009; Craig 1966) and built by driving posts, side-by-side, into the sea floor (Dampier 1697) (see Figure 4). During migratory seasons, when sea turtles would arrive to a certain location in large numbers, the surplus turtles that were caught were kept in these crawls in order to maintain a supply of turtles after the roaming reptiles had quit the area (Barnett 2009;

Bjorndal 1995; Craig 1966; Dampier 1697). The 1764 map, along with the corrals is featured on the back of the Belize \$5 bill (see Figure 5).



Figure 4. Depiction of a turtle “crawl” in Key West, FL (Swampys 2011)



Figure 5. Belize \$5 bill

Sea turtles have been exploited by people across the globe throughout history and prehistory. Appetites have desired these large creatures’ meat and eggs, and aesthetics instigated the use of their shell to craft decorative items (Bjorndal 1995; Craig 1966). In

his 1697 account, William Dampier reported turtling activity across the globe, specifically Madagascar, Indonesia, the Philippines, the African coast, and the Americas. The Caribbean Sea is home to the largest sea turtle nesting grounds in the Western hemisphere (Carr 1967) and William Dampier (1697) claimed that the “sweetest” turtles in the world were those caught in the West Indies. Historic accounts describe sea turtle populations in great abundance (Baldwin 1778; Bjorndal 1995; Smith 1985), what some had called “inexhaustible” (Smith et al. 1992). When Columbus first arrived in the Cayman Islands he found sea turtles to be in such great abundance that he first called the islands “Las Tortugas” (Smith 1985).

Sea turtles were exploited by indigenous people of the Caribbean and Central America long before Europeans arrived. When settlers arrived from the Old World they found sea turtles to be a convenient and abundant food source. According to historians, the abundance of sea turtles in the Caribbean Sea provided a steady supply of protein for sailors and settlers that helped enable their movement through the Caribbean (Craig 1966; Smith 1985, 1987). While sailing across the Caribbean, and coasting near beaches explorers would capture turtles and bring them on board (Bjorndal 1995; Craig 1966; Smith 1985). They would sometimes be butchered on land, and their meat smoked dry for storage (Exquemelin 1969). They were also often held on board on their backs where they could survive for up to a month before being eaten or transferred to a corral onshore where they could reestablish a healthy body weight (Exquemelin 1969). According to Alan Craig “explorers and early settlers along the coast of Yucatan and Honduras depended heavily upon turtle fishermen to provide them with a source of fresh meat” (Craig 1966).

For each species of exploited sea turtle, there were different methods of capture involved, and a different use and value as a local food source, craft resource and export commodity (Bjorndal 1995; Price 1966; Smith 1985). Of the six species of sea turtle that inhabit the Caribbean (Bjorndal 1995), three species were primarily hunted by the early occupants of the Bay of Honduras (Bjorndal 1995; Craig 1966; Smith 1985). The green sea turtle (*Chelonia mydas*), has been highly prized over all others for its meat, that has been called “very sweet”, “extremely good to eat” (Exquemelin 1969) and “the sweetest of all the kinds” (Dampier 1697). This turtle gets its name, and its flavor from a layer of green fat, called calipee, which it carries under its carapace (Craig 1966). In 1697 Alexander Exquemelin called this fat “green and delicious” and recorded that it “...is so penetrating that when you have eaten nothing but turtle flesh for three or four weeks, your shirt becomes so greasy from sweat you can squeeze the oil out and your limbs are weighed down with it” (Exquemelin 1969: 73). This is not only a testament to the abundance of fat in green turtles, but also to the large quantity of these turtles that they were eating. This green color is created by their diet, which consists almost exclusively of sea grass. Sloane (1707: lxxxviii) noted that the calipee was the best part of the turtle, and that the “liver and fat are counted as delicacies”. Sloane (1707) also observed the profuse sweat that would run out of those that consumed a large amount of green turtle. In Jamaica he noted that:

they infect the shirts of those feeding on them, whence their shirts are yellow, their skin and face are the same colour, and their shirts under the armpits stained prodigiously. This I believe may be one of the reasons of the complexion of our European Inhabitants, which is changed in some time, from white to that of a yellowish color, (xviii).

Green turtles have been known to graze in large groups, which are called “bales” in

reference to sea turtles (Bjorndal 1995). As early as the late 19<sup>th</sup> century, these turtles were shipped overseas to canning facilities where their meat and calipee was turned into turtle soup (Craig 1966; Doughty 1984). The hawksbill sea turtle (*Eretmochelys imbricata*) was less common at meals, but was widely exploited for its beautiful, translucent shell. The outer plates of their carapace, called scutes, were sold under the label “tortoiseshell”. This popular commodity was widely distributed for crafting such objects as combs, jewelry, eyeglasses and home goods (Smith 1985). The outer plates of green turtle shell were likewise used for crafting and were thought to be “better clouded” than those of the hawksbill. These plates were extraordinarily thin and thus were restricted to be used only for inlays (Dampier 1697). The loggerhead sea turtle (*Caretta caretta*) was a common local food item (Bjorndal 1995; Craig 1966; Henderson 1811), though I never came across any reference that suggests it was ever exported. The fourth and final species of sea turtle that is, and has been, commonly found throughout the Bay of Honduras that is worth mentioning in short, is the leatherback sea turtle (*Dermochelys coriacea*). It is the largest living species of turtle, and was commonly encountered in the past and present waters of the Bay of Honduras (Bjorndal 1995). I did not encounter any reference that suggested this large reptile was ever exploited for food or trade. On the contrary, their meat has been called “rank”, “not fit to eat” and is supposedly “full of oil” (Dampier 1697; Exquemelin 1969).

This thesis is concerned with the capture and trade of the three species that were primarily exploited, and their place in the food supply, sport and early economy of Belize. By looking at which species of sea turtle is more prominently represented by the faunal material of the island, we can make assumptions about early turtling activity on St.

George's Caye and the settlers' place in the greater turtling industry of Belize. The distribution of each species across the island can also reveal how involvement in these activities might differ spatially and could potentially suggest which occupants were involved in the different aspects of this industry. The goal of this research project was to look at the archaeological and historical material to better understand the importance of turtling in Belize's early history, and to better illuminate its impact and involvement with the early settlement and growth of St. George's Caye.

A large amount of faunal bone was recovered from the island throughout the course of archaeological research on St. George's Caye (Garber 2010, 2011, 2012, 2013, 2014, 2015). In order to understand the relationship that the early inhabitants of the island had with the turtling industry in British Honduras, I wanted to explore the distribution of sea turtle bone on the island in comparison to that of other species that were consumed. The faunal analysis was one of the main goals of this research project and was conducted in order to understand the prominence of sea turtle in the settler's diet, its distribution across the island, and which species the settlers exploited. The prominence or lack of certain species over others across the island also has the potential to reveal which species may have been exploited as a market commodity. This in turn could reveal behavioral habits, in regards to turtle fishing, of the people that once inhabited St. George's Caye.

## 2. METHODOLOGY

In order to understand the role that turtling has played in the early settlement and growth of what today is Belize, I have used a combination of archival and archaeological research methods. The use of historic documents was very important in this case in order to interpret the archaeological data. St. George's Caye has been struck by several hurricanes throughout its history that have displaced much of the buried material (Garber 2009). This makes it difficult to interpret the chronology of deposited material on the Caye. By effect, the historical literature seemed to be the most reliable source to examine the ways in which the turtling industry progressed and changed through time on St. George's Caye and the mainland of British Honduras.

I consulted research conducted by contemporary historians as well as colonial literary accounts of the region in order to understand the role that turtling played in the early settlement of St. George's Caye by British Buccaneers. Historic literature provided insight into the importance of turtling to the growth of the British Honduras economy. Early ethnographic accounts from the Bay of Honduras and the Miskito Coast were used in order to understand historic turtling methods and their ties to the developing culture of colonial British Honduras. Two previous studies on historic turtling in Belize were consulted, and these include Alan Craig's (1966) book *A Geography of Fishing in British Honduras* and a section of a report created by WIDECAST and members of the Belize Audubon Society (Smith et al. 1992).

I consulted a series of historic documents that are curated by the Belize Archives and Records Service in Belmopan, the current capital of Belize. These date back to the early 1800s and include government market regulations, correspondence, minute papers

and export documents such as the Handbook of British Honduras.

Norbert Stanchly, of AS&G Consulting, conducted the analysis of all of the faunal bone that was recovered throughout the course of the St. George's Caye Archaeology Project in the summer of 2014. Sea turtle bones have morphological features that distinguish the different species from each other (Wyneken 2001). The bones of the shell each have patterns on the surface that differ among the species, and the bones of land and sea turtles have different densities that can indicate what family of turtle the bones belong to (Norbert Stanchly, personal communication 2014).

One of the main goals of this thesis has been to investigate the four turtle corrals from the 1764 map. The purpose being to recover faunal bone that might be present in their current locations, and to determine what species of marine turtle are represented by the remains in each corral. If there are differences in the distribution of species among the four corrals, this could provide insight into the range of economic involvement of the owners and operators of each corral. In order to investigate these features, I needed to discover their current locations around the Caye. Using ArcGIS software (Esri 2012), I created a map from an overlay of the 1764 map with current satellite imagery of the caye. The predicted locations of the historic docks and turtle corrals that were taken from the new map became the objects of field investigations for this thesis during the 2014 field season on St. George's Caye.

With the new map, we sought to investigate the subsurface content within and around each predicted location. Each individual predicted corral and dock was named prior to investigation. As these features were slightly offshore, adjacent to the east and north coasts of the island, testing was conducted in water that was approximately knee-to-

waist-deep. Testing in these areas was timed so that we worked during low tide when the sea level was the lowest. A series of shovel tests were placed throughout the interior of each corral location, and additional tests were placed outside of their boundaries in order to confirm whether or not subsurface cultural material was restricted to the interior of the predicted boundaries. These shovel tests were circular to oval in shape and ranged from one to three meters in diameter and 40 to 100 cm in depth. Horizontal and vertical measurements were taken from each pit, and measurements of each pit from nearby docks were taken using a 100-meter tape. The locations of each offshore test pit were also recorded with a handheld Garmin GPS unit. The sediment that was excavated during each test was water screened adjacent to the test pit in a box screen constructed with ¼ inch steel mesh. Cultural material recovered was placed in cloth bags on site and separated according to class. These classes included: bottle glass, historic ceramics, faunal bone, ballast stone, ceramic smoking pipes, metal, and modern refuse. The faunal bone recovered from these areas was included in Stanchly's 2014 analysis of the faunal material.

After the 2014 summer season I compiled the data from the faunal analysis from all areas of the island in order to understand the distribution of the faunal material across the island. I divided the island into separate regions based on differences in location and artifact assemblages. These regions were divided by the property from which they came, and properties that produced artifacts, particularly sufficient faunal bone were the Habet and Fuzy properties. The cemetery was divided into separate areas based on the distribution of excavation units throughout the course of the Texas State University archaeology project, and the distribution of different types of historic material. These

regions in the cemetery include the cemetery entrance, cemetery rear, cemetery OP1, and cemetery XU6. Faunal bone that was recovered from the predicted turtle corral locations was divided into four groups that correspond with each individual corral depicted in the 1764 map. I summed all of the number of specimens of each class of identified animal remains in each area, and divided that by the sum of total faunal specimens from each respective area investigated in order to produce a figure as a percentage of the proportion of bone that each faunal class comprises in each individual area. I then analyzed these proportions to understand the distribution of each faunal class throughout the island.

### **3. THE HISTORY OF SETTLEMENT AND GROWTH OF TURLING IN BELIZE**

#### Geography, Ecology, and Settlement

Much of the earliest colonial history of coastal Belize and its adjacent cayes was influenced by its geographic and physical setting (Campbell 2003). The world's second largest barrier reef stretches from the southern tip of Ambergris Caye in northern Belize down to the Atlantic coast of Honduras. A long string of small islands are enclosed between it and the Belize coast to the West. A sea of varying combinations of shallow water, sandy shoals and mangrove swamp spreads in between them. These waters were once occupied by the Maya, who traveled and settled through the area (Jackson 1987; Thomson 2004). Though it's a relatively easy for boats of shallow draught to traverse this area, it proved difficult for the Spanish, with their large man 'o war, to occupy it (Campbell 2003; Henderson 1811). The reef is very shallow in most places along the coast, and even breaks above the surface at places. There are few natural openings along the reef through which large ships could pass, and thus limited places where ships could enter into Belize's coastal waters (see Figure 6). These channels were said to be dangerous in the colonial era, when only experienced pilots that were knowledgeable of the location of the channels could pass through them without running aground (Baldwin 1778; Campbell 2003; Henderson 1811). Even today, GPS maps list some of the waters inside the reef as treacherous water that should be avoided. Henderson (1811) remarked that:

In all directions the approach of the extensive coast which lies contiguous to the bay of Honduras, is attended with imminent anxiety and danger; and the difficulty of navigation is alarmingly demonstrated by the numerous remains of vessels that have been wrecked on the different reefs and keys

which are so abundantly dispersed along it (19).



Figure 6. Current satellite imagery of Belize coastal waters (Google 2015)

Though the Spanish crown controlled what is today Mexico, Guatemala, and Honduras, it never quite gained a lasting foothold on the Belize mainland and its many cayes. The first Europeans to settle Belize were English pirates, called “Lutheran corsairs” by the colonial Spanish (Campbell 2003). The cayes along the coast of Belize were “infested” with (Campbell 2003), and “long the chosen haunts” of the Buccaneers (Henderson 1811). These pirates are estimated to have occupied this area as early as the 1550’s, when Spanish officials complained about the presence of pirates (Campbell 2003). When they tried to chase them down, they would strategically retreat inside the reef among the cayes where they were “protected by the intricacy of a navigation where

none dare follow” (Henderson 1811). This provided a safe haven for English pirates that were plundering Spanish ships and settlements (Campbell 2003; Everitt 1986; Henderson 1811; Thomson 2004).

The first solid account of pirates in Belize was made by Jose Delgado, a Spanish priest who was sent by the governor of Yucatan to explore and determine if it would be possible to build a road between Yucatan and Guatemala. He and his company travelled north along the Belize coast on his return to Bacalar. Their campfire was spotted by a group of pirates one night, whom captured and took them to their base of operations at St. George’s Caye. Here they would meet the pirate Bartholomew Sharp, the “chief” in charge of the island and operations in the area. Delgado reported that Bartholomew Sharp treated him kindly and allowed him to leave. After this he had a second run-in with pirates at the modern Manatee or Mullins River. Upon Delgado’s return, his report to Spanish officials at Bacalar and Merida documented the extent of pirate presence to be heavy among the cayes and inland along the major rivers (Campbell 2003).

There is an important relationship in the literature between pirates and turtling. Not only were sea turtles an important food source, but they also enabled and supported their passage and operations through the Caribbean (Exquemelin 1969; Johnson 2014; Smith 1985). According to Alexander Exquemelin in 1678, the buccaneer diet during a voyage consists solely of meat, and this is either pork or turtle (Exquemelin 1969). In the unknown author, Captain Charles Johnson’s (2014) account of piracy in the 18<sup>th</sup> century, he wrote that:

These are small sandy Islands, appearing a little above the Surf of the Water, with only a few bushes or Weeds upon them, but abound with Turtle, amphibious Animals, that always chuse the quietest and most unfrequented Place, for laying their Eggs, which are to a vast Number in

the Seasons, and would seldom be seen, but for this, (except by Pyrates:) Then Vessels from Jamaica and the other Governments make Voyages, called Turtling, for supplying the People, a common and approved food with them (14).

Small islands that abounded with turtles were often the places where pirates would hide out from crown forces and were often the “hiding places for their riches” (Johnson 2014).

Alexander Exquemelin frequently mentions turtling. He tells us that groups of buccaneers would divide up large beaches to demobilize turtles by flipping them over onto their backs, and sometimes they would encounter up to 100 turtles every 500 feet (Exquemelin 1969).

Some indication about the early activity on St. George’s Caye can be gleaned from its naming. The Spanish originally named the island “Cayo Casina”. This name appears as early as 1764 on the Spanish map previously mentioned (see Figure 3) but according to Mavis Campbell, the island was named as such much earlier, and received its name “long before the buccaneers arrived.” The name “Casina” is similar to “cocina”, the Spanish word for “kitchen” in English. The similarity eventually led to the island appearing as “key cocina” or “kitchen caye” on English maps. This led to the supposition that St. George’s Caye was originally settled by buccaneers as a meat smoking outpost (Campbell 2003).

