Foodways and Community: Shellfish Consumption at Sitio Drago in Bocas del Toro, Panamá

Megan E. Winnick
University of Massachusetts Boston

FOODWAYS AND COMMUNITY: SHELLFISH CONSUMPTION AT SITIO DRAGO IN BOCAS DEL TORO, PANAMÁ

A Thesis

Presented by

MEGAN E. WINNICK

Submitted to the Office of Graduate Studies,
University of Massachusetts Boston,
in partial fulfillment of the requirements for the degree of

MASTER OF ARTS

December 2025

Historical Archaeology Program

FOODWAYS AND COMMUNITY: SHELLFISH CONSUMPTION AT

SITIO DRAGO IN BOCAS DEL TORO, PANAMÁ

A Thesis Presented

by

MEGAN E. WINNICK

Approved as to style and content by:

____

David B. Landon, Associate Director,
Andrew Fiske Memorial Center for Archaeological Research
Chairperson of Committee

____

Nedra K. Lee, Associate Professor
Member

____

Stephen W. Silliman, Professor
Member

____

Heather B. Trigg, Program Director
Historical Archaeology Program

____

Patrick Clarkin, Chairperson
Department of Anthropology

ABSTRACT

FOODWAYS AND COMMUNITY: SHELLFISH CONSUMPTION AT SITIO DRAGO IN BOCAS DEL TORO, PANAMÁ.

Megan E. Winnick B.A., State University of New York at Oswego.
M.A., University of Massachusetts Boston

Directed by Dr. David B. Landon

Food-related practices provide marginalized groups with spaces for cultural exchange and asserting agency within colonial contexts, often leading to the formation of new communities and identities. Marine mollusks, due to their widespread accessibility, have a significant role in the cuisines of African Diaspora and Indigenous communities in Latin America. This thesis examines shellfish consumption at Sitio Drago in Bocas del Toro, Panamá, highlighting how shellfish harvesting and communal cooking fostered community expression through local food sources. The study includes analyses of spatial distribution of mollusk species, MNI counts across three temporal periods, and a size distribution of common gastropods. Findings indicate a decline in shellfish consumption around 1200 AD due to population decrease and overharvesting, followed by an increase in the post-Columbian period correlated with European and Afro-Caribbean migration. While there were shifts in mollusk preferences, particular species, such as ark clams, remained consistently relied upon. The research also shows ongoing shared cooking spaces between Indigenous and

Afro-Caribbean groups, which facilitated cultural exchange and kinship, leading to a shared cultural identity known as Bocatoreño by the late 19th and early 20th centuries.

ACKNOWLEDGMENTS

This endeavor would not have been possible without the unwavering support of my thesis chair, Dr. David Landon. Thank you for the many Zoom meetings and all your guidance. It is because of you that I made it through this process. I also want to express my gratitude to my thesis committee, Dr. Nedra Lee and Dr. Stephen Silliman, who helped me navigate the complexities of archaeological theory, and for all your helpful feedback. To the rest of the UMass Boston faculty and Fiske Center staff, thank you for all you have taught me and for your support. A special thank you goes to Dr. Jerry Howard, without whom this research would not have been possible, and who brought me to Bocas del Toro, a gift for which I will forever be grateful. To the people of Bocas del Toro and all the wonderful people I met in Panamá, thank you for your kindness and hospitality. Bocas is truly a special place, and I am honored to contribute to the stewardship of your story. I want to express my gratitude to the staff of the Smithsonian Tropical Research Institute, who provided us with the space necessary to inventory and process the shell artifacts for shipping back to UMass Boston. I would also like to acknowledge the work of Dr. Thomas Wake, who was essential in establishing the archaeological projects at Sitio Drago.

A special thank you to my graduate school cohort for their invaluable camaraderie throughout my academic journey. A shout-out to my lab partner, JT Crawmer, who always knew just the right song to keep me motivated during the long days of counting shells. I also want to thank Dr. Douglas Pippin, my undergraduate anthropology professor and friend, for encouraging me to pursue my master's degree in Historical Archaeology. I am immensely grateful to my parents, grandparents, and family for instilling in me the value of education and their unwavering support of my schooling and academic path. Lastly, to my husband and partner, Jeremy, who always encourages my professional goals and never complains about the many nights I keep him awake with the glow of my computer screen.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