Buccaneers would very often smoke meat in order to store it on voyages. The word buccaneer has its roots in “boucan”, a French word that refers to the method of smoking meat that was adopted from the Caribs (Campbell 2003). Exquemelin tells us that this process was crucial to the storage and transport of meat that was gathered from islands by buccaneers. Rovers would pull up to a wild shore, or uninhabited island and send off a hunting party that would go out in search of game meat such as wild pigs,

turtles, deer etc. This usually involved the killing of many animals, enough to sufficiently feed the crew for the anticipated journey ahead. After the hunt, they would smoke whatever meat they had taken and carry it onboard where it was stored on top of the ballast in the hull of the ship. Meat was gathered in such abundance that they would eat it alone for two meals every day “without rationing” (Exquemelin 1969). The assumption that St. George’s Caye was founded as a meat-smoking outpost is suggested by the original misspelling of “casina” as “cocina”. Though the Spanish may not have originally named the island in reference to its initial use, the misspelling by English writers could imply that the buccaneers that inhabited St. George’s Caye were using the island as a meat preparation depot (Campbell 2003), which would most likely involve processing turtle meat.

Pirates were documented throughout the Bay of Honduras (Campbell 2003; Johnson 2014; Thomson 2004). These early accounts often mention pirate encounters with turtlers in this area. In 1717, Captain Edward Teach, alias “Blackbeard” took refuge at Turneffe Atoll for some time (Johnson 2014), which is a large atoll that lies east of the Belize barrier reef (see Figure 6). Blackbeard is reported to have taken a “small turtler” after he sailed out of Turneffe toward Grand Cayman. Similarly, the famous pirate Captain Charles Vane was fed by a group of turtlers periodically while he hid out on an unknown island called “Barnacko” in the Bay of Honduras (Johnson 2014). The connection of pirates with turtling, and pirates with the early settlement of St. George’s Caye suggests that turtling played a big role in the early settlement of St. George’s Caye by supplying the early inhabitants with a steady and abundant supply of meat, while they took refuge from the Spanish.

A positive feature of St. George's Caye is the shallow water that surrounds it. Here, colonial ships could be tipped on their sides for cleaning, caulking, or repair, known as "careening". A portion of the bay on the west side of St. George's Caye served as a careening ground as shown on the 1764 map (see Figure 3). According to William Dampier (1697), when he and his crew would choose a place to careen their ships, they would most often pick one where there were plenty of sea turtle and manatee that they could capture (Dampier 1697). In addition to the island's strategic position and good careening waters, it could have further established it as an ideal location for settlement if there were many sea turtles nearby, where finding a nest of 150 turtle eggs was "not an uncommon prize" (Henderson 1811). William Dampier noted that turtles would often breed among the islands of the Bay of Honduras (Dampier 1697). Baldwin (1778) recorded that there were "plenty of green turtles" among the islands of the Bay.

Pirates in the western Caribbean gained some of their fortune by plundering ships and camps full of logwood, a popular dyewood in Europe. These pirates that were operating in the Bay of Honduras realized the value of logwood, and many who had settled there altered their strategy from stealing logwood, to harvesting and selling it. Through this, the logging industry in Belize was born (Camille 1996). Settlement on St. George's Caye and the Belize mainland developed to revolve around the extraction and export of logwood, and then Mahogany by the 1770s (Camille 1996; Campbell 2003). At this time St. George's Caye became the center of government, settlement and the "chief place of trade in this part of the world" where most all of the merchants of the settlement resided (Campbell 2003; Everitt 1986; Henderson 1811; Thomson 2004).

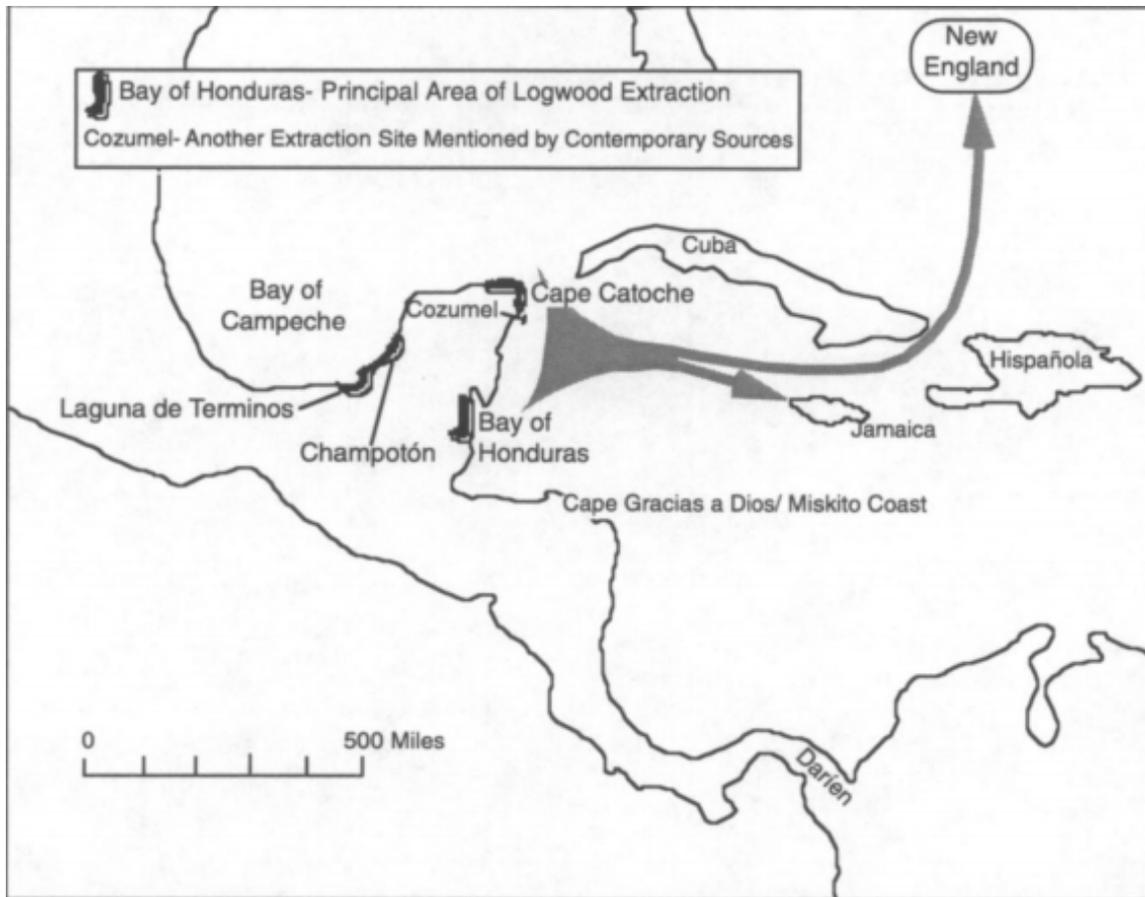


Figure 7. Map of logwood extraction sites and export routes (Camille 1996)

### The Early Settlement and the Turtlers of the Miskito Coast

The Miskito Coast settlement of present day Honduras and Nicaragua had an ongoing relationship with that of St. George's during the early colonial settlement of Belize (see Figure 8). The indigenous Miskito had a tumultuous relationship with Spanish explorers in the region and maintained a violent resistance against their occupation. When the British, enemies of Spanish forces, settled the area they established a good relationship with the Miskito, and this allowed them to maintain settlement there (Thomson 2004). By the mid 1600s, Britain had established a protectorate over the Miskito coast, and a triangular trade network between it, Jamaica and the settlement in the Bay of Honduras. Up until the mid 1700s, English settlers of St.

George's Caye would often travel to and from the Miskito Coast in order to seek refuge from sporadic attacks by the Spanish (Campbell 2003). Specifically between 1779 and 1884, many settlers of the Bay of Honduras sought refuge “among the Indians of the Mosquito Shore” (Henderson 1811).

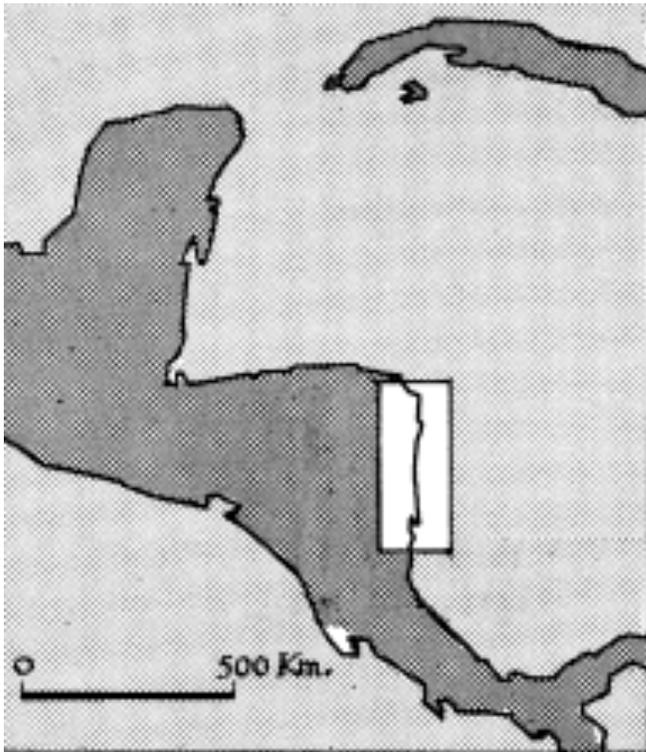


Figure 8. The Miskito Coast of Nicaragua (Nietschmann 1972)

The indigenous Miskito have been notoriously skilled turtlers from the colonial era up to the 20<sup>th</sup> century (Conzemius 1932; Dampier 1697; Helms 1971; Nietschmann 1972). In 1697, William Dampier reported that the Miskito were “esteemed and coveted by all privateers” because of their skill at catching turtle and manatee. Their unrivaled skill at the hunt was so highly prized that they were often taken on board of naval and privateering vessels in order to provide food for the crew (Baldwin 1778; Dampier 1697).

Dampier (1697) reported that:

they are very ingenious at throwing the lance, fisgig, Harpoon, or any manner of Dart, being bred to it from infancy, for the children imitating

their parents, never go abroad without a Lance in their hands, which they throw at any object, till use hath made them masters of the art (7).

On board English vessels, these Miskito “striker”, as they were called, would strike three or four turtles every day, and a crew of 100 could be well fed by a lone striker or a pair (Dampier 1697). As far as the English were concerned, Miskito strikers were permitted to come and go as they pleased to any settlement, on any vessel, and catch a ride back to their home on the Miskito Coast, paying their way with the sea turtles and manatee that they provided for the crew (Dampier 1697). It was a common practice by buccaneers throughout the Caribbean, whereby indigenous turtlers would be captured, or coaxed, their prowess in the hunt brought into service of the crew (Exquemelin 1699). Dampier wrote that sea turtles were captured in such abundance that “In May the turtle have arrived on the coast, and our food for two months or so is turtle meat and turtle eggs” (Dampier 1697). Prior to his arrival, Gunter of London set up an operation to can turtle meat, building large “Kraals” in which “hundreds of turtles were confined” and “the people of the town could not consume a quarter of the meat he daily killed” the remainder of which was thrown into the lagoon (Dampier 1697).

In 1932 Eduard Conzemius reported in detail the methods the Miskito employed for catching turtle. Given the relationship between the Miskito Coast and St. George’s Caye, some inferences about turtling methods along the Belize coast might be made by look at those of the Miskito Coast. The Miskito used a combination of methods that were reported to be in use at least until 1970. The Miskito mainly focused on the capture of green sea turtles, which by meat weight comprised 70% of their diet during the peak season (Nietschmann 1972). Turtles were most commonly captured by either net or harpoon. Large nets with wide mesh were hung at an angle over beds of sea grass with

one end anchored, and the other afloat so that when the feeding turtles surfaced for air, they would become trapped (Conzemius 1932; Nietschmann 1972). A wooden sea turtle decoy was often attached to the net to attract social or breeding turtles into it (Conzemius 1932).

As for the hunt, two turtlers would usually go out together in a dugout canoe: one to row the boat and the other, the “striker”, would direct the rower towards the animals and then harpoon them (Conzemius 1932). They would intercept turtles in the area between their sleeping shoals and feeding banks as they surfaced for air (Nietschmann 1972). Paddlers would take little caution when creating noise, as turtles have a poor sense of hearing (Craig 1966). The harpoon was composed of three separate parts: A long wooden shaft provided the body of the harpoon and was fitted with a socket on the distal end so that the metal harpoon head could be inserted. This head called the “peg” was triangular in section, with a barb on each of the three lateral sections. It was short, 1½ to two inches in length and was designed to penetrate the turtle’s shell without inflicting a mortal wound. A thin rope was then attached to the peg at one end, and the bow of the boat at the other. The turtlers would approach the turtle either from behind or head on, because turtles have poor forward vision. When the team would come into range of the target turtle, the striker would throw the harpoon upwards so that it would arch, and fall vertically into the turtle’s back. Though this was a difficult method that required refined skill, it was necessary because an angled throw directly towards the turtle’s carapace would cause the harpoon to deflect, and send the startled turtle diving to safety. When the peg penetrates the shell, its barbs would secure it in place while it would detach from the harpoon shaft. At this moment the turtle would plunge beneath the surface, pulling

the line and the boat along with it until it becomes exhausted (Conzemius 1932).

Conzemius (1932) describes how they secure the catch as follows:

The boat is swamped and placed under the turtle to haul it in, for the latter may weigh up to several hundred pounds. By shoving the canoe from one side to the other the Indians throw out enough water to allow it to float, while the remainder is bailed out with a calabash (84).

The Miskito would often harpoon turtles at night, when their movements would be highlighted by bioluminescence in the water (Conzemius 1932). Harpooning turtles was the traditional way to catch them, and nets were not introduced until the 1700s when turtles were caught in large numbers for export (Craig 1966).



Figure 9. Tasbapauni Miskito turtlemen hauling in a green turtle (Nietschmann 1972)

Turtling persisted to be major part of Miskito life into the 1900s. In 1972 Bernard Nietschmann studied subsistence behavior among the Miskito Indians and found that 65% of Miskito men concentrated solely on turtle fishing while the remainder focused on a combination of different hunting and fishing strategies for various animal species.

Turtling was such an important activity that the coastal Miskito adapted much of their

technology, life ways, and economic patterns to predictable patterns and the dependability of the turtle catch. Nietschmann found that turtling had found its way into human relations, where the most common way to express and fulfill kinship obligations was through the reciprocity of turtle meat. Turtle meat was not only a valuable trade commodity, but was also shared generally amongst kin groups. For the Miskito, achieving greater skill at capturing turtling would elevate status and respect within the community (Nietschmann 1972).

The 1786 Convention of London permitted British settlers in the Bay to extract Mahogany and extended their log cutting territory on the mainland. In exchange, Britain handed over claims to the Miskito Coast to the Spanish crown. After this, most of the British inhabitants of the Miskito Coast settlement moved to Belize. Following their arrival, the migrants from the Miskito coast outnumbered the Bay settlers and their slaves, making up more than  $\frac{3}{4}$  of the population (Everitt 1986). The steady relationship between the colonial settlers and the Miskito Indians could have influenced those migrant's skill and ability as turtlers, and it is likely they could have adopted similar methods for capture, and ultimately a similar reliance on turtle meat. It's also possible that this could have influenced their attitude toward skill at sea turtle capture as a means to achieve prestige if not among certain sectors of early Belizean society.

The historian P.A.B. Thomsen wrote that poor white settlers from the Miskito Coast had found it very difficult to establish themselves in the Mahogany trade because they lacked land, capital and labor. In 1817, Lieutenant Colonel Arthur passed a decree that established the Crown's ownership of all unclaimed land in British Honduras. This would have made entry into the mahogany industry more difficult for a person with little

capital, if they could not afford to buy land from existing owners (Thomson 2004). However, the profitable logwood industry was an easier business to enter for those with little capital because it didn't require as great a quantity of cattle, slaves, machinery and provisions, nor did it require the detailed knowledge and experience that was necessary for cutting mahogany (Henderson 1811). Turtling would have been another profitable industry that would only require the possession of nets, harpoons and a small boat in order to operate (Bolland 2003; Craig 1966; Dampier 1697; Nietschmann 1972). The logwood industry often sent its pursuers into swampy conditions and was an occupation defined as "found of a most unpleasant and unhealthy description" (Henderson 1811). Of these two industries, it's my opinion that the open water pursuit of sea turtles may have been a more pleasant and attractive occupation compared to that of the logwood industry. Though, turtling also must have also had its drawbacks. Those migrants from the Miskito shore who came with little capital, and a working knowledge of the skill required to catch turtles, may have found their way into the business of hunting for sea turtles.

#### The Sea Turtle Industry of British Honduras

When travelling through the shallow waters between the central cayes, you can see large areas of the sea floor that are covered in sea grass. This vegetation runs almost continuously between the cayes, the reef and the mainland. As previously mentioned, the green turtle diet primarily consists of sea grass. The thick bladed grass that grows underwater in this region is *Thalassia testudinum*, commonly called "turtle grass". It's likely that it was named after the creatures that feed on it, and this term was in use at least as early as the 17<sup>th</sup> century (Dampier 1697). The Convention of London map of 1786 has areas in between the Drowned Cayes, Frenchman's Caye, St. George's Caye and the

coast, as well as others both north and south of this region, labeled as “turtle grass” (see Figure 10). Searle (2002) tested the gastrointestinal tracts of green turtles that were captured in the Robinson Point foraging ground of Belize, and observed that the majority of their diet did consist of turtle grass. Robinson Point, previously called the Southern Triangles, is currently a major feeding ground for green turtles in Belize. The majority of sea turtles sold at market in Belize in the recent past were harvested from this area (Searle 2001), and many were likely harvested here in the past (Linda Searle, personal communication 2015). Sea turtles were likely captured elsewhere throughout the cayes, as green turtles were reported to be widespread along the coast in the colonial era (Baldwin 1778).