CHAPTER 1
INTRODUCTION

We consume food multiple times throughout the day, often in group settings, establishing the act of eating as vital to social encounters. As people have migrated across the world, so have their culinary practices and traditions. These practices facilitate the sharing of ideas among different cultural and ethnic groups. Relationships fostered through shared meals can contribute to the emergence of new shared identities and socioeconomic structures (Mintz and Dubois, 2002: 104-109). Cultural encounters and exchanges in colonial contexts frequently give rise to new kinship ties and cultural communities. These exchanges intersections of identity are often negotiated through the daily practices of procuring and preparing food (Graff 2018; Hunter et al. 2014; Lightfoot et al. 1998, 2009; Mintz and Dubois 2002; Pavao-Zuckerman and Loren 2012; Pezzarossi et al. 2012). This thesis illustrates how cultural preferences and shared food practices contribute to the formation of a collective identity among Afro-Caribbean and Indigenous groups along the Caribbean coast of Latin and Central America, utilizing widely available and affordable resources like shellfish. The findings of this thesis were gathered through the analysis of shellfish deposits at Sitio Drago (800 AD - 1900 AD) on Isla Colón in the Bocas del Toro Province of Panamá. This analysis reveals changes and continuities in shellfish consumption, from the transition of a pre-Columbian Indigenous chiefdom to an Afro-Indigenous-Latin community known as Bocatoreño, which emerged in the mid-19th to early 20th centuries.

Previous archaeological research at Sitio Drago has primarily focused on the early periods of pre-Columbian Indigenous occupation (Howard 2014; Martin 2015; O'Dea et al. 2015; Wake et al., 2004, 2006, 2013). These studies investigated the connections between socioeconomic trade structures and foodways in pre-Columbian chiefdoms and through zooarchaeological, palaeobotanical, and ceramic analyses. By the 19th and 20th centuries, Bocas del Toro had evolved into an Afro-Latino community, which sparked further archaeological interest in the later post-Columbian periods and the encounters of African, European, and Indigenous groups. Later archaeological findings by Howard (2014) included faunal remains, as well as locally made and imported ceramics from this period of cultural and community change in 19th- to early 20th-century Bocas del Drago, also referred to in this thesis as Sitio Drago on the northwestern tip of Isla Colón in the Bocas del Toro province of Panamá. Howard employed the methods of historical and African Diaspora archaeology, combining ethnographic and archaeological data to identify the relationship between foodway practices and the formation of kinship and community ties among Afro-Caribbean and Indigenous groups.

Howard identified a shared community identity in Bocas del Toro, that succinctly captures the use of shared consciousness and narrative tradition, which encompasses a long history of cultural interactions between African peoples and marginalized Indigenous communities under a structure of European colonialization. These encounters have resulted in a cultural identity deeply rooted in its use of community and space, known as Bocatoreño, meaning "to be from Bocas" (Howard 2014: 73).

Over time, significant changes to both Indigenous and migrant communities have created a complex intersection of identities in Bocas. Historical archaeology projects rely on the use of ethnography and oral histories to provide context and support in the interpretation of material culture. Ethnographic narratives collected by Howard (2014) identified the cultural connections Bocatoreño people share through place and food. A narrative collected by Lavinia Dean, a local Bocatoreño woman, summarizes the Bocatoreño relationship to food:

> "Its da food you eat. You see Bocas people eat da fish wit da rice And beans and da coco. Only Bocas people eat that way. Fried fish is Bocatoreno tambien, oh yes with da patacones, that's Bocas…Well if you eat Ron Don then you are a Bocatoreno. That's it, you can only be from Bocas." (Howard 2014: 87)

Food serves as a common daily necessity that offers a space for these cultural groups to find commonalities despite their differences. The blending of Indigenous foodways and the culinary practices of Afro-Caribbean communities has led to the development of a new food tradition. These traditions have helped form and express a shared identity among the people of Bocas. Despite their cultural and social differences, food provides a unifying identity for Bocatoreños. The cultural history in Bocas del Toro highlights the varying intersections of identity, especially among African descendant groups and Indigenous people in Latin America and the Caribbean.

African Diaspora in Latin America

Intersections of identity are a critical lens in discussions surrounding African Diaspora and the archaeology of colonialism. Archaeological studies of dispersed African communities in the Western Hemisphere highlight their experiences within a racially structured framework. Scholars examining the African Diaspora utilize archaeological evidence to gain insight into the lived experiences of African communities, as well as their tools for agency and resistance against enslavement and racialized violence (Bilby 1981; Bilby and Baird 1992; Brunache 2011; Franklin and Lee 2019; Houston 2007; Kelly and Wallman 2014; Wallman 2020).