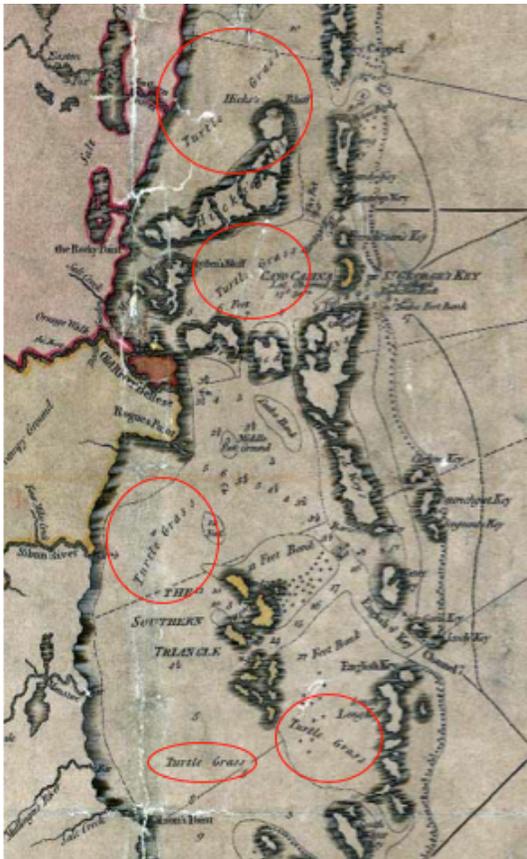


Figure 10. 1786 Convention map with areas labeled “turtle grass” (Casado 2015)

Not long after the Convention of London, a poll was taken by the British in 1790

to break down the numbers of free people employed by occupation. The poll listed each occupation along with the number of individuals employed in it, such as “traders”, “logcutters”, “housekeepers” etc. According to the poll, 71 individuals, almost 25% of the free population, was employed in turtling. There were eight individuals, or 11% of turtlers, that were listed as “Turtlers residing in the district, possessed of Boats and Nets fit for carrying on the business, who employ servants”. The remaining 63 individuals were “Turtlers of no property, of no fixed place of Residence and employed by the Master Turtlers among the Keys and Reefs along the Coast”. According to the poll, an estimated 2,000 slaves were living in British Honduras, and were “principally in possession of” woodcutters, traders and housekeepers. No mention is made of the employment of slaves in turtling, and at least 50 other individuals are listed as “Turtlers, Fisherman and free Negroes, many of whom have no place of fixed Residence and are possessed of no property” whom operated among the cayes and coast of British Honduras (Bolland 2004).

It is worth noting that at this time, Jamaica, which was Britain’s primary settlement and administrative center in the Caribbean, (Campbell 2003; Thomson 2004) had many turtlers that would travel long distances to the Cuban keys, Isla de Vacas along the coast of Haiti, the Cayman islands, and the Miskito coast to catch turtles (Baldwin 1778; Dampier 1697; Sloane 1707). In the Cayman Islands, turtles were noted to migrate from the Bay of Honduras (Baldwin 1778). These turtlers would “seldom fail” to catch a lot of turtles in these areas (Sloane 1707). The historic accounts of turtling in Belize is contrasting to this, where turtlers are noted to hunt locally in the Bay of Honduras to catch turtles where they were plentiful to provide food for the population of the

settlement (Henderson 1811). Demonstrating the difference in attitude toward the quality of turtle as a food source of these two areas, sea turtles in Belize were widely preferred by the population (Henderson 1811), while in Jamaica they were noted to be eaten by the “ordinary”, “inferior” and “poorer” sort of people (Dampier 1697; Sloane 1707).

In 1811 Captain George Henderson of the British 44<sup>th</sup> Regiment recorded a detailed account of the natural and social environment of the British settlement of Honduras (Henderson 1811). In his book, he includes details of turtling activity in the coastal waters, which he describes as the “most profitable” and “most pursued” fishery in the country that usually involved taking a considerable quantity of green, hawksbill and loggerhead sea turtles. Turtles were “very generally preferred by settlers” in Belize and green turtles were included “amongst the foremost necessities of life”. By this time, the majority of them were consumed domestically, while some were making their way to the London market. Turtling formed an “exclusive occupation” that constituted “an advantageous employment to those engaged in taking it”. The turtlers were generally “inhabitants of the different keys in the neighborhood of Belize” that would often cultivate the various cayes that they would frequent as they traveled about during the nesting season when turtles would arrive in large numbers (Henderson 1811). They would most often form into parties of four or five to catch turtles. Henderson (1811) stated:

A more independent description of beings could scarcely be found... During the period of their labor, they are nevertheless, conspicuous for a religious adherence to sobriety, water only being permitted to be taken on the excursion. But this over, a penance so mortifying is at once atoned for in weeks of continued drunkenness (45).

Turtlers would focus on both male and female turtles at the start of the

breeding season, when both sexes had a high quantity of fat. Towards the end of the season, males would lose most of their fat and would be selected less than the females who would retain their fat and through the entire season (Dampier 1697). After a successful season they would spend time catching fish for themselves and their families, and dispose of their considerable income with “an immoderate consumption of rum” (Henderson 1811). As briefly mentioned, the West Indian manatee was often caught in Belize waters (Dampier 1697; Exquemelin 1969; Henderson 1811), the meat of which was considered a delicacy that was “particularly admired” and “thought equal to the finest veal” (Henderson 1811). These sea cows were harpooned frequently by slaves of the settlement and the Miskito, all of who were “wonderfully dexterous” at spearing them. Supposedly the best part of the manatee was the meat of the tail, which was often pickled, and best eaten cold (Henderson 1811).

By the end of the 1790s, the expansion of turtling beyond subsistence, to an export industry is apparent by the rise of the hawksbill “tortoise shell” market in British Honduras. Hawksbill capture was “particularly desirable” and at this time almost 2,000 lbs. of tortoise shell were exported from Belize every year (Thomson 2004). In 1798, local victory at the Battle of St. George’s Caye ended the last attempt by the Spanish to force control over Belize. After the battle, a new phase of settlement began in which the population grew rapidly and settlement expanded on the mainland (Campbell 2003; Everitt 1986; Thomson 2004). Prior to this, St. George’s Caye was the capital and main hub of settlement in Belize. Most of the settlers lived on St. George’s Caye, while the “settlement at the mouth of the Belize River” contained the warehouses, docks and places

where the settlers would conduct business (Everitt 1986). After the Battle, the focus of settlement shifted to the mainland around what today is Belize City (Campbell 2003; Everitt 1986; Thomson 2004). A letter from Isaiah Simmins to the Superintendent in 1850 documents the movement of turtling from St. George's Caye to the mainland. In the letter, he states that he has been slaughtering cattle and turtle for 16 or 17 years, and that many of the kraals are in disrepair. He requests permission to erect a turtle kraal, 25x25 feet on the north side of Fort George, at the mouth of the Belize River (Belize Archives and Records Service, Belmopan, [BARS], Correspondence, Isaiah Simmins to Superintendent, 21 July, 1852, 39R287). Though there is evidence of market expansion to the export of tortoise shell, and the shift of the settlement to the mainland around the turn of the century, most turtlers at this time were likely employed in providing meat for the settlement. In 1806, Henderson reported that sea turtles were preferred by settlers and mostly eaten locally (Craig 1966).

At least as early as the 1830s, live green turtles were exported from Belize. This practice of shipping live turtles became well established by the late 1800s (Craig 1966).

According to Craig (1966):

Shipping turtles were carefully selected from immature green turtles weighing not more than fifty or sixty pounds. Special wooden tanks, each evidently having a capacity of three turtles, were built on the decks of large ships making scheduled runs to Great Britain. Pimm's Restaurant in London was the ultimate destination of many of these turtles which were sold at auction on the dockside.

In the late 1850s and early 1860s turtle meat must have been featured heavily at the market, as many market regulations were passed that mention turtle in reference to meat slaughter. Acts were passed that applied specifically to turtle (BARS, Acts, 19 Victoria Cap. 6, 23 February, 1856; BARS, Acts, 24 Victoria Regina, Cap. 9, 2 April, 1861). A

special allowance was given to turtle vendors that permitted them to keep up to 3 live turtles in a market stall, a provision that only applied to turtle vendors (BARS, Acts, 24 Victoria Regina, Cap. 9, 2 April, 1861). Around this time, Between 2,000 and 6,000 green turtles were exported from Belize and shipped live to the UK every year (Smith et al. 1992). In 1856, a market regulation was passed that prohibited people from slaughtering any turtle intended for sale anywhere except the market place (BARS, Acts, 19 Victoria Cap. 6, 23 February, 1856), then strictly the public slaughterhouse in 1861 (BARS, Acts, 24 Victoria Regina, Cap. 9, 2 April, 1861). A particular regulation from the same year prohibited anyone from throwing refuse, specifically “turtle-backs” into the river or from the wharves (BARS, Acts, 24 Victoria Regina, Cap. 9, 2 April, 1861). This could have been due to a variety of reasons, but it brings to mind an account by William Dampier that describes an instance when a large quantity of turtle remains had been thrown into a local lagoon along the Miskito Coast: “The consequence was that sharks and alligators swarmed to an incredible extent, and all our bathing and games in the water were put a stop to” (Dampier 1697). Around this time the Central American River turtle, known as the “hickatee” was also a popular choice for a meal. Though not a marine turtle, this inland river dweller has been called “a very delicious dish”. In high demand when it was available, the meat of these turtles would sell at market for up to \$4 per pound in 1925 (Metzgen & Cain 1925). These were being consumed back at least as early as 1800, and likely even at the earliest exploration of the mainland (Henderson 1811). In 1811, Henderson wrote of the hickatee: “though smaller than the sea turtle, are in no other respect inferior”.

The heavy exportation of green turtles must have had an impact on their

population, as exports began to decline and regulations for their protection began to be passed in the 1880s. The first major ordinance to regulate turtling was passed in 1881. The “Turtle Preservation Ordinance” regulated the “taking, capture of, or fishing for Turtle or Turtle Eggs within the jurisdiction of the colony”. The regulations made it unlawful to take turtles or turtle eggs on the shores or to set nets to catch turtles within 100 yards of the shore of the mainland or any of the cays. It also prohibited people from buying and selling turtles that weighed less than 30 lbs. Violators of the ordinance were subject to arrest and would have to appear before the Justice of the Peace, and pay a fine of up to \$25 or serve up to 2 months imprisonment. Nets and equipment would be seized, along with the captured turtles that were then to be released back into the water (BARS, Acts, British Honduras Legislative Council, Ordinance [O.] No. 16, 1881). According to the “1888 Handbook of British Honduras”, over 2,000 turtles were imported into British Honduras in 1887 in order to meet local demand (Bristowe & Wright 1889). Turtles were imported from Isla de las Mujeres, Cozumel, and Xacalak in Mexico. Bags of turtle eggs from the deserted coast of Quintana Roo were exported into British Honduras as well (Craig 1966). By the 1890s green turtle exports had decreased to 50-150 turtles annually (Smith et al. 1992).

In a 1918 letter to the Colonial Secretary, the District Commissioner of Orange Walk drew attention to the decline in turtle populations in British Honduras: “I call attention to this subject as it notorious that there has been a marked falling off, in the last ten or fifteen years, in the yield of fish and turtle in the waters of the Colony” (BARS, Minute Papers, Orange Walk District Commissioner to Colonial Secretary, 10 July, 1918, 2205-18). In 1926 the Turtle Preservation Ordinance was amended with stronger

regulations. It extended regulations to establish a closed season, prohibiting any turtle or turtle eggs to be taken during July, August and September, and increased the fine to \$100 (BARS, O. No. 16, 1881; O. No. 12, 1926). In 1928 the Ordinance was further amended to give the Governor, “by Order in Council”, the right to further establish any period when turtle and eggs could not be taken (BARS, O. No. 14, 1928).

As for loggerhead turtles, though they were not as highly prized as green and hawksbill turtles, were noted to be generally well liked by the inhabitants of the Bay of Honduras (Craig 1966; Henderson 1811; Metzgen & Cain 1925). Conflicting accounts from outside the Belize cayes, have suggested that loggerhead were not good to eat (Exquemelin 1969; Dampier 1697). Dampier claimed that the meat of these turtles was “very rank” and “seldom eaten but in case of necessity” (Dampier 1697), a contrast that draws attention to possible biases and differences of opinion held by individuals and groups of people when considering historic food preferences.

Despite the decline in green turtle population, hawksbill tortoise shell trade continued in Belize into the 20<sup>th</sup> Century (BARS, Minute Papers, James Brodie & Co., Ltd to the Colonial Secretary, 3 September 1918, 2678-18) (Metzgen & Cain 1925). The “1888-89 Handbook of British Honduras” featured an advertisement by the merchant W.G. Aikman that listed only two main examples of his exports: tortoise-shell and logwood (see Figure 11) (Bristowe & Wright 1889).

**W. G. AIKMAN,**  
**GENERAL MERCHANT AND COMMISSION AGENT.**

---

*IMPORTER OF EVERY DESCRIPTION OF*  
**BRITISH AND AMERICAN GOODS.**

---

*EXPORTER OF*  
**LOGWOOD, TORTOISE - SHELL,**  
**AND OTHER**  
*CENTRAL AMERICAN PRODUCE.*

---

**AGENT FOR**  
**THE JOSEPH SCHLITZ BREWING CO., Limited,**  
**MILWAUKEE LAGER BEER.**

---

*Town and Country Orders promptly attended to,*  
*and forwarded at the lowest Cash Prices.*

---

**BELIZE, BRITISH HONDURAS.**

Figure 11. Advertisement listing logwood and tortoise-shell (Bristowe & Wright 1889)

The trade in tortoise-shell declined slightly around the beginning of the 20<sup>th</sup> century due

to competition with imitation products. Businesses in Belize, in particular the firm of Melhado exported hawksbill shell, shipping mainly to firms in the UK (Craig 1966; Metzgen & Cain 1925). Over 4,000 lbs. of it were exported in 1919 in order to make “fancy goods” (Metzgen & Cain 1925). To put these numbers in perspective, a single hawksbill turtle was reported to have as much as three and a half pounds, and most commonly one and a half pounds of scutes on their carapace in the 17<sup>th</sup> century (Dampier 1697). By using Dampier’s ratio of shell weight per turtle, the amount of tortoise shell exported from Belize in 1919 alone would require the harvest of 1,000 to 2,500 individual hawksbill turtles. Hawksbill fishing occurred throughout Belize’s waters, but was concentrated in the southern cayes. According to Craig “substantial fortunes were made” in Belize when the market was expanding (Craig 1966). An account by William Dampier (1697) in the 17<sup>th</sup> century described the following:

I knew a man in Jamaica, that made 8 pound Sterling of the shell of these Hawks-bill turtle, which he got in one season, and in one small bay, not a half a mile long. When the turtle come ashore, the Man that watches for them turns them on their backs, then hales them above high-water mark, and leave them till the morning (105).

A good deal of the shell was used locally but the greater proportion was exported (Metzgen & Cain 1925).

Green turtle was by every account the most preferred for their meat, though opinions have differed on the preference for hawksbill and loggerhead turtles. References to hawksbill turtle meat have noted that it was eaten on the Miskito coast, less often than green turtles, but about as often as loggerhead (Nietschman 1972) and scarcely preferred in Belize (Craig 1966; Metzgen & Cain 1925). Dampier reported that their meat was “unwholesome” in some places, though “generally sweeter than loggerhead”

(Dampier 1697). As mentioned above, Dampier's opinion may have differed from that of the people eating loggerhead turtles in the Bay of Honduras. This could be due to a personal or cultural preference, or could be the result of a difference in meat quality depending on the location where the turtles were feeding. Dampier noted hawksbill meat was good or bad depending on the type of food they were eating. Those that fed on grass were "sweeter", while those that ate seaweed and fed "among rocks" were not very good (Dampier 1697). This could have been the case with the ones that would feed on such animals as jellyfish and sea urchins (Bjorndal 1995) among the Belize barrier reef. Hawksbill meat could be bad enough that Dampier wrote that they "In some places are so unwholesome, causing them that eat them to purge and vomit excessively" (Dampier 1697). Likewise, those that spent times among rocks had lesser quality shells because they would be taken over by barnacles (Dampier 1697).

#### Recent Turtling in Belize

Local Belizeans today who were around when the Belize turtle fishery was active have attested to turtling along the coast, and remember seeing turtle meat on sale at the local market (Trevor Roe, personal communication 2014; John Searle, personal communication 2014). For this thesis, it was important to understand the ways in which sea turtles were processed, in order to understand what characteristics of historically discarded turtle bone on St. George's Caye can tell us about the activity of historic occupants. I have been told that the common way to butcher a sea turtle was to cut the underside of the shell, called the plastron, away from the body. It was then discarded, and the meat removed (Trevor Roe, personal communication 2014; John Searle, personal communication 2014). Turtles were often butchered, and sometimes the meat was

thrown back into the giant bowls of their empty shells and cooked into soup. The front and hind flippers were often eaten (Chester Baptist, personal communication 2014; John Searle, personal communication 2014) and I have been told that these parts were often cooked into soup and eaten as an aphrodisiac (Chester Baptist, personal communication 2014). In 2001, Searle reported that green turtles were still preferred for their meat over hawksbill and loggerhead turtles.

In 1966 Alan Craig documented the still active turtle fishery in Belize. At that time, he writes that there are no more than a “few dozen” people in Belize who “have retained the lore and skills necessary to capture these animals”. The decline in activity was due to a “general scarcity” of turtles along the coast, and he tells us that loggerhead turtles were the most abundant compared to the green and hawksbill turtle and were the most commonly pursued (Craig 1966). This was likely due to the preference of the other two species over the loggerhead. By the time of Craig’s observations, harpoon use had almost disappeared in favor of the use of nets, and turning over turtles on the beach was seldom practiced. Nets were used widely from Ambergris Cay southward to Punta Gorda and were most commonly hung over the reef, where loggerheads feed on crustaceans, with one end anchored and the other afloat. A wooden decoy was attached to the net, and according to Craig large male turtles would charge these decoys during the March/April breeding season, or attempt to mount them, and become entangled. From June to July, during the nesting season, turtle nets were placed a short distance offshore from nesting beaches. Turtle kraals had almost ceased use completely by the time he conducted his fieldwork, due to the diminished market demand (Craig 1966).

According to Searle (2001), by 2001 demand for turtle meat in Belize had

decreased dramatically, and was not eaten by much of the Belize's youth. For the Creole and Garifuna cultures, sea turtle capture and consumption has been "an important part of their culture, and as such they are reluctant to give it up" (Searle 2001). In spite of the preference for turtle meat by some, Belizeans have been actively involved in sea turtle conservations. In 1977 the Belize Fisheries department enacted further regulations on turtle capture, and organizations have been monitoring the turtle population, including their nests, through surveys since 1998 (Searle 2001). In 1992 the Sea Turtle Recovery Action Plan for Belize was drafted in order to outline management needs and suggested actions for sea turtle conservation in Belize waters (Smith et al. 1992). The International Union for the Conservation of Nature (IUCN) has classified loggerhead and green turtles as endangered, and hawksbill turtles as critically endangered. As of 2002, all sea turtle species have full protection in Belize waters (Coleman & Majil 2012; McManus & Lacambra 2012), though illegal capture of turtles continues to this day (Trevor Roe, personal communication 2014; Linda Searle, personal communication 2015).

#### **4. A BACKGROUND OF ARCHAEOLOGICAL INVESTIGATIONS ON ST. GEORGE'S CAYE**

The St. George's Caye Archaeology Project

Archaeological investigations on St. George's Caye, led by Dr. Jim Garber of Texas State University, began in 2009 and have run each year consecutively up to the present completion of this thesis (Garber 2010, 2011, 2012, 2013, 2014, 2015). Intrusive excavations, testing and survey have been conducted throughout the majority of the known historic extent of the island. Excavations have mostly been focused within the confines of the cemetery, though several excavation units have been placed elsewhere throughout the island (Garber 2010, 2011, 2012, 2013, 2014, 2015). Much of the research previously conducted on St. George's Caye has concerned the logging industry and the cemetery burial complex of the island's cemetery (Elverson 2013; Garber 2010, 2011, 2012, 2013, 2014, 2015; Springs 2012). Two previous theses have been written on the Cemetery, one by Lauren C. Springs (2012) on the analysis of human skeletal material and the other by Matthew T. Elverson (2013) concerned the cemetery's internment traditions. This thesis does not include any analysis of burial components, but includes an analysis of the faunal material, which has been recovered in most of the investigated areas throughout the island, including the cemetery (Garber 2010, 2011, 2012, 2013, 2014, 2015). For background on this research project, these areas that have contained faunal bone will be discussed in the following section as it relates to this investigation.

Faunal remains have been recovered in most areas across the island, and throughout most of the stratigraphic layers where other cultural material is present. Much

of the distribution of the faunal material present on St. George's Caye has been disturbed by the many hurricanes that have struck the island throughout its history. Hurricanes that have struck in recent history include the 1931 Hurricane, Hurricane Hattie in 1961, and Greta in 1978 (Garber 2009) (see Figure 12).

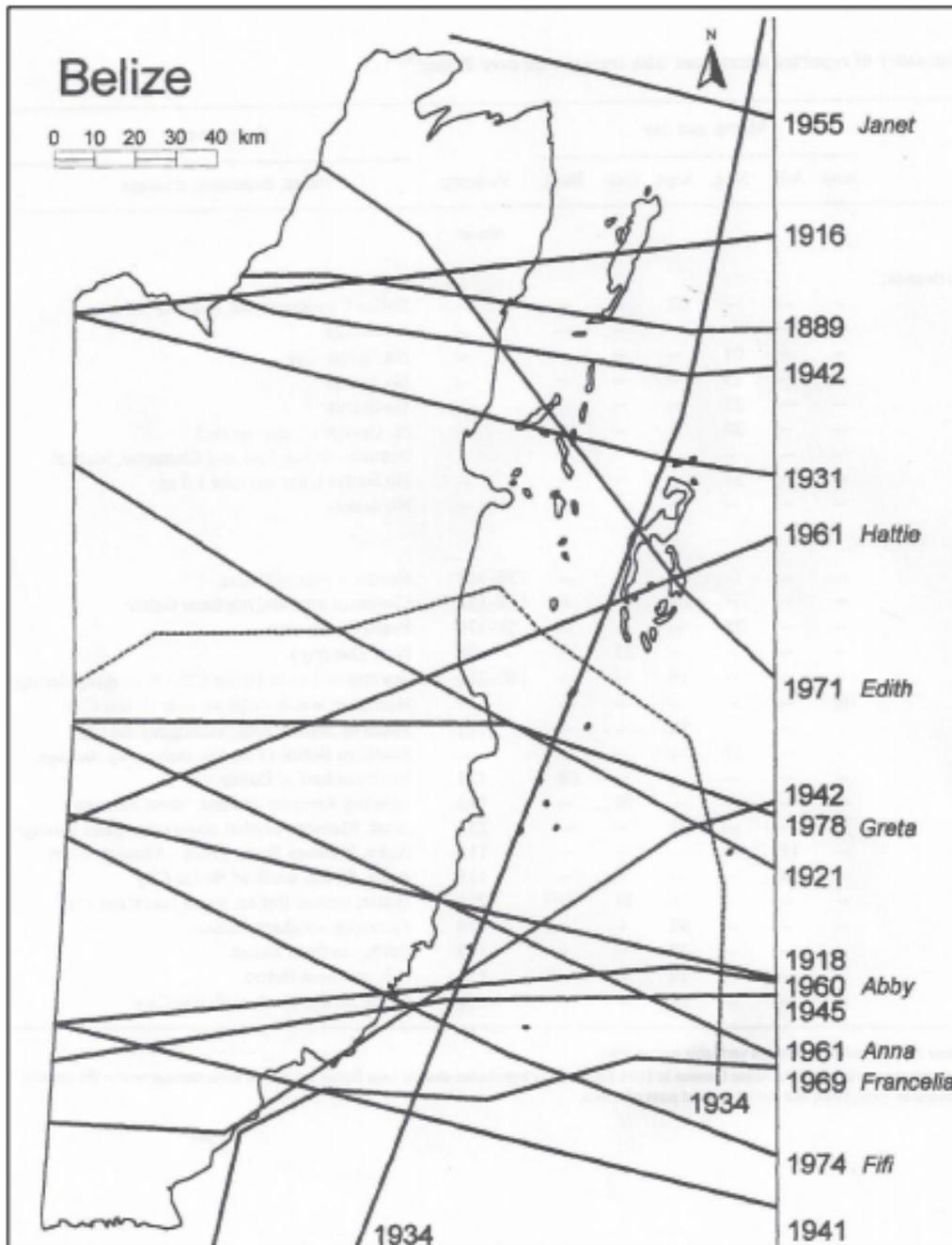


Figure 12. Paths of historic hurricanes that have hit Belize (Weaver & Sabido 1997)

These have altered the location of cultural material both horizontally and vertically across St. George's Caye. The disturbance ranges in its severity. Some material appears to be in place and only slightly affected by these processes, while others are highly disturbed. In many instances modern refuse such as hard plastic and screw top bottles have been directly located alongside historic artifacts (Garber 2010, 2011, 2012, 2013, 2014, 2015).

Due to the low elevation of St. George's Caye, its ground surface rises slightly above sea level. Almost the entire island has been filled with dredged sand from beneath the surrounding waters. This fill is very distinct when encountered, and consists of a conglomerate of fine clay, medium sand, micro marine shell fragments and large portions of marine shells (see Figure 13). It has been encountered across the island in all terrestrial excavation units and shovel tests, with the exception of some units within the cemetery. A thin layer of it is present slightly below ground surface in some areas of the cemetery. Shovel tests along the east shore, and areas north of the current Fuzy and Hunt (adjacent north of the Fuzy lot) properties have dredge fill that extends over one meter beneath the ground surface.



Figure 13. Excavation unit on the Fuzy property with white fill sand in upper layer

The island has been periodically filled with dredged sand due to inundation as a result of erosion caused by hurricane storm surges (Garber 2010). Without periodic filling, much of the island might be reduced to a submerged sand bar, a sandy shoal or a mangrove swamp. The cayes that immediately surround St. George's Caye, specifically Frenchman's, Hick's, Montego, and the Drowned Cayes, are made up almost entirely of mangrove swamp. Most historians primarily discuss St. George's Caye in reference to the early occupation of the Belize Cayes by English buccaneers, but it is likely that many of the swampy islands that exist there today were habitable at that point in time. At this point, it is hard to determine. These mangrove swamp cayes could have shown up in recent history, or could have been dry sandy islands in the early days of English settlement that were frequented by pirates, log cutters, turtles and turtles alike. Just as well, those that were often frequented could be nothing more than a raised bed beneath

the seafloor today. As Johnson put it: “some of them that have been within continual View... are observed within our Time, to be entirely wasted away and lost, and others daily wasting” (Johnson 2014: 46).

#### A Method For Excavation Below the Water Table

The water table does not sit far beneath the surface of St. George’s Caye, a result of its low elevation and proximity to the sea. During excavation, water is generally encountered 30 to 50 cm. below surface. A high water table incorporates a visual obstruction into excavation and physically inhibits efficient and easy soil removal from a buried object. This is especially difficult when trying to uncover and view artifacts in place, such as faunal bone and human burials. To properly conduct and record investigations it was necessary to develop a system to reduce the water table during excavation because most of the historic material that has been recovered throughout the course of this project was encountered below the water table (Garber 2010, 2012, 2012, 2014). As human burials account for the deepest cultural deposits, all of them have been encountered buried completely beneath the level of the water table.

To lower the water table, we use a Honda trash pump model WT30 (see Figure 14). This particular model has a self-priming feature that allows it to reduce power and keep its prime once the water table has been reduced at or below the level of its intake nozzle. A model without this feature would lose its prime and shut down after it reduces the water table so low that it begins to suck air into the intake. This particular model has a 3-inch suction and discharge ports, through which it removes and expels 317 gallons per minute (Honda 2015). Over the course of the project, we have continued to modify the technique to pump water during excavation and over the last three field seasons we

have settled into a technique that can lower the water table below the deepest cultural deposits on St. George's Caye fairly efficiently. This technique could be helpful for the recovery of material in a similar environment, so I will describe it here.



Figure 14. Honda trash pump in use at the St. George's Caye Cemetery

To do this, we dig a hole in the sterile back dirt of a former excavation unit adjacent to the new unit that we intend to excavate. The pump hole should not be smaller than 1x1 meters to prevent the undisturbed sand around the rim of the hole from collapsing into it. The hole should be excavated slightly below the deepest level that is intended for the new excavation unit. During excavation of the pump hole, digging will certainly continue beneath the natural water table before the pump is introduced. Once the water becomes an obstruction to shoveling dirt out of the pump hole, the end of the intake hose can be submerged, and used to reduce it to a manageable level. Once the

proper depth of the base of the hole has been reached, a synthetic pipe, approximately 4 feet long and 4 inches in diameter, is inserted vertically into the middle of the hole (see Figure 15). The pipe will serve as the main port through which to insert the intake hose during excavation. It allows the hose to reach a considerable depth into the sand that would be difficult to reach with the use of a shovel alone. It is helpful to attach a rope handle to the upper end of the pipe before submerging it, in order to facilitate its removal later on. The pipe should also be drilled with one to two inch holes throughout all sides of the lowest one-third portion of the pipe.



Figure 15. Pump intake hose with the vertical synthetic pipe

To insert the pipe into the sand, we start by digging a deep depression in the center of the base of the pump hole as deep as possible with a shovel. The pipe is then shoved vertically into the center of the hole by hand and firmly rotated back and forth to

insert it as deep as possible. The pump intake hose is housed with a cage on the end of the nozzle to keep out large obstructions from entering the pump. This cage is removed, and the intake hose is then inserted vertically through the pipe and into the sand at the bottom, while the pump is turned on and pumping. This allows it to quickly remove sand through the bottom of the pipe and open up space beneath it so that it can be inserted deeper into the sand. Ample pressure on the top of the pipe is required in order to allow it to sink while the sand is removed beneath it. It is important not to insert the intake nozzle directly into the sand, because this can cause the pump to intake too much sand at once and clog. A steady up-and-down motion against the sand is the best approach that we have found to avoid this. Large bivalve shells will often clog the intake without the filter cage on the end. The pump then has to be cut off, and the intake cleared before proceeding. It is ideal to insert the pipe deep enough so that about 6 inches of its upper end protrude out of the sand. It's best to insert the pipe deep enough to allow water to steadily flow over its top after the water table has been reduced to its lowest level for the purpose of the excavation, while not inserting it so deep that sand can flow over the top and into the pipe.

Preventing collapse of the soft sand surrounding the hole is the biggest challenge of this process. The fast flowing water into the intake will steadily erode the sidewalls of the pump hole and carry sand towards the pipe. This often happens, and will form caverns into the sidewall that can cause sand and ground surface to collapse from above the bottom of the hole. Collapsed sand can be a big problem as it can cover the intake pipe and send additional sand into the pump and slow the pump's rate of water extraction. Sandbags have been used in the past to barricade the eroded walls and prevent collapse.

A good technique is to dig the center of the hole out additionally around the base of the pipe and then barricade this area with a circle of flexible sheet metal (see Figure 16).



Figure 16. Pump intake hose with sheet metal support

### Intrusive Investigations

During the seven field seasons on the caye, most excavations have been performed within the confines of the cemetery (see Figure 17). The St. George's Caye Cemetery is the oldest non-Maya historic cemetery in Belize, and its use dates back to at least as early as 1787, which is the earliest recorded date from grave marker inscriptions in the cemetery (Garber 2010). A lower level of burials is suspected to date to the early or mid 1700s. A total of 48 excavation units of various sizes have been placed

throughout the cemetery on an organized grid aligned with the west cemetery wall. Excavations have been conducted throughout most of the cemetery over the course of the project. They have tended to focus on one or two specific areas during each single field season, and through time have spread to distribute investigations throughout most of the cemetery (Garber 2010, 2011, 2012, 2013, 2014, 2015).



Figure 17. The St. George's Caye cemetery

Human burials have been recovered throughout all areas of the cemetery roughly 70-100 cm below ground surface. Faunal remains have been recovered throughout all areas of the cemetery from roughly 10 cm below surface to slightly above burials. They occur at a greater density between 30-70 cm below surface. These bones have been recovered in association with historic artifacts (see Figure 18) and above human burials with a clear distinction between their deposit and that of the burials. In rare cases of

extreme disturbance in the cemetery, some faunal remains have been found intermixed with human bone that has been dislocated from its intentional placement during the initial burial (Garber 2011, 2012, 2013, 2014, 2015). In other cases, faunal remains have been recovered alongside human burials that are only slightly out of place. Despite the physical association between faunal and human bone in the cemetery in these rare instances, it is unlikely and difficult to determine if, and in which cases, faunal remains were intentionally deposited along with a human burial for religious symbolic purposes. In some cases modern garbage, specifically a screw-in light bulb and a black trash bag have been recovered directly on top of, human bone (Garber 2015).