While racialization as a social construct for control was a shared tactic across all European colonies, it was not always applied or experienced homogenously. In North America, race is applied as a binary structure, stemming from the dehumanizing institution of chattel slavery, which used race to justify the deplorable treatment and othering of African people. This system of racialization presented race within a rigid structure of white supremacy, drawing distinctions of race as either "white" or "Black" (Fanon 1967; Lee 2020; Mintz and Price 1976; Orser and Funari 2001).

However, a racial binary based on this perspective is not purely applicable to the experiences of racially marginalized people within Latin American colonies and countries. In Spanish colonies, racial structures were based on a more detailed casta system (Balanzategui 2012; Funari 2006; Pavao-Zuckerman and Loren 2012; Trigg 2004; Voss 2008). While this system still depended on racial classification under a structure that valued and celebrated whiteness, it also accounted for racial mixing within the social hierarchy, known as mestizaje. The Spanish casta system established social classes that delineated the intermarriage of different races while emphasizing a power hierarchy of white Europeans. The acknowledgment of interracial marriages and the classification of those racial identities created avenues for kinship between Indigenous peoples, Europeans, and African people. This system was complex; it acknowledged race but presented racial identities as more fluid than the rigid dichotomy than that of English colonies and the eventual racial structure seen in the United States (Voss 2005; Weik 2004, 2009).

While the fields of African Diaspora archaeology and the archaeology of race and identity have significantly developed in English colonial and post-colonial contexts, the study of the African Diaspora in Latin America has been slow to develop (Gaitán Ammann 2022;

Balanzategui 2017, 2018, 2022; Sampeck 2018: 170-171). Sampeck (2018) argues that the discussion of African descendant communities in colonial Latin America has been overlooked in part due to the erasure of African people in the Latin American historical record through the process of mestizaje and the use of the casta system. Racial designations within this system were often applied to enforce labor roles and social hierarchy rooted in the acculturation of whiteness (DiPaolo Loren 2007; Pezzarossi 2017; Sampeck 2018: 170).

Diana DiPaolo Loren (2007) highlighted the visual reinforcement of this racial social hierarchy and identity in her analysis of casta paintings from Spanish colonies in Texas. Loren noted that the clothing depicted in these casta paintings served as symbols of racial and social hierarchy. These paintings often depicted individuals of mixed European and African descent, known as mulattos, wearing distinctly simpler European fashions that reflected their lower social status compared to Spanish and mestizo groups. In contrast, Indios (Indigenous people) were consistently depicted in traditional indigenous attire, illustrating their lowest status next to enslaved Africans as well as their racial designation (Loren 2007: 29). Through mestizaje, racial identity and social standing could shift, often emphasizing the mixture of white Europeans and other racial groups.

In a paper given by Guido Pezzarossi at the Workshop on Afro-Latin American Archaeology in 2017, he outlines the use of mestizaje to reinforce labor roles of African and Indigenous peoples through kinship in Guatemalan highlands in the 17th century. Pezzarossi points out that the colonial agenda was to classify the offspring of Free black men and native women as Indios within the casta system rather than placing them in other racial categories, which effectively erased the presence of Afro-descendants. This was an intentional action by the Spanish colonial government, utilizing the racial identity of Indios as a tool for implementing administrative control, where Indios were forced to pay tribute, while also exploiting them for labor. Mestizaje and racialization within the casta system can both erase the presence of African people in Latin American contexts, while also providing new avenues to seek out Afro-Latin kinship relationships with Indigenous communities (Sampeck 2018).

While Loren and Pezzarossi give examples of the racialization and relationships between African descendant communities and Indigenous groups under the casta system, Orser, Rowlands, and Funari's archaeological project at the Quilombo dos Palmares in Brazil provides new insight into the relationship between maroon and Indigenous communities in 16^{th} and 17^{th} century Latin America (Funari 2003; Sampek 2018: 168-169). Brazil is one of Latin Americas broadest spatial and temporal contexts and is home to the largest modern population of African descendant peoples in the Americas (Finneran and Sarpong 2025: 2). Quilombola refers to Brazilian maroon communities, often located in and around the Amazonian region of Brazil (Funari 2003; Sampeck 2018; Singleton and De Souza 2009: 462-463) Palmares, the largest quilombola in the Americas, existed during much of the seventeenth century and was formed by formerly enslaved Africans, criollos, and Indigenous people. Palmares capital, Serra da Barriga, uncovered ceramic evidence indicating a continuous occupation from the pre-colonial era to the end of colonialism, illuminating the shared use of space among Indigenous groups and African descendant groups (Menezes and Symanski 2023: 5-7).