Figure 18. Faunal remains (upper right) in association with historic bottle glass

Differences in the artifact assemblage have been encountered in cemetery excavations. Throughout the cemetery, the assemblage consists primarily of historic

animal bone, bottle glass, brick, ceramic, ceramic smoking pipes, bone buttons, etc. Excavation units placed along the west cemetery wall have produced a higher concentration of these artifacts, as well as additional items that are unique to this particular region of the cemetery (see Figure 19). This area has yielded a number of military buttons of the British West India Regiments, as well as several gun flints and historic firearm hardware (Garber 2010, 2011, 2012, 2014) that suggests this area was in use by the West India Regiments that were stationed on the island at the turn of the 19<sup>th</sup> century (Everitt 1986).



Figure 19. Previously excavated area along the rear/west cemetery wall

Though it is difficult to determine the depositional context of much of the animal bone in the cemetery due to disturbance, there is at least one instance in which it might be preserved close to its original context. During the 2012 field season, Feature 1 was discovered along the west wall of the cemetery (see Figure 20). This feature consisted of a dense concentration of historic artifacts that included heavily patinated bottle glass, queen conch shell fragments, ceramic sherds, and various animal bones. It was ovular in

shape, extending parallel to the cemetery wall, and measured 2.38 by 0.75 meters. Additional historic artifacts were loosely scattered around the periphery of this concentration (Garber 2013). This dense concentration is unique in the artifact distribution of the cemetery, and no other such feature has been discovered so far on this project.



Figure 20. Feature 1

The soil in the cemetery is fairly consistent throughout with some slight variation. Generally, there is a thin humic layer with dark sand, followed by a thin layer of clay (Garber 2010, 2011, 2012, 2013, 2014, 2015). This clay is likely the result of a hurricane storm surge that carried the clay from the bay area on the west side of the island and deposited it on the surface (Elverson 2013). Following this is a brown layer of coarse sand with micro marine shell inclusions. This layer contains the bulk of historic artifacts, which includes the animal bones. Beneath this layer is one of white medium-course sand

with a high proportion of micro marine shell inclusions. This layer contains all of the human burials and is almost always sterile of artifacts outside of the burials (Garber 2010, 2011, 2012, 2013, 2014, 2015).

Shovel testing in 2012 revealed animal bone and other historic material on the Habet property south of the cemetery (Garber 2013). Excavations followed the next year in which a high quantity of animal bone was recovered alongside historic ceramics and bottle glass roughly 23 to 85 cm. below surface (Garber 2014). In 2010 and 2012, excavation units were placed on the south side of the Fuzy property, which is adjacent and north of the cemetery. Two 1x1 meter units were spaced apart to test the area in 2010. These two units produced quite a bit of animal bone, some with butcher marks, and also contained various historic artifacts. In 2012 a 2x2 meter excavation unit was placed on the Fuzy property just north of the north cemetery wall. The stratigraphy in this unit differed from that inside the cemetery wall with multiple clay and sand layers that were not present in the cemetery (Garber 2010, 2011, 2012, 2013, 2014, 2015). No burials were recovered outside of the cemetery, and historic material was present at a slightly less dense deposit compared to the deposit inside the west cemetery wall (Garber 2013). A series of systematic shovel tests were placed across the Fuzy property and continued north to the Codd property. Each test was approximately 30 cm in diameter and was excavated to a depth of 80-100 cm. below surface. Shovel tests were organized along parallel rows that were placed ten meters apart, and individual tests were established in 10-meter intervals from the east shore to the west. Historic artifacts, including animal bone were recovered throughout the Fuzy property, particularly concentrated to its east side, and extended into the south portion of the Hunt property,

adjacent to the north of the Fuzy lot (Garber 2013).

### Stable Isotope Analysis

A study by Prince and Bartelink (2014) examined the stable isotope signatures of individuals recovered from the St. George's Caye cemetery. Stable isotopes, extracted from the bone collagen and apatite of skeletal remains, have specific carbon and nitrogen signatures that are characteristic of specific types of plants and animals that the person has consumed. By effect, these samples can be analyzed in order to ascertain the contribution of types of flora and fauna in an individual's diet (Bogaard & Outram 2013; Prince & Bartelink 2014; Renfrew & Bahn 2012). Stable carbon and nitrogen isotope signatures can provide information on the individual's diet from the last 10-15 years of life (Prince & Bartelink 2014). The results of this study, when compared to the faunal analysis, can give us clues about the relationship between the deposited faunal material on the caye, and the people buried in the cemetery.

Prince & Bartelink (2014) concluded that the main contribution to the diet of individuals in the cemetery was terrestrial mammal protein with some signatures of fresh water species as well (see Figure 21). Marine animals did not play a primary role in their dietary protein intake. Two individuals have signatures that correspond to a diet primarily of marine protein, and three others have indications that both marine and terrestrial animals were primary contributors. However, they point out that these results are cloudy due to similarities in the signatures of marine animals and certain terrestrial animals of Belize (Prince & Bartelink 2014).

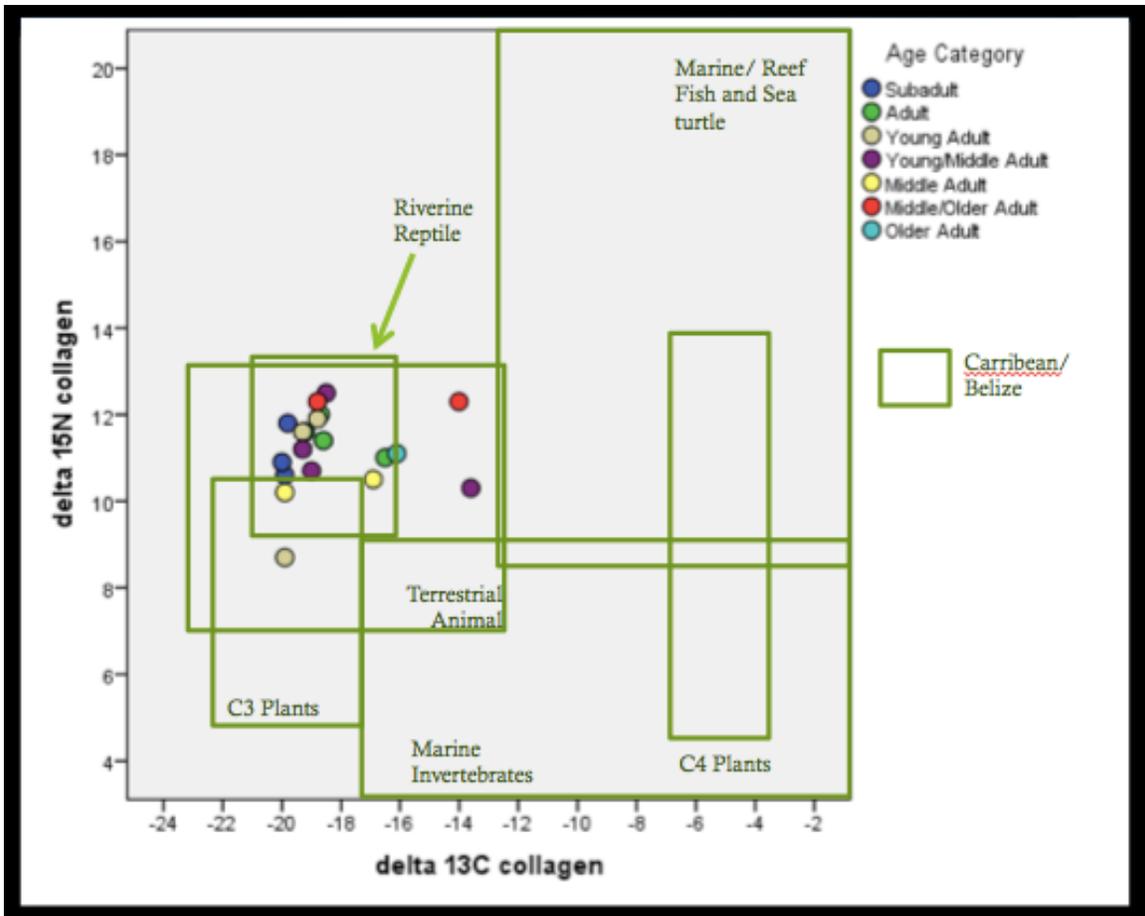


Figure 21. Results of the stable isotope analysis for the St. George’s Caye cemetery (Prince & Bartelink 2014)

## **5. LOCATING HISTORIC DOCKS AND CORRALS WITH ARCGIS**

The first step in the investigation of the four turtle corrals on the 1764 map was to attempt to discover their locations along the coast of St. George's Caye. To do this, I wanted to be able to reference their possible locations to current physical space on island. To do this, I created a map through ArcGIS that includes current satellite imagery of the island with these relevant historic locations shown on the map. We could then potentially locate these historic features for investigation. In addition, I thought it would be beneficial to include spatial information on the map that indicates areas where faunal bone has previously been recovered in shovel tests. These locations could provide potential areas where additional terrestrial intrusive tests could be placed in order to recover additional faunal remains.

The software that I used for this operation was ArcGIS 10.1 by Esri (Esri 2012). The software enabled me to upload both historic and current maps, overlay them, and georeference their location so that coordinate data could be transferred onto the map. I accomplished this by using the georeferencing and editor functions along with the "Convert Map to KML" tool in ArcMap.

My data for this project included current satellite imagery of St. George's Caye, the 1764 historic map of the island, and GPS coordinates gathered from field excavations. I used 2011 satellite imagery from Google Earth as my base layer and transferred it into ArcMap in .jpeg format. The Google Earth data was projected in WGS 1984 UTM Zone 16N. Because of the close detail of Google Earth imagery and its recent date of 2011, I would trust the accuracy of the imagery as a reference to the actual physical form and appearance of the island. I chose Google Earth imagery to use for this project because it

was the most detailed imagery I found that was available for this area.

The 1764 map was originally produced by a visiting Spanish emissary and was later reproduced in Alan Craig's (1966) "Geography of Fishing in British Honduras and Adjacent Coastal Waters". I obtained the 1764 map file from:

<http://www.stgeorgescayebelize.org/maps.html>, the website maintained by the St.

George's Caye Village Council. The physical map is held in Spanish archives and is inscribed with "Cartografia de Ultramar (Madrid), ANON. Map-1780" on the bottom

(see Figure 3). GPS coordinate data for the previously excavated shovel tests on St.

George's Caye, was taken on site using a Garmin handheld GPS and used a WGS 1984 datum.

I approached the use of the historic map with caution because historic maps that predate the use of satellites and computer mapping systems tend to have some degree of inaccuracy. In addition, comparison of the 1764 map, a map created in 1945 (see Figure 22) and current satellite imagery indicates that this island has undergone changes in its form over the years. This is to be expected due to hurricanes that came through the area and altered the island through heavy erosion and deposition. Over the years, parts of the island have been removed by storm surges, others have been added to by dredged sand (Garber 2010), and as a result some of its physical features have been distorted.

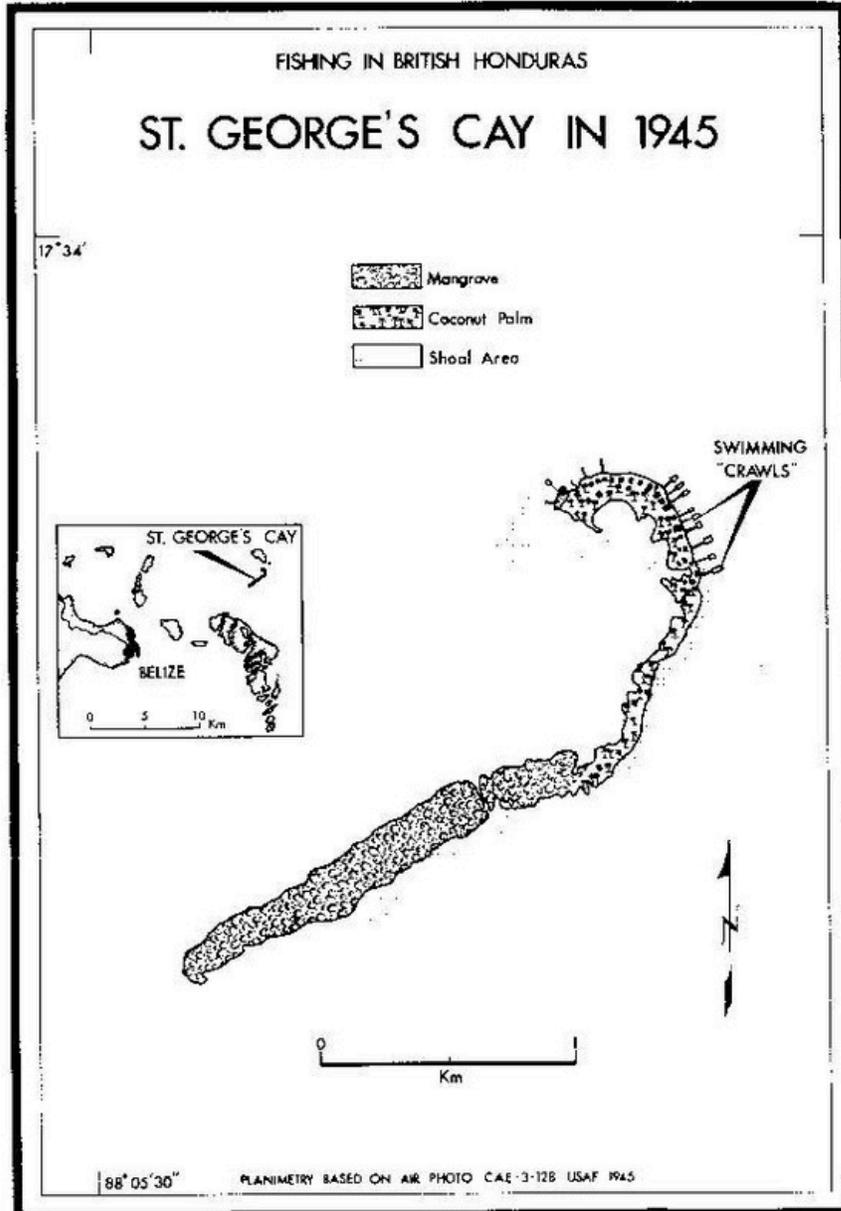


Figure 22. 1945 map of St. George's Caye (Craig 1966)

By comparing an aerial photo taken in 1978 (see Figure 23) with current satellite imagery (see Figure 24) we can see the effects that these processes have had on the form of the caye. In Figure 23, at least three channels are present that cut through the island laterally. One of them is present on the north end of the island in Fisherman Town, another alongside the Mistre property and the third through the edge of the cemetery.



Figure 23. 1978 aerial map of St. George's Caye showing hurricane channels (St. George's 2015)



Figure 24. Current satellite imagery of St. George's Caye (Google 2015)

I first transferred the 1764 map and the current Google Earth image of the island

into .jpeg format and transferred them as individual layers into ArcMap. I then used the “georeferencing” function to connect the 1764 map to the satellite image. To do this, I placed the satellite image above the 1764 map and adjusted the transparency so that the black outline of the 1764 map was visible. I then used georeferencing to create links from the historic map to the satellite image. I created three links that connected the map and used matching contours in the island’s shape as anchor points to connect the two layers. The new layer that resulted from the two combined was exported in .jpeg format (see Figure 25). This image was used along with Google Earth to gather approximate coordinates for the historic locations of the two docks and the four turtle corrals.



Figure 25. Overlay of current satellite imagery and 1764 map of the Caye

In ArcCatalog, I created three new shape files: one for the historic docks, a second for the turtle corrals and the third for the locations of shovel test pits that contained animal bone. I researched the projection used for Belize in Google Earth and found it to

be projected in WGS 1984 UTM Zone 16N. I then set the new shape files to this same projection. Back in ArcMap, I used the editor function to create polygon features for the turtle corrals and the docks. I input the coordinates that I gathered from Google Earth to establish the vertices. I then created point features for the shovel tests that contained turtle bone and input the GPS coordinates for their locations. I used the conversion tool “convert map to KML” to create a KML file from the three shape files on the map (see Figure 26). I opened this newly created KML file in Google Earth and inspected it against the original layer with the two maps overlaid. I adjusted the vertices of each feature to correct any inconsistencies between the KML shapes and the historic features on the 1764 map. I also slightly expanded each feature to compensate for inaccuracies in the both 1764 map and the operation. After this, I adjusted the transparency on the features to display what was underneath on the satellite imagery and created a final KML file that I reopened in Google Earth (see Figure 27).

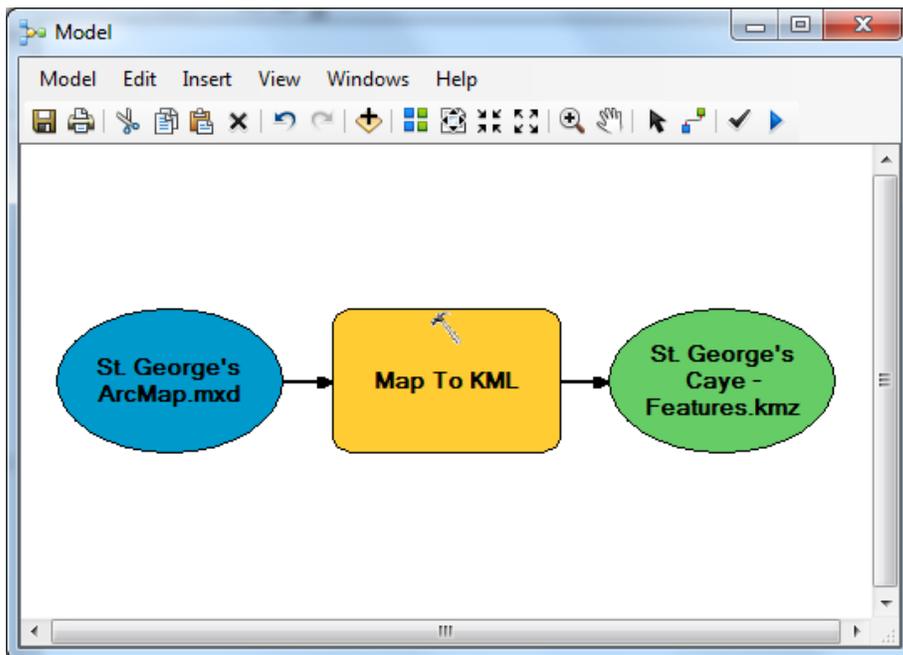


Figure 26. Model created in ArcGIS to convert shape file to KML



Figure 27. Predicted locations of historic docks (red) and turtle corrals (green) over satellite imagery

Afterward, I transferred this image back into ArcMap and used it to create the final map.

The final map depicts the predicted locations of the historic turtle corrals in green, the docks in red and the shovel tests where animal bone was previously recovered in yellow. Each of these features was given a title with a letter and number designation. Turtle corrals are labeled with “TC” for turtle corral and docks were labeled “D” for dock. The transparency of each of these features was set to 50% so that the imagery underneath them is visible. The final map includes an inset of the island’s location in relation to Belize City (see Figure 28).

## Turtle Corrals on St. George's Caye



Figure 28. Final map with historic docks and turtle corrals indicated

In comparison of the 2011 satellite imagery and the 1764 map after the overlay it is evident that there are inconsistencies between the two maps in the island's shape. This

was to be expected due to inaccuracies in historic cartography and the tendency of small islands to change form due to storm erosion and intentional dredging by island inhabitants in an effort to both restore and create dry ground on the island. In addition, I expect there to be inaccuracies in the precise size and locations of the turtle corrals and docks indicated on the 1764 map. In light of this, I slightly expanded each of these features in order to compensate for possible inaccuracies. What appears on the map are estimated areas for these historic features, and the accuracy of this overlay operation can only be confirmed by testing in the field, which will be discussed in the next chapter.

## **6. OFFSHORE TESTING ALONG THE ST. GEORGE'S CAYE COAST**

The summer 2014 field season included offshore survey that involved shovel testing in shallow water along the coast of St. George's Caye. The main goal was to test the predicted locations of fractures depicted on the 1764 map of the caye and to recover marine turtle bone contained within these areas. A series of 24 offshore shovel test pits were implemented in order to test the locations of the two docks and four turtle corrals that were predicted in the previous chapter (see Figure 29). The test pits were dug in roughly waist to chest-deep water and the matrix was water screened using a box screen with ¼ inch steel mesh. Test pits were titled "OT" for Offshore Test and assigned a number chronologically. Offshore tests were placed systematically within the predicted boundaries of the historic features in order to recover historic artifacts, primarily marine turtle and other faunal remains. The goal was to test the presence and absence of artifact and faunal remain deposits across the predicted boundaries of the historic docks and turtle corrals in order to determine the accuracy of the map overlay. This included the placement of multiple test pits outside of the proposed locations in order to accurately narrow the locations of historic cultural deposits and compare them against the proposed outlines of the feature locations.

The results of these tests varied with each dock and turtle corral. Historic artifacts were present at every location, and some of the material aligned with the proposed location, and others did not. GPS coordinates were taken for each offshore test pit and these were plotted on the map (see Figure 30). Test pits that did not produce any historic cultural material are labeled as negative tests. The offshore test pits that did produce historic artifacts and faunal material are labeled as positive tests. A description of the

area tested in and around each proposed turtle corral follows below.

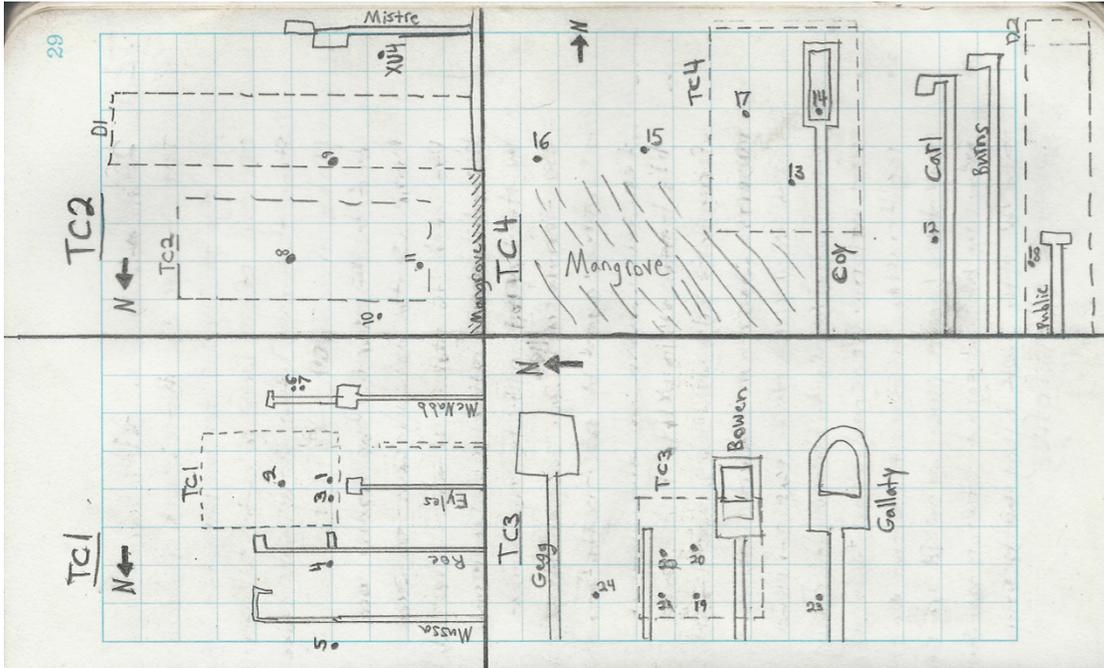


Figure 29. Offshore testing sketch map with OT numbers indicated

# St. George's Caye: Offshore Test Results

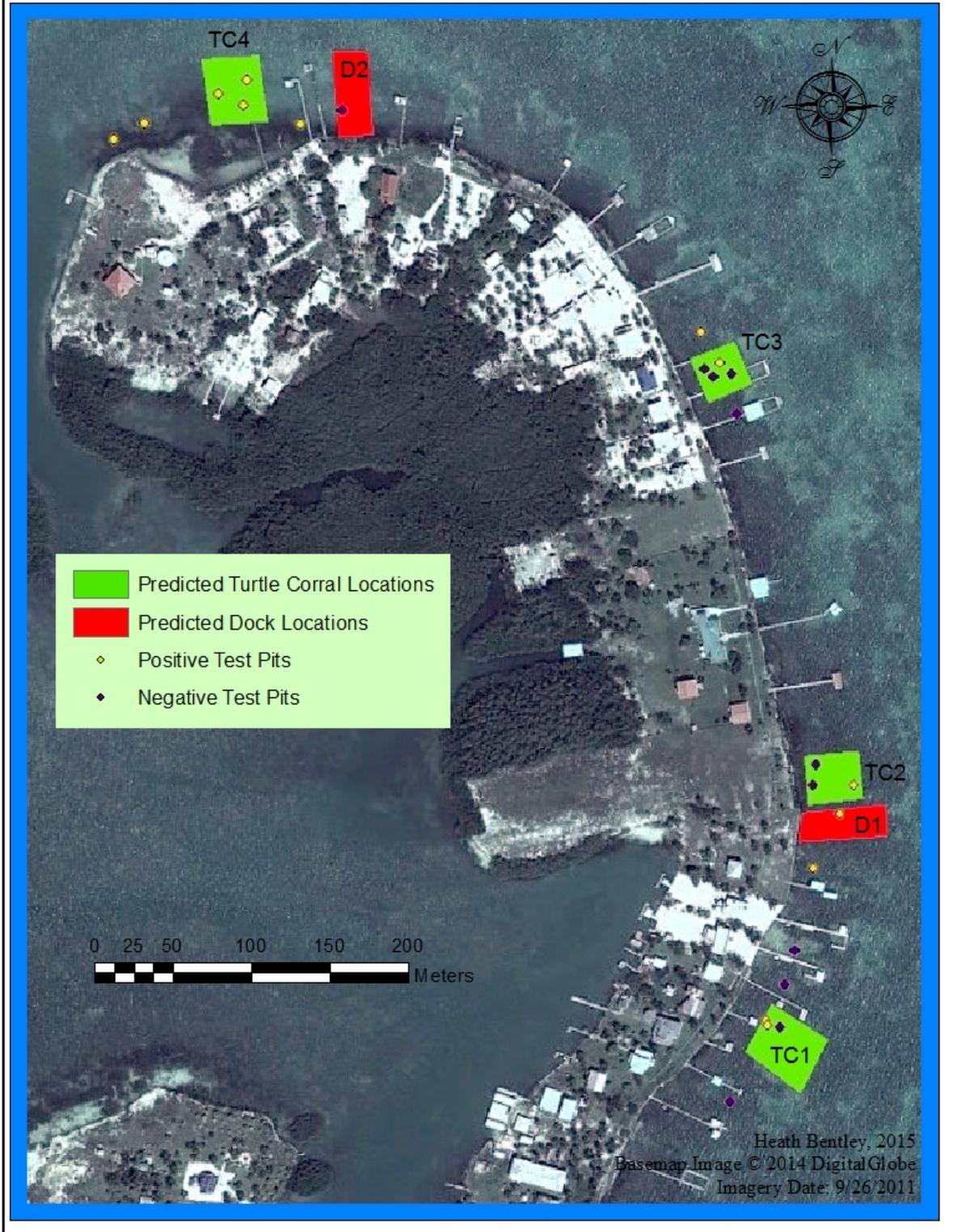


Figure 30. Offshore test results

## TC1

TC1 is the most southern of the historic corrals shown on the 1764 map. It is located in the area between the Roe, Eyles and McNabb docks (see Figure 31). Three test pits were placed within the boundaries of the proposed corral and four addition tests were placed outside of it in order delineate the feature. In comparison to the three other corral locations, the highest quantity and concentration of marine turtle and other faunal remains was recovered from within this proposed corral. All of this material came from two test pits placed east of the end of the Eyles dock. All units placed outside of the boundaries of the predicted corral produced no significant cultural material and were counted as negative tests. The seafloor consisted of a thick bed of turtle grass, the roots of which extended through the upper ten centimeters of matrix. This zone was composed of white sandy clay. Immediately below this area, the matrix changed to white sand with an estimated 60% micro marine shell inclusions and continued through beyond the termination of each test pit. All historic material was recovered from throughout this lower zone. A further description of the results of each individual test will follow.



Figure 31. Testing the location of TC1

OT1 was located 3.39 meters east of the end of the Eyles dock (see Figure 32). This was an approximately two by five meter test pit that extended roughly 37 cm. below surface. A high quantity of 199 individual pieces of marine turtle bone were recovered from this pit. Some of the turtle bone was large in size and composed the greater majority of the animal bone recovered from this pit. This was the highest concentration of turtle bone found in any of the offshore tests thus far (see Figure 33). Various other fragments of animal bone were recovered. Other material included: two ceramic pipe bowl fragments, one additional pipe bowl with a maker's mark, ceramic pipe stems, a few large pieces of non-native stone that was likely ship ballast, a historic glass bottle neck, a partial black ceramic dish with a foot (see Figure 34), a metal bolt, three wire nails, a high quantity of other metal fragments and green glass shards. According to the

map overlay, the location of OT1 would be on the inward edge of the historic turtle corral. During excavation three wood pilings, each approximately two to three inches in diameter were recovered. Due to the continued use of this area of the island, and the regular rebuilding of docks throughout the island's history it is difficult to determine whether or not these pilings are the remains of the turtle corral or a separate, previously existing dock. Due to the disturbed nature of underwater remains, and the lack of a reliable dating method, it is difficult to estimate the age of the wood recovered. However, the location of these pilings along with historic cultural material suggests that they could have belonged to the same structure. OT1 was terminated due to time constraints, though it continued to produce historic material.



Figure 32. Testing OT1 (foreground) and OT2 (top)



Figure 33. Sea turtle bone recovered from OT1. Larger pieces on the surface were identified as green turtle remains (U.S. silver dollar for scale)



Figure 34. Partial ceramic footed vessel recovered from OT1

OT2 was placed roughly 19.8 meters south of the Roe dock and 18.4 meters east of the end of the Eyles dock. This circular pit was 1.03 by 1.13 meters in diameter and extended down 40 cm. below the surface of the sea floor. No faunal material was recovered from this test. A moderate amount of unidentifiable metal fragments were recovered throughout. A steel pin and a section of a wood piling were recovered roughly 30 cm. below ground surface. A shard of modern glass was recovered at the bottom of this pit and it was terminated and counted as a negative test.

OT3 was a 1.93 by 1.19 meter test pit was placed north of OT1, 3.96 meters northeast of the Eyles dock. It extended down 47 cm. and produced the second greatest quantity of marine turtle bone of all the offshore test pits, with 91 individual identifiable pieces. Other identified specimens of animal bone were recovered as well, which will be discussed in the next chapter. Other material recovered included: wood piling segments, one steel bolt, one ceramic pipe stem, two historic ceramic sherds, a moderate quantity of unidentified metal fragments, two modern glass shards and an aluminum Schlitz beer can. Modern and historic material was dispersed and intermixed throughout the depth of the test pit and the presence of material continued until its termination. This test was abandoned due to time constraints.

OT4 measured 51 by 96 cm. and was established 2.31 meters north of the Roe dock outside of the TC1 boundary. It extended down for 54 cm. and no cultural material was recovered so it was counted as a negative test.

OT5 was a 91 by 172 cm. test pit was placed 4.67 meters north of the Musa dock, outside of the TC1 boundary. It extended down 46 cm. below ground surface and included the recovery of two small, unidentifiable bone fragments, 10 pieces of modern

window glass, two fragments of unidentifiable metal, a modern ceramic plate sherd, a ceramic pipe stem and a modern beer can. All artifacts were intermixed and this unit ceased to produce artifacts at its lowest 15 cm. This test pit was terminated at this point and labeled as a negative test due to its lack of significant historic material.

OT6 and OT7 were two separate pits placed side-by-side, 3.7 meters south of the McNabb dock outside of the perimeter of TC1. OT6 measured 76 by 135 cm. and produced a modern cut queen conch shell, 3 small metal fragments and an aluminum bottle cap. OT7 was 1.18 by 1.38 meters and produced one ceramic pipe stem segment. Both of these tests extended vertically 42 cm. below the seafloor and were terminated when they no longer produced any modern or historic material. These two test pits were labeled as negative tests due to their lack of significant historic material.

## TC2

This proposed turtle corral is located alongside the location of a historic dock, D1. TC2's predicted location is east of the shore along current Fred Good's property (see Figure 35). The adjacent D1 is located east of the seawall at the Mistre property. A large subsurface ballast stone pile was discovered in the summer of 2009 south of the proposed location of D1. This test pit, XU4 was excavated to the surface of the large collection of dark, non-native stone at approximately 1 meter below the seafloor. It produced several pieces of marine turtle carapace, a ceramic pipe bowl fragment, and historic bottle glass shards (Garber 2010). TC2 is located east of a mangrove patch along shore (see Figure 36). Much of the area east of the mangroves and the north section of the Mistre seawall had a swampy seafloor with a soft, mucky silty clay matrix that was easily penetrable and slightly colloid and continued to roughly 120 cm below the seafloor. This matrix

constituted approximately 50% of the TC2 and D1 predicted areas and limited the range of stable matrix that could be excavated. The matrix was consistent throughout the area that was tested and included a bed of turtle grass with roots in sandy clay that composed the upper 10 cm of matrix. A strict change to sand with an estimated 60% micro marine shell inclusions occurred below the previous level and extended beyond the termination on each test pit. The quantity of historic material encountered in the 2014 test pits was sparse and minimal in comparison to the faunal bone recovered from XU4 during the 2009 field season. The positive test pits from the 2014 field season were all located near the edges of predicted D1, one of which was located within the TC2 boundary.