Quilombola stems from the term quilombolo, which has multiple meanings. It reinforces the maroon community identity through shared experience in a landscape. This term highlights the connection of community memory and oral history tied to a specific location (Funari 2003; Sampeck 2018: 169). Quilombola can also denote a racial identity as a darker-skinned person in Brazil, emphasizing quilombolo and quilombola cultural groups as both a physical identity and a community identity tied to a place and shared history. This nuanced discussion of quilombolo bridges the discussion about community formation as a tool among Afro-Latin peoples in a context as diverse and large as Brazil (Funari 2003; Sampeck 2018: 169). While the quilombola example is specific to maroonage in Brazil, it provides new examples of the way African descendant communities formed identity and kinship tied to place.

Howard (2014, 2019) observed a similar relationship between community identity and place among Bocatoreños in Panamá. Howard (2014) interpreted this process of community formation in Bocas del Toro as a shared consciousness and identity created and reinforced through foodways as well as a shared sense of place (Howard, 2014: 87). Howard argues that community serves as a means for Bocatoreños to navigate and resist marginalization stemming from racialized colonial structures that affect both Afro-Latin and Indigenous peoples. He emphasizes the relevance of African Diaspora archaeology as both a contemporary political tool for community engagement and a complex academic discipline within the Caribbean coast of Central and Latin America.

This thesis contributes to Howard's work with a deeper investigation of one of the most widespread resources in Bocas' foodways: shellfish. Howard's previous ethnographic and archaeological findings identified food as an important facet of the Bocatoreño identity; thus, a closer examination of the changes and persistence of shellfish consumption helps illustrate the periods of formation of the Bocatoreño community in the 19th and 20th centuries through the lens of foodway practices.

Foodway Studies

Foodways refer to any activities or materials involved in obtaining and preparing food. While acquiring and preparing food is essential for human survival, individuals also make intentional choices within their subsistence strategies, transforming basic food into cuisine (Diaz-Andreau et al. 2005; Graff 2020; Mintz and Dubois 2002; Pavao-Zuckerman and DiPaolo Loren 2012; Pezzarossi et al. 2012). In contrast to food systems, which focus on the economic and physical infrastructure surrounding food, studies of foodways emphasize food as a form of cultural expression and intention (Diaz-Andreu et al. 2005; Graff 2020; Hunter et al. 2014; Rahn 2006; Lightfoot et al. 1998, 2009; Mintz and Dubois 2002; Pavao-Zuckerman and DiPaolo Loren 2012; Pezzarossi et al. 2012; Tourigny 2020; Twiss 2012).

Early anthropological studies, particularly those of Goody (1982), asserted that food preparation and consumption methods are inherently linked to a community's responses to geographical, historical, and socioeconomic contexts. This approach presents food procurement and cooking as responsive to external change. The expressions of individuals involved in food-related labor are therefore shaped by a complex intersection of identities that are reinforced by broader societal structures, including gender, ethnicity, class, and race (Graff, 2020; Hunter et al. 2014; Lightfoot et al. 1998, 2009; Pavao-Zuckerman and DiPaolo Loren 2012; Pezzarossi et al. 2012; Twiss 2012). Foodways are both responsive and enduring; they evolve while maintaining traditions that unite a community. Cultural structures and identities associated with foodways are further reinforced through everyday practices (DiPaolo Loren 2008; Graff 2018; Hall 2014; Lightfoot et al.1998, 2009; Silliman 2009; Voss 2008).

Morrison (2012) discusses the connection between food and cultural expression, highlighting that this relationship often begins with necessity or function. She uses the phrase "food with function" to illustrate this idea. This concept can be seen in both migratory and agricultural societies, where portable grain dishes like roti and tortillas were developed to meet economic and labor needs, eventually becoming cultural staples (Abarca 2003; Morrison 2012; Pezzarossi et al. 2012; Smith 2006; Trigg 2004). Jones (2007) emphasizes that communal eating fosters deep connections among individuals, making it difficult to separate foodways from the essence of community life. The labor involved in food procurement and preparation is often formed and reinforced through daily repeated actions, eventually creating community bonds through food traditions (Jones 2007: 162).

Daily practices can both change and persist in response to political, economic, and sociocultural influences. Changes in daily practice are often observed in colonial contexts where new cultural groups are brought together and negotiate change or persistence through everyday activities, such as those related to food (DiPaolo Loren 2008; Lightfoot 1998; Silliman 2009). Meals are essential in shaping the experiences of both those who prepare food and those who consume it, serving as a cornerstone for meaningful social exchanges (Atalay and Hastorf 2006; Spataro and Villing 2015). Trigg (2004) explored the connections between foodways and the evolution of cultural practices among Pueblo and Spanish colonial communities. Trigg found that Pueblo peoples engaged with colonial social and economic systems through their culinary traditions. This is particularly evident in their use of indigenous cooking methods to create traditional tortillas using European-introduced wheat. This case study highlighted the choices made by Pueblo cooks within new sociocultural dynamics.

The relationship between cooks and their communities is inherently collaborative; cooks often function as stewards of tradition while simultaneously infusing their own identities and choices into the dishes they create. This idea is further illustrated in Marshall's (2020) examination of the role of cooks within African Diaspora communities. Marshall contends that "cooks sought to create foods that enabled the survival of their communities and satisfied and gratified those who consumed them" (Marshall 2020: 74-75). This perspective underscores cooking as a fundamental aspect of social and cultural continuity within the community and an act of personal expression.

Food, Community, and Identity

Hastorf (2012) underscores food's significant role in shaping community and identity by exploring the social relationships that form around it. She observes that our food choices throughout the day often differ based on the social context of the meal, indicating that social interactions influence the decisions or intentions we make regarding a meal, and often meals are structured around social exchanges. Hastorf distinguishes between "daily cuisine" and "feast cuisine," with feasting being particularly impactful due to its association with deeper cultural meanings linked to religious practices and celebrating traditions. As a result, feasts or celebratory meals shared in social settings serve as powerful events that can bring groups together. Hastorf illustrates how individuals influence both macro and micro changes to their community's identity and foodway practices. Community identity and foodways are both prominent and dynamic, as smaller households and daily individual choices can influence a community's cultural expression surrounding food (Hunter et al. 2014; Pezzarossi et al. 2012; Van Derwarker et al. 2007).

Beyond their role in shaping and maintaining a community's identity through tradition and social and cultural practices, the actions and intentions surrounding foodways can also be responsive. This adaptability has been particularly salient in studies examining foodways within colonial contexts (Abarca 2003; Morrison 2012; Pezzarossi et al. 2012; Smith 2006; Trigg 2004; Voss 2008). In marginalized communities, food often serves as a powerful tool for unification and a means of expressing a shared identity and exercising choice within oppressive social frameworks (Bilby 1981; Bilby and Baird 1992; Brunache 2011; Franklin and Lee 2019; Houston 2007; Kelly 2008, 2014; Wallman 2020).

Colonial structures often intentionally weaken and dismantle the connective aspects of a community to exert control. The institution of slavery frequently forced individuals together from different backgrounds, leading to linguistic challenges and cultural barriers. The marginalization of Indigenous and African communities led to the formation of new cultural groups as a response to the destruction of their cultural connections in colonial contexts (Brunache 2011; Marshall 2021; Gomez 2005: 62-65; Mintz and Price 1976; Wilkie and Farnsworth 2010).

Brunache (2011) examines the experience of African slavery across the Caribbean, highlighting how enslaved Africans were forced to adapt to new foodways due to a lack of access to imported or familiar foods. This adaptation eventually led to Indigenous foodways becoming essential components of local Afro-Caribbean cuisine (Brunache, 2011: 184). Many foodway practices among African descendant communities did not develop in isolation; they typically relied on cultural exchanges with Indigenous peoples (Bilby 1981; Bilby and Baird 1992; Bauer and Agbe-Davies 2010). Many culinary traditions in the Caribbean emerged from blending West African cultural practices and Indigenous foodways (Balanzategui 2012, 2017; Kelly 2008; Kelly and Wallman 2014; Orser 1998; Orser and Funari 2001; Rucker 2001; Weik 2004).

Food insecurity and restrictions were prevalent among enslaved and Black communities throughout the colonial Americas and the Caribbean. These communities demonstrated creativity and resilience by supplementing their diets through hunting, fishing, and raising domestic fowl and edible plants. Foraging for low-cost resources helped to meet dietary needs while also providing opportunities for individuals to express choice in restrictive environments. Harvesting wild resources has often allowed marginalized communities to navigate oppressive social and economic structures and created opportunities for expression of community and tradition (Brunache, 2011; Kelly, 2009, 2014; Wallman, 2020).

Brunache (2011) further emphasizes the significant role of gender, particularly women, in adapting traditional African practices to local Indigenous foodways. This evidence illustrates the experiences of individuals involved in food-related labor and underscores how different identities influence preferences and choices regarding foodways. Specifically, the insights regarding gender reveal the crucial roles women play in African Diaspora communities, preserving tradition and expressing agency and choice that impact broader community practices (Wallman 2020: 1-4).