Figure 35. TC2 location



Figure 36. Colloid silty clay with mangroves along the seawall

OT8 was a 1.7 by 1.8 meter test pit was located in the southeast corner of TC2 and 41.15 meters east of the mangrove patch. It extended 101 cm. below the seabed and included the recovery of two marine turtle carapace pieces, two large dark non-native stones, five modern glass shards, one historic glass shard, 14 unidentifiable metal fragments, one burned marine shell fragment, three historic ceramic sherds and one historic ceramic pipe stem segment. This unit ceased to produce artifacts before it was terminated.

OT9 was a 1.02 by 1.48 meter test pit was placed on the edge of predicted D1, 28.57 meters east of the seawall. This pit extended 47 cm. below the seafloor and included the recovery of one animal bone fragment, one burned historic ceramic sherd and one metal fragment. This test pit was considered positive and was terminated after the matrix became sterile of cultural material.

OT10 was a 1.13 by 1.71 meter test pit was located inside the west edge of TC2, 18.8 meters east of the shore. This pit extended 77 cm. below the seafloor and only produced two small faunal bone fragments and a burned shard of modern glass, all of which were widely dispersed vertically. This test pit was considered negative due to its lack of historic material.

OT11 was a 96 by 75 cm. test pit was established inside the west edge of TC2, 14 meters east of the shore. It extended 59 cm. below the seafloor and did not produce any cultural material. Therefore, this was considered a negative test.

### TC3

This predicted corral is located toward the north end of the island and straddles the Bowen dock and the dock located directly north of it (see Figure 37). Very little historic material was recovered from only two of the six test pits implemented here. Of these, only one produced historic faunal remains. Modern refuse was encountered near the surface in most test pits and the few historic artifacts that were recovered were followed vertically by a zone that was sterile of cultural material, with the exception of OT24. This area had clear water with a continuous bed of turtle grass across the seafloor. The grass roots continued through the upper ten centimeters of matrix, which was white sandy clay. Directly below this layer was medium white sand with 40-50% micro marine shell inclusions that continued beyond the depth of the test pits' termination.



Figure 37. TC3 location

OT19 was a 126 by 34 cm. oval test pit was established 23 meters east of a seawall and 10 meters north of the Bowen dock, and extended vertically 68 cm. below the seafloor, within the boundaries of TC3. This test pit produced a minimal amount of modern refuse that included a beer can and a modern animal bone. This unit was terminated and labeled as a negative test due to its lack of historic material.

OT20 was a 1.38 by 1.55 m. test unit was located 36 meters east of the seawall and eight meters north of the Bowen dock, within the boundaries of TC3. This pit extended 48 cm. below the seafloor and only produced a small amount of modern refuse. This unit was then labeled as a negative test and was terminated.

OT21 measured 94 by 73 cm. and was established 15 meters north of the Bowen

dock, within the boundaries of TC3. It extended for 74 cm. below the sea floor and produced two small historic ceramic sherds.

OT22 was a 118 by 84 cm. test unit was established 17 meters north of the Bowen dock, within the boundary of TC3. It extended 72 cm. below the sea floor and did not produce any cultural material. Therefore, this test pit was labeled negative.

OT23 measured 87 by 43 cm. and was implemented 18.5 meters east of the seawall and 2.2 meters north of the Gallaty dock, south of TC3. This test pit extended down 74 cm. below surface and did not produce any cultural material, so it was terminated and labeled as a negative test.

OT24 measured 71 by 108 cm. and was established 19 meters north of the Gegg dock and 29 meters east of the seawall, north of TC3. It extended down 57 cm. below the sea floor where it encountered a dense collection of coral stone (see Figure 38). From this pit, 11 large pieces of white coral rock, one large piece of brick ware, one historic dark olive bottle base, one historic glass shard and one piece of unidentified animal bone were recovered. This collection of stone was continued down beneath the point of unit termination. Through subsurface probing with a copper grounding rod I determined that this subsurface collection of stone continues out horizontally beyond the limits of the test pit. This subsurface obstruction was three meters long on its north-south axis and six meters wide on its east west axis.



Figure 38. Coral stone and brick recovered from OT24

#### TC4

The predicted location of this turtle corral accompanies a historic dock, named D2, on the north end of St. George's Caye in what is Fisherman Town today. Several historic bottles had previously been recovered during the construction of one of the docks in between the predicted locations of TC4 and D2 (Carl Bischof, personal communication 2014). Seven offshore test pits were excavated across this area and encountered variation in the stability of the sea floor and the matrix composition as they approached a mangrove patch (see Figure 39). Historic artifacts were discovered to have a fairly wide distribution across this area, with the highest concentration of material coming from within the predicted TC4 boundaries.



Figure 39. TC4 location

OT12 was a 94 by 84 cm. test pit was placed six meters west of the Bischof dock, in between TC4 and D2 (see Figure 40). Its upper layer was composed of slightly colloid sandy clay that continued down for approximately 40-50 cm. Modern animal bone pieces and other modern refuse were recovered throughout this zone. This included several shards of modern bottle glass and a plastic toy truck. Directly below this layer, the matrix composition changed to solid white sand with estimated 70% micro marine shell inclusions. This layer continued down 85 cm. below the seafloor and produced a burned ceramic pipe stem segment and eight small pieces of animal bone. The test pit stopped producing cultural material slightly before its abandonment.



Figure 40. OT12 excavation alongside dock

OT13 measured 118 by 90 cm. and was excavated north of a path of mangroves and 5.5 meters west of the Coy dock, inside the southern boundary of TC4. It began over a bed of turtle grass with roots that extended into sandy clay in the upper ten centimeters. Directly below this layer, the matrix consisted of white sand with 60% micro marine shell inclusions. Modern glass and metal fragments were recovered throughout the upper 50 cm. of matrix. Historic artifacts were recovered from 50 cm. below the sea floor up to the termination of the pit. These included: nine pieces of loggerhead turtle bone, eight smaller pieces of indeterminate turtle bone, a small quantity of other animal bone fragments, two historic ceramic sherds, one complete ceramic pipe stem with a partial bowl and two ceramic pipe stem segments (see Figure 41). Artifacts were not recovered

in the lower ten centimeters of the pit and OT13 was abandoned 74 cm. below the surface of the sea floor.



Figure 41. Material recovered from OT13

OT14 was a 2.12 by 1.70 meter test pit was located two meters north of the Coy dock within the boundaries of TC4. The matrix consisted of white sand with 60% micro marine shell inclusions that began at the surface and continued beyond the test's termination at 65 cm. below the sea floor. Recovered artifacts included: two ceramic pipe stem segments, a modern Belize coin, a modern metal key, a piece of modern animal bone refuse and 21 pieces of faunal bone. Most of the faunal pieces were too small to determine what species they belonged to, but at least one was assigned to loggerhead sea turtle and two others indeterminate turtle. OT14 was abandoned after it became sterile of

cultural material.

OT15 measures 72 by 95 cm. and was placed west of TC4, approximately 22 meters north of the shore (see Figure 42). It began over a bed of turtle grass with roots that extended into sandy clay in the upper ten centimeters. Directly below this layer, the matrix consisted of white sand with 60% micro marine shell inclusions. No cultural material was recovered in the upper 50 cm. below the sea floor. Beneath this point, two small historic ceramic sherds, and 39 pieces of loggerhead turtle bone were recovered. This test pit was abandoned 76 cm. below the sea floor when it stopped producing material.

OT16 was a 1.83 by 1 meter test pit that was established west of OT15, approximately 15.5 meters north of the shore. It began over a bed of turtle grass with roots that extended into sandy clay in the upper ten centimeters. Directly below this layer, the matrix consisted of white sand with 60% micro marine shell inclusions. Material recovered from this test pit included: two modern bottle glass shards, a rodent mandible, two small historic ceramic sherds, a historic glass bottle bottom with a maker's mark and six small pieces of bone, two of which belonged to fish and four were too small to determine. This pit was abandoned 76 cm below the sea floor after it stopped producing cultural material.



Figure 42. OT15 & 16 locations

OT17 measured 172 by 95 cm. and was located 18.5 meters west of the swimming corral on the end of the Coy dock, inside the TC4 boundaries. It began over a bed of turtle grass with roots that extended into sandy clay in the upper ten centimeters. Directly below this layer, the matrix consisted of white sand with 60% micro marine shell inclusions. A small historic glass shard, one small piece of turtle exoskeleton, and four small pieces of bone that were deemed indeterminate were recovered from this pit. This test pit was abandoned 76 cm. below surface after it stopped producing material.

OT18 measured 80 by 95 cm. and was established ten meters west of the public dock, on the edge of predicted D2. It started over a bed of turtle grass with roots that extended into sandy clay in the upper ten centimeters. Directly below this layer, the

matrix consisted of white sand with 60% micro marine shell inclusions. This test pit only produced one ten centimeter steel bar. It continued down 84 cm. below the sea floor and was abandoned and labeled negative after it failed to produce historic material.

## **7. THE DISTRIBUTION OF DEPOSITED FAUNAL REMAINS ACROSS ST. GEORGE'S CAYE**

In order to understand historic turtling activity on St. Georges Caye and its relation to the wider turtling industry, it was crucial to understand the proportions of each marine turtle species on the island compared to that of other animal taxon. This chapter will explore the results of Norbert Stanchly's analysis of the faunal material from all previous excavations on St. George's Caye, and its distribution across the island.

Stanchly conducted this analysis during the summers of 2013 and 2014 with a primary focus on identifying species of marine turtle in the collection. The collection consisted of 3,670 individual specimens of animal bone of various sizes. The analysis aimed to assign each individual specimen to a bone type, and a zoological class (Stanchly 2014). Both a minimum number of individuals (MNI) and number of individual specimen (NISP) approaches were taken for the quantification of bone in the collection. According to Marshall and Pilgrim, an MNI method of quantification is useful when there is low level of bone fragmentation and a higher proportion of complete, identifiable bones. As bones become more fragmented in a collection, NISP become the more reliable approach to more accurately represent and compare proportionality of zoological classes (Marshall & Pilgrim 1993). For this analysis, NISP was used in order to account for and compare the relative proportions of different groups of fauna due to the fragmented nature of the collection.

Those species represented in the faunal collection include domesticates such as cattle, pig and goat with the addition of marine turtle, inland turtle, fish and West Indian Manatee. Mammal remains that were easily identifiable were noted to belong to a

specific species, though much of the mammal remains were not classified beyond simply “indeterminate mammal” or “indeterminate ungulate”. Those listed as such could include domesticates such as pig and cattle, as well as West Indian manatee, tapir, and deer (Stanchly 2014). Fish were likely very common in the diet of the caye’s early inhabitants, as many were procured from the surrounding waters (Craig 1966). The identifiable fish bones that were recovered from the island include portions of the cranium and vertebrae. Other bones that were recovered were classified as the remains of birds, and at least two were identified as that of a wading bird and another large bird. The faunal analysis did not include an in-depth analysis of the mammal, fish and bird remains as the focus of this study was not the individual species of these classes of animal (Stanchly 2014). For this study, specimens from these bulk classes will be compared against all turtle remains, as well as individual species of turtles in order to understand the prominence of turtle in the diet of St. George’s Caye’s early inhabitants. To represent these proportions, I compared the sum of the identified specimens from each class and divided that by the bulk sum of specimens to produce a percentage that was then rounded to one decimal place.

Turtle remains, specifically those of marine turtles, represented the majority of faunal remains recovered from St. George’s Caye. Divided by zoological class, reptile remains make up 77.5% of the specimens recovered, while mammals comprised 17.1%, and the remainder included bird, fish, and marine invertebrate remains (see Table 1). Turtle made up the majority of faunal bone specimens, 77.4% of the collection. Of this, 44.6% were fragments of turtle bone that were unidentifiable because they were either too small or did not contain features that are used to distinguish between marine turtle

species. These fragments were most likely green and loggerhead turtle, and possibly hawksbill. Of these specimens, two shell fragments are charred on the surface of the shell and one carapace piece appears to have been smoothed (Stanchly 2014).

Table 1. List of Identified Taxa (Stanchly 2014)

<b>Taxon</b>	<b>Common Name</b>	<b>NISP</b>	<b>%</b>
<b>Class Reptilia</b>			
<i>Caretta caretta</i>	Loggerhead	657	27.8
<i>Chelonia mydas</i>	Green Turtle	51	2.2
<i>Dermatemys mawii</i>	C. American River Turtle	67	2.8
Order Testudines	Indeterminate turtle	1,053	44.6
Class Reptilia	Unidentified reptile	3	0.1
<b>Class Mammalia</b>			
<i>Bos taurus</i>	Domestic Cow	15	0.6
<i>Capra hircus</i>	Domestic Goat	3	0.1
<i>Sus scrofa</i>	Domestic Pig	8	0.3
Order Artiodactyla	Ungulate (likely domestic)	12	0.5
Family Cricetidae	Mouse or Rat Family	1	< 0.1
<i>Trichechus manatus</i>	West Indian Manatee	17	0.7
Class Mammalia	Unidentified mammal	349	14.8
<b>Class Osteichthyes</b>			
Order Sparisoma	Parrotfish	1	< 0.1
Class Osteichthyes	Unidentified bony fish	89	3.8
<b>Class Aves</b>	Unidentified bird	19	0.8
<b>Class Malacostraca</b>			
Order Decapoda	Unidentified crab	16	0.7
<b>Class Bivalvia</b>	Unidentified marine bivalve	1	< 0.1
<b>Class Gastropoda</b>	Unidentified marine univalve	1	< 0.1
<b>Total</b>		<b>2,363</b>	<b>99.8</b>

The majority of the identified turtle bone was loggerhead, at least 27.8% of the turtle specimens, while the Central American River turtle, known as the hickatee, comprised 2.8%, and the green turtle 2.2%. By comparing strictly turtle remains, loggerhead specimens account for 35.9% of all identified turtle remains. To further refine it, loggerhead specimens make up 84.8% of all turtle remains that have been identified by species. Within these same restrictions, green turtle accounts for the least

amount at 6.5%, and the hickatee at 8.6%. 99.8% of all loggerhead bones are fragments of the shell, both the plastron and the carapace, while one limb bone was identified. Three identified loggerhead bones had cut marks, though additional unidentified turtle long bones were also recovered with clear butcher marks. Of the green turtle remains, two left humeri were identified, one with a single cut mark (see Figure 43). Based on their presence, the green turtle specimens account for at least two individuals. No hawksbill turtle bone was identified, but it is possible that they could be included with the indeterminate material (Stanchly 2014).



Figure 43. Green turtle humeri (Cem. XU40 L3-3)

The displacement of material by hurricanes has been one of the most difficult factors that obstruct our interpretation of the island's past. While certain objects may have remained in context, this is difficult to determine. The safest approach is to assume that everything is out of place unless there is substantial evidence that suggests that it is not. However, for clusters of artifacts we can discuss the distribution of animal bone across the island with a certain degree of certainty about the location where they were

initially deposited. During a hurricane, the incoming storm surge carries with it a layer of coarse sand that it collects from the seafloor. As it makes landfall, this layer of sand is deposited over the natural ground surface (Elverson 2013). It is possible, during these events, that this layer of coarse sand would cover material on the island's surface and contain it, to some degree, within the range of its pre-event location.

With that in mind, we can make an attempt to analyze the distribution of animal bone across St. Georges Caye. There is some variation in the proportions of faunal specimens by each group across different areas of the island. To study this distribution, I divided the faunal data according to areas that have been excavated across the island. I grouped the faunal material first by property on the island. Remains from the Habet property, south of the cemetery have been grouped under the title "Habet", and those from the Fuzy property as "Fuzy". As most of the excavations have been conducted in the cemetery and most of the faunal remains have been recovered from there, I divided the remains in the cemetery into four groups. The division was made by different regions within the cemetery due to their difference in location. These consist of those recovered from the series of excavation units along the rear wall of the cemetery (Cem. Rear), the solitary 1x1m excavation unit at the southern end of the cemetery (XU6), OP1 (Cem. OP1), and the series of units near the cemetery entrance and the current monument to the Battle of St. George's Caye (Cem. Entrance). The data has been further divided up by each of the predicted offshore turtle corrals (TC1, TC2, TC4), with the exception of TC3, which was omitted from this table due to the very limited amount of material that was recovered from this location (see Table 2).