Wallman (2020) points out that foraging, particularly shellfish harvesting, is often a gendered activity, with the responsibility often falling to women, children, and the elderly (Gassiot Ballbè 2002: 44; Wallman 2020: 25). This supports Brunache's argument that foodways and subsistence practices facilitate intersections of identity in the case of gender, shellfish harvesting serves as both an adaptive cultural practice employed by enslaved and Afro-Caribbean communities out of necessity and a gendered task, empowering women through the sharing and exchanging of cultural knowledge for their communities with

Indigenous peoples and broader trade of food resources (Balanzategui 2012, 2017; Carney 2017; Kelly 2009, 2014; Orser 1998; Orser and Funari 2001; Rucker 2001; Wallman 2020; Weik 2004).

Shellfish and Foodways

Marine mollusks, commonly referred to as shellfish, are present in various archaeological contexts. Scholarly literature on these mollusks covers a broad spectrum of studies, including subsistence practices, economic trade, and expressions of cultural identity (Aldeias et al. 2016; Allen 2017; Armstrong 1979; Gassiot Ballbè 2013; Bouzouggar et al. 2007; Bowdler 2009; Claassen 1998; Waselkov 1987). Shellfish are often easy to forage and are readily available in coastal regions, frequently found in abundance at archaeological sites along coastlines. The more specialized study of mollusks in archaeology is called archaeomalacology. While zooarchaeology examines all types of animals remains, archaeomalacology focuses specifically on mollusks, with particular attention to the diverse uses of shells for things such as subsistence and adornment (Claassen 1998; Somerville et al. 2017).

It is estimated that marine mollusks make up to 85% of the edible meat found at coastal shell-bearing midden sites (Martin 2015: 238). Moreover, the extensive use of marine mollusks in coastal foodways provides evidence for changes or continuities in harvesting practices and cultural structures (Gassiot Ballbè 2013; Bouzouggar et al. 2007; Claassen 1991, 1998; Sampson 2015; Smith et al. 2019; Waselkov 1987). Due to their accessibility as a foraged resource, marine mollusks hold significant importance in local food traditions throughout the Caribbean and the Americas (Aldeias et al. 2016; Gassiot Ballbè 2013; Bar-Yosef Mayer 2002: 1).

While shellfish are often valued for their nutritional quality, they also serve various purposes. Shells have been used as building materials for roads and architecture, while some shells are prized for their aesthetic appeal, being transformed into beads, pigments, and funerary displays (Bouzouggar et al. 2007; Ford 1989; Hutterer et al. 2021). This variability highlights the diverse roles of marine mollusks within cultural practices and expression.

Although prior studies in archaeomalacology have often concentrated on pre-Columbian shell midden sites, assessing shellfish subsistence over long periods (Claassen 1998; Somerville et al. 2017). In recent years, archaeomalacological studies have explored the complexities of aspects of identity such as gender, political dynamics, and social hierarchies (Claassen 1991, 1998; Hastorf 2017; Moss 1993).

Hunter et al. (2014) examined the role of shellfish in the community and family foodways of the Eastern Pequot in Connecticut. Their research found that shellfish harvesting is highly valued within the community's food practices. For the Eastern Pequot in the 18th century, shellfish gathering was a culturally significant activity that connected the community to its traditions and helped them navigate the demographic shifts and restrictions within native reservations. Additionally, these traditions were primarily upheld by women, who passed down knowledge about shellfish harvesting, while informing changes in consumption over time. Their study highlighted the importance of harvesting local resources in shaping community identity and resilience, especially in restrictive environments. Due to the extensive use of marine mollusks in local food traditions, the study of these mollusks frequently intersects with food studies, emphasizing the significance of locally harvested resources for communities facing social and cultural marginalization (Claassen 1991, 1998; Hastorf 2017; Hunter et al. 2014).

Thesis Structure

This thesis presents the findings of an analysis of shellfish consumption at Sitio Drago across three different periods. It aims to explore how the food practices surrounding accessible and widely available resources, such as shellfish, can evolve and persist over time. Additionally, it posits that the foraging of shellfish and local foodways helped foster relationships between Afro-Caribbean and Indigenous people in the Bocas del Toro province, contributing to the formation of the Bocatoreño community in the 19th century.

This thesis is organized into five chapters. Chapter 2 provides a cultural history of Bocas del Toro, highlighting the long period of Indigenous occupation in the region and the demographic shifts at Sitio Drago concerning both Indigenous and African-descendant communities. This chapter discusses the early transactional relationship between Afro-Caribbeans and the Ngäbe-Buglé-Guaymí people in the 19th century, eventually forming kinship ties through shared foodways and socioeconomic need. Additionally, it explores how oral traditions and food strengthen and bolster community among Bocatoreños.