Table 2. Proportions of Faunal Class by Location

		PROPORTION OF REMAINS BY LOCATION								
		Cem. Rear	XU6	Cem. OP1	Cem. Entrance	Fuzy	Habet	TC1	TC2	TC4
CLASSIFICATION OF REMAINS	LOGGERHEAD	27.3%	24.2%	11.0%	13.8%	3.6%	10.7%	0.8%	36.4%	32.7%
	GREEN TURTLE	0.6%	-	0.8%	0.8%	6.5%	1.5%	3.9%	-	-
	HICKATEE	0.6%	16.9%	0.4%	0.8%	6.5%	3.8%	0.7%	18.2%	1.2%
	INDETERMINATE TURTLE	20.7%	11.8%	21.3%	38.4%	28.1%	32.8%	52.5%	45.5%	15.2%
	MANATEE	0.3%	1.7%	-	0.5%	-	4.6%	0.2%	-	-
	BIRD	0.4%	1.1%	0.8%	0.5%	-	0.8%	0.7%	-	0.6%
	BONY FISH	3.4%	0.6%	-	1.5%	1.4%	0.8%	2.3%	-	5.3%
	PARROT FISH	-	-	0.4%	-	-	-	-	-	-
	CRAB	0.3%	1.7%	-	0.5%	-	-	0.2%	-	2.9%
	INDETERMINATE UNGULATE	0.1%	-	-	0.5%	-	5.3%	-	-	-
	DOMESTIC PIG	0.3%	-	-	-	-	2.3%	0.2%	-	-
	DOMESTIC COW	0.6%	-	-	0.5%	-	1.5%	-	-	-
	DOMESTIC GOAT	-	-	-	0.2%	-	1.5%	-	-	-
	INDETERMINATE MAMMAL	11.3%	26.4%	11.0%	7.4%	7.9%	10.7%	2.5%	-	2.3%
	POSSIBLE IGUANA	0.1%	-	-	-	-	-	-	-	-
INDETERMINATE BONE	34.2%	15.7%	54.3%	34.9%	46.0%	23.7%	36.2%	-	39.2%	

The numbers laid out in table 2 represent the percent proportion that each category makes up. In most of these areas, the greatest proportion of faunal bone specimens belong to either the indeterminate turtle bone category (those that have been recognized as turtle, but not by any distinct species) and the indeterminate bone category (those which had no features that distinguished to which type of animal they belonged). When combining the proportion from the indeterminate turtle group with that of identified turtle species, and excluding the indeterminate bone, turtle bone makes up the majority of faunal bone specimens in each area, and outnumbers all other groups of animals.

In order to more easily compare the proportions of each individual identified

species of turtle by area, I removed all of the classes that included specimens that could not be identified. I removed all classes for indeterminate bone. What remains on the new table is a breakdown of the proportion of specimens that were identified as turtle, fish, mammal, bird etc. (see Table 3). This approach at the analysis helps by eliminating those specimens that were too small to be identifiable in order to gauge their presence in the record by proportion. An analysis of these proportions with the indeterminate bone class removed follows below.

Table 3. Proportions of Faunal Remains by Location

		PROPORTION OF REMAINS BY LOCATION								
		Cem. Rear	XU6	Cem. OP1	Cem. Entrance	Fuzy	Habet	TC1	TC2	TC4
CLASSIFICATION OF REMAINS	LOGGERHEAD	41.4%	28.7%	24.1%	21.2%	6.7%	14.0%	1.3%	36.2%	54.4%
	GREEN TURTLE	0.9%	-	1.7%	1.2%	12.0%	2.0%	6.2%	-	-
	HICKATEE	0.9%	20.0%	0.9%	1.2%	12.0%	5.0%	1.0%	18.4%	1.9%
	INDETERMINATE TURTLE	31.4%	14.0%	46.6%	59.1%	52.0%	43.0%	82.2%	45.5%	25.2%
	MANATEE	0.5%	2.0%	-	0.7%	-	6.0%	0.3%	-	-
	BIRD	0.6%	1.3%	1.7%	0.7%	-	1.0%	1.0%	-	1.0%
	BONY FISH	5.1%	0.7%	-	2.3%	2.7%	1.0%	3.6%	-	8.7%
	PARROT FISH	-	-	0.9%	-	-	-	-	-	-
	CRAB	0.4%	2.0%	-	0.7%	-	-	0.3%	-	4.9%
	INDETERMINATE UNGULATE	0.2%	-	-	0.7%	-	7.0%	-	-	-
	DOMESTIC PIG	0.4%	-	-	-	-	3.0%	0.3%	-	-
	DOMESTIC COW	1.0%	-	-	0.7%	-	2.0%	-	-	-
	DOMESTIC GOAT	-	-	-	0.2%	-	2.0%	-	-	-
	INDETERMINATE MAMMAL	17.2%	31.3%	24.1%	11.4%	14.7%	14.0%	3.9%	-	3.9%
	POSIBLE IGUANA	0.1%	-	-	-	-	-	-	-	-

In the cemetery rear, entrance and OP1 area, loggerhead turtle is the most abundantly represented by quantity of bone specimens. They compose roughly 21-41% of the faunal specimens in these areas. Green turtle and hickatee were identical in proportion in the cemetery rear at 0.9% and entrance at 1.2%. Green turtle remains

slightly outnumbered hickatee at 1.7% compared to 0.9% in the OP1 area. All other identified classes were sparsely represented in comparison throughout the rear, entrance and OP1 areas of the cemetery. All combined turtle specimens comprised a range of 62-74% in all areas of the cemetery. Mammal remains were the second most abundant in the cemetery and encompassed between 19% and 33%. Fish and crab made up between 0.9% and 5%, and birds between 0.6% and 1.7% throughout all areas of the cemetery. Bony fish were most abundantly represented in the cemetery rear at 5.1% compared to 2.3% in the cemetery entrance and 0.7% in XU6. Bony fish remains were not identified in the OP1 area. The remains of parrotfish were identified in the OP1 area of the cemetery (Stanchly 2014) and account for 0.9% of the remains. The 1x1 meter excavation unit, XU6, on the south end of the cemetery contained a faunal assemblage that differed in proportion compared to the rest of the cemetery. Though loggerhead remains accounted for the highest proportion of turtle remains by NISP at 28.7%, there was a high concentration of hickatee remains at 20% of identified specimens. The highest proportion of manatee in the cemetery is present here at 2%, as well as the highest proportion of indeterminate mammal remains at 31.3%. Bony fish remains accounted for 0.7% of identified specimens in this area. No green turtle remains were identified in the XU6 area of the cemetery.

Though loggerhead remains were the most abundant by number of specimens from the Habet property, the proportion was lower than that of the cemetery at 14%. This area has the highest proportion of West Indian Manatee remains recovered anywhere on the island at 6% of specimens. This property also had the highest proportion of identified domestic pig, cow, goat and indeterminate ungulate remains on the island.

Turtle remains encompassed 82.7% of the faunal material recovered from the Fuzy property, with the bony fish at 2.7% and mammal remains at 14.7%. This is the only terrestrial area on St. George's Caye where loggerhead remains do not make up the majority of turtle remains recovered. Green turtle and hickatee remains each comprised 12% of the identified Fuzy faunal collection, while loggerhead remains accounted for 6.7%. Two turtle humeri and three femurs were recovered at this location along with additional fragments. Most of these long bone fragments have cuts marks and other signs of butchering (Stanchly 2014). Most of them appear to have been chopped off just below the heads of the long bones (see Figure 44), which would indicate that the flippers were removed at the point where they meet the shell.



Figure 44. Sea turtle long bone heads with butcher marks (FUZY XU34 L5-6)

The faunal material recovered from offshore testing on the island had differences in the distribution both among the historic corrals and compared to that which was

recovered from terrestrial excavations. Most of the faunal material from these areas was recovered from TC1, at 76.9% and TC4, which comprised 21.6% of the offshore collection. 1.4% of the offshore animal bone was recovered from TC2. TC3 was not included in the distribution analysis because there were only two small pieces of faunal bone recovered from this area, which would not be sufficient to represent activity at that site.

TC1, TC2, and TC4 each contained a lower proportion of mammal bone compared to all of the terrestrial areas on the island. No identified mammal bones were recovered from TC2, while indeterminate mammal bone comprised 3.9% of all remains from TC1 and TC4. One manatee vertebrae and a pig tooth were recovered from TC1 (see Figure 45), which each encompassed 0.3% of the proportion from this area. 100% of the identified faunal material from TC2 was turtle bone. No green turtle bone was identified here, while loggerhead bone comprised the majority at 36.2% and hickatee 18.4%. Loggerhead turtle also makes up the majority of bone recovered from TC4 at 54.4%. No green turtle bone was identified at this location either. Bony fish and crab remains represent the next most abundant groups in this area at 8.7% and 4.9% respectively. Hickatee remains made up 1.9% of the recovered material from this area.



Figure 45. OT1 faunal remains (TC1)

TC1 contained the highest concentration of green turtle bone anywhere on the island, with 24 individual specimens. All of the faunal material from this corral was recovered from the two test pits mentioned previously (OT1 & OT3) (see Figure 46). These remains account for 6.2% of the recovered remains, but this figure is substantially low due to the fact that 82.2% of the faunal remains were classified as indeterminate turtle. Total turtle specimens make up over 90% of the faunal material recovered from this area. The majority of these bones are portions of the shell, though vertebra, long bones and a sea turtle phalange (see Figure 47) were also recovered (Stanchly 2014). Green turtle makes up 72.7% of the turtle specimens that were identified by species, with loggerhead at 15.2% and Hickatee at 12.1%. This makes the TC1 area unique on the caye because it is the only location investigated thus far in which green turtle makes up

over a 50% majority of identified turtle species. It is also likely that many of the remaining indeterminate turtle specimens could be green turtle as well.



Figure 46. OT3 faunal remains (TC1)



Figure 47. Sea turtle phalange (OT3, TC1)

Overall, turtle remains comprise over  $\frac{3}{4}$  of all identified faunal remains on the caye. Loggerhead turtle bone makes up 84% of the turtle specimens that were identified by species across the island. Compared to loggerhead, very little green turtle bone was recovered from areas outside of the TC1 and Fuzy areas, and no hawksbill turtle remains were identified anywhere on the island (Stanchly 2014).

## 8. DISCUSSION AND CONCLUSION

I have hoped that the results of my research, and that of others, has shed light on the important relationship that the early inhabitants St. George's Caye have had with the Bay's sea turtle population. The great proportion of turtle remains across the island, and the prevalence of references to turtling in historic documents indicate that sea turtles were an important staple in the diet and early economy of Belize. Turtling was established as a way of life and an occupation that has since settled into obscurity along the coast of Belize, now to the benefit of the surviving turtle population.

Today, all sea turtles are listed on the endangered species list, and are protected in Belize waters. Although they are listed on the country's "no catch list", live sea turtles continue to be captured illegally by individuals in Belize waters (ECOMAR 2015). ECOMAR Belize and Hol Chan Marine Reserve specialize in monitoring and rehabilitation of sea turtle populations (ECOMAR 2015). In the future, the continuation of education and outreach programs by these organizations could help to further decrease this activity that has had an important place in Belize's growth and development.

An important relationship exists between the geography of the Bay of Honduras, and the settlement of this area by both turtles and humans alike. The same aspects of the maritime environment that caused large ships to avoid the area and provided a refuge for pirates, could have similarly provided a refuge for sea turtles from the large high occupancy vessels of the Spanish. Additionally, the barrier reef provides protection from the rough waters of the Caribbean Sea, and allows the many small cayes to exist in the Bay's calm waters, without the threat of constant heavy erosion. This in turn provided these islands as an ideal refuge for the amphibious creatures to lay their eggs out of reach

of many of the mainland animals that would gladly feast on them. When turtles came upon these islands, I imagine they may have been dominated by dense vegetation. A large number of sea turtles landing on the island over time would have an impact on the density of vegetation on the beach. This would in turn leave a nesting beach relatively clear and open, making it easier, and more appealing, for people to settle there. As buccaneers arrived to these cayes, they likely would find these small, sandy islands full of turtles. A large sandy platter created by the turtles, on which they would find themselves served, as their safe haven was taken over by the opportunistic new comers that arrived there.

Turtling played an important role in providing sustenance to the early buccaneers who settled in the Bay, and also provides a commonality that links the early settlers of Belize with the inhabitants of the Miskito Coast. Inhabitants of the Bay of Honduras, and the Miskito Coast could have exchanged technologies and passed on skills in regards to turtling. The importance of turtling to the Miskito people could have influenced its importance as a practice in early Belize. As migrants from the Miskito Coast settled in Belize after the 1786 Convention, turtling could have provided a profitable industry to those who did not have the capital necessary to enter into the logging industry. This could have helped distribute wealth to those outside of the profitable logging industry in the growing country. In turn, turtling helped support the logging industry by providing a steady local source of meat to the colony.

From the late eighteenth century on, turtling grew in importance until it began to decline along with marine turtle populations. The role that inhabitants of St. George's Caye could have had in this industry could have shifted along with settlement to the

mainland in the 19<sup>th</sup> century. The presence of green turtle remains in TC1 indicate that at least at one point in the island's history, these turtles were captured and carried to St. George's caye, where they met their end. Alan Craig mentioned that green turtles were captured around Robinson Point, fairly close to St. George's Caye. It refers to activity in 1966, over 100 years after populations began to dramatically decline and just as long since the market stopped exporting up to 6,000 head of green turtles annually. It wouldn't be hard to believe that green turtles were more widespread in the area pre-1850s, and that they could have fed in the waters surrounding St. George's Caye and other nearby cayes.

An important aspect about archaeology on St. George's Caye is that it's hard to date artifact deposits due to the disturbance inflicted by the many hurricanes that have hit St. George's Caye. This means that it's very difficult, if not impossible at this point, to determine which bones recovered from St. George's Caye were deposited before or after 1800. The same goes for the turtle corrals on the 1764 map. From this map, we know that these corrals were present in 1764, but what we don't know is for how long they remained there and stayed in use. The island was burned prior to the Battle of St. George's Caye, and whether or not offshore corrals were burned as well is unknown, and also rather unlikely due to seawater saturation. Currently we don't know whether or not these corrals survived, or were repaired after the fire, and continued to be used.

We do know that green turtle populations began to decline prior to 1861, half a century after the human population began to grow rapidly and settlement expanded on the mainland. We don't know whether or not the loggerhead bone was deposited prior to this. Though, even in the more shallow deposits of animal bone on the island, loggerhead comprises the majority. As I just mentioned, using the stratigraphy isn't a totally reliable

dating method, but it at least suggests that loggerhead consumption continued to dominate on the caye through its historic occupation. If loggerhead capture and consumption continued to dominate on the caye during a period of time in which organized groups of commercial fishermen were heavily exploiting the already waning populations of green turtles, it makes sense, that loggerheads were the most available to local sport & subsistence fishermen. There is no record that loggerhead turtles were ever exported as a commodity and served as anything other than a local food source. There is also no record that they were ever preferred for consumption over green turtles. I think that if loggerheads did not face the same pressure as greens, that it is likely that their populations did not decline as quickly as the greens and hawksbills. Alan Craig even noted in 1966, that turtling activity had declined significantly, and as a result loggerhead turtles were the most heavily exploited by local fishermen due to the relative scarcity of other species (Craig 1966).

It would be helpful to know how long the four turtle corrals on the island were in use, and specifically the one that was located near the current Eyles/Roe docks, named TC1. This was the only one that contained a majority of green turtle bone and it would be good to look at when it was being used and compare that to the export data concerning green turtles. If the green turtle bone was deposited circa 1764, and before slaughter for sale was restricted to the marketplace, this turtle corral could have been used to raise greens that were slaughtered on site and sold locally. However, there's not enough data to back up that claim unless we had a way to date these deposits. It would also be helpful to further investigate historic documentation to understand who owned and operated the four turtle corrals on the 1764 St. George's Caye map. The higher quantity of hickatee

and green turtle remains compared to loggerhead on the Fuzy property could reflect the dietary preferences of its historic occupants, as both were prized food items.

The greater proportion of turtle bone present on St. George's Caye could be the result of the way turtles are butchered: the shell is removed in shallow water and discarded on site. Also, it could be due to the greater proportion of bone on the animals' body compared to others types of animals. The prevalence of loggerhead remains, and limited presence of green turtle remains on the caye could be due to the fact that green turtles were exported, and also their slaughter for sale was restricted to the market and the slaughterhouse on the mainland.

As green turtles declined in numbers by the late 1800s, those that remained around St. George's Caye could have been capitalized by professional turtlers, limiting their accessibility by local sport & subsistence turtlers. This may have left loggerhead turtles as the most available for local catch as they occupy a separate niche and feed on crabs along the reef (Craig 1966), as opposed to the shallowly submerged grassy meadows occupied by green turtles.

Additionally, as green turtles were sold live at the market and used for soup, the lesser quality meat of loggerhead turtles may have had a separate treatment. Green turtles may have been consumed widely as documents indicate, and its slaughter and processing may have been restricted to separate quarters than that of the loggerhead. It is quite possible that green turtle meat was butchered at market for sale, and even canned locally. The lesser quality meat of the loggerhead could have been reserved for smoking. Thus, it's possible that these turtles were brought to St. George's Caye, butchered, their meat smoked on site and bones discarded across the island, resulting in a greater

proportion of loggerhead bone on the caye. It remains in question if these remains were discarded by turtles that lived on the island, or by transient turtling crews. Their meat could have either been consumed locally or taken elsewhere aboard ships, all in continuation of the island's supposed founding as a meat-smoking outpost.

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