In addition to a cultural history overview, Chapter 2 provides a detailed outline of archaeological projects in Bocas del Toro, focusing specifically on the Sitio Drago site. It includes pre-Columbian archaeological findings from Martin (2015), O'Dea et al. (2014), and Wake et al. (2004, 2006, 2013), while centering on Howard's (2014) historical archaeological project, which involved excavating three units 49, 50, and 51 from which this thesis's data was compiled. The results of this thesis will be discussed in relation to these previous archaeological contexts.

Chapter 3 explores various methodology for examining shell-bearing sites and sampling shell assemblages, detailing the methods used in this analysis and the scope of the data examined. Chapter 4 presents the findings of this analysis, focusing on both spatial and temporal changes within the assemblage and a size selection analysis of common gastropods, specifically conch and West Indian top snails.

Finally, Chapter 5 reviews and discusses the results of this analysis with those of previous foodway studies conducted by Howard (2014). This comparison connects the research findings to broader scholarly discussions about the role of shellfish harvesting and consumption in local foodways and the relationship between food practices and community formation. The chapter concludes by discussing the relevance of this thesis within the larger context of academic works related to Afro-Indigenous relationships in Latin America.

CHAPTER 2
CULTURAL AND SITE HISTORY

The Bocas del Toro archipelago, located on the Caribbean coast of Panamá, has long been a center for trade and cultural exchange, both in pre-Columbian and post-Columbian times. Historical and archaeological evidence indicates that, before the colonial period, a vast network of Indigenous chiefdoms was established throughout Panamá, with some of the oldest chiefdoms located in the Bocas del Toro region (Martin 2015: 72-73). In 1502, Christopher Columbus encountered the region during his final voyage to the Western Hemisphere. Upon entering the Bocas del Toro corridor, he observed an outcrop resembling a bull lying on its side, which led him to describe the region as "Bocas del Toro (mouth of the bull)." Columbus recorded his interactions with the Indigenous community after he careened one of his ships on one of the islands, during which he traded with them for gold and eventually capturing two individuals to translate along their exploration of the coast (Dugard 2005: 167-168) This interaction with Columbus marks the first case of forced bondage from a colonial encounter along the Western Caribbean Coast of Central America (Dugard 2005; Howard 2014: 4-5).

Before Columbus's arrival, there had already been a decline in the occupation of Indigenous chiefdoms in the area. This decline was likely due to warring groups and conflicts, leading to the emergence of more isolated local communities known as the Doraces, Changuenas, Téribes, and by 1820, these communities had abandoned the region (Martin 2015: 73). It was only after the displacement of these groups from Sitio Drago that the Ngäbe-Buglé-Guaymí people migrated from the highlands of Western Panamá to Bocas de Toro, where they continue to reside in the interior of Isla Colón (Martin 2015: 73-74). Although early Bocas del Toro holds a unique position in Panamá's history, particularly as the national narrative often emphasizes the influence of Spanish imperial history, Bocas del Toro remained relatively isolated from the reach of the Spanish control until the 18th century.

Early attempts to settle the Bocas del Toro region were unsuccessful due to the challenges posed by the environment and resistance from Indigenous groups (Howard, 2014: 5). In 1745, the first English-speaking people from other Caribbean islands established settlements in Boca del Drago. Firsthand accounts by Samuel Gutierrez indicate that by the mid-18th century, they were raising cattle and chickens in Bocas del Drago (Howard, 2014: 5). Historical records indicate that the first Spanish-speaking inhabitants of Bocas del Toro originated from Colombia in the late 18th century (Heckadon Moreno 2011: 46; Howard 2014: 11, 84-85; Martin 2015: 73).

Although Spanish colonization and control were not present in Bocas del Toro until the 18th century, the region had encounters with pirates and privateers. Today, the region is rich with tales of pirates from the 17th and 18th centuries, referred to by Howard (2014) as the "Piratas" era. Many legends surrounding pirates continue to play a significant role in Bocatoreño culture. According to ethnographies and stories compiled by Heckadon Moreno (2011), Henderson (2012), and Howard (2014), the Bocas del Toro archipelago served as a sanctuary for pirates and privateers. During the 18th century, pirates and privateers began using these islands as safe havens and supply ports. Oral traditions from Bocas del Toro celebrate encounters of piracy to weave a shared narrative that emphasizes a history of resilience and defiance under colonial socioeconomic structure (Henderson 2012; Howard

2014:1-4). Howard (2014) captured the profound impact of this narrative with a Bocatoreño phrase: "Somos Piratas" - "we are pirates" (Howard 2014: 73).

During the 17th and 18th centuries, Bocas del Toro remained overlooked by structured colonial settlement and administration. By the early 19th century, disputes arose between neighboring territory governments in Colombia and Costa Rica over who should control the region, leading Colombia to claim Bocas del Toro in 1834. Throughout the late 19th and early 20th centuries, the territory's designation changed multiple times due to political shifts, instability, and boundary disagreements. The town of Bocas del Toro (known as Bocas del Drago) was founded in 1836 and initially inhabited by English-speaking immigrants from across the Caribbean, specifically Jamaica, San Andres, and Providencia (Alphonse 1938; Heckadon Moreno 2011; Howard 2014: 4). The presence of Afro-Caribbean people in Bocas highlights both the physical and cultural demographic impact resulting from the long period of forced movement of West Africans during the Trans-Atlantic slave trade.

Early documented evidence from 1523 indicates the presence of enslaved individuals from Senegambia in Panamá, Hispaniola, and other Spanish colonies such as Puerto Rico (Gomez 2005: 95). While most regions of the Spanish empire relied on the production of cacao, coffee, sugar, and indigo, Panamá, especially Panamá Viejo, primarily functioned as a trade outpost and an epicenter for slave auctions in Spanish-controlled regions of Central America. The port of Nombre de Dios, located on Panamá's western Caribbean coast, served as the initial entry point for most West Africans arriving in the Spanish-controlled Caribbean and the western coast of Central America (Gaitán Ammann 2012: 27; Guerrón Montero 2014: 31-32).

During the colonial and post-colonial periods, additional internal migration occurred of African Diaspora communities throughout the Americas. (Davis 2006; Finneran and Sarpong 2025). Finneran and Sarpong (2025) argue that the "movements and removements" of diasporic communities in the Caribbean and Americas during the late colonial and post-colonial periods have led to the emergence of new cultural identities and heritages. Finneran and Sarpong (2025) have coined the term "mesa-diasporas" to describe this phenomenon, emphasizing the cultural and heritage impacts of the migrations of African descendant groups within the Americas and the varying experiences of these communities.

Howard (2014) provides an early example of the application of the idea of the meso-diaspora through the late 18th-century narratives of Olaudah Equiano. Equiano was a former enslaved African who ultimately gained his freedom. He documented his experiences, starting from his capture in West Africa to his eventual liberation in the Caribbean. Throughout his travels on merchant ships in the Caribbean, Equiano observed the dynamics between Indigenous communities and Spanish colonial rule, noting that these Indigenous groups actively resisted Spanish control (Equiano 1789: 253; Howard 2014: 4). Equiano ultimately settled in Cape Gracias a Dios, near the modern borders of Nicaragua and Honduras, bringing with him several African peoples from Jamaica (Equiano 1789: 254; Howard 2014: 4). As an African traveling through the colonial Caribbean, Equiano's journey offers valuable insights into the social and cultural interactions and the impact of African people along the western Caribbean coast and into Central America. The migration of diaspora communities throughout the Americas had a significant impact on Bocas del Toro. Evident in the written records of Alphonse Pinart, a 19th-century French linguist and ethnologist, Pinart observed English merchants trading with a community in Boca del Drago that was "almost entirely of the African race" (Pinart 1885: 4).

By the late 19th century, Panamá was experiencing significant economic growth alongside new waves of migration. During this period of financial and infrastructural development, many individuals moved to Panamá, particularly for opportunities in railroad construction and the excavation of the Panamá Canal (McGuinness 2008; Heckadon Moreno 2011). This period of socioeconomic change attracted people from the Antilles islands in the Caribbean, with estimates suggesting that by the mid-20th century, around 200,000 Afro-Antilleans had moved to Panamá (Montero 2014: 29). Montero (2014) indicates that a historical tension has existed between English-speaking Afro-Antilleans and the broader Spanish-speaking Panamanian population. This tension often manifested as a perceived hierarchy based on language and the economic advantages associated with English versus Spanish in trade and infrastructure projects among the different African descendant communities in Panamá (Montero 2014: 33).

According to the narratives of Carlos Reid, a Bocatoreño man who lived in the early 20th century, the term "Criollo" was used to refer to English-speaking Afro-Caribbean people in the region (Heckadon Moreno 2011). Reid explains that the Criollo population in Bocas del Toro primarily consisted of Afro-Antilleans who migrated to the area for work during the 19th and early 20th centuries (Heckadon Moreno 2011; Boukman Barima 2013). This migration of English-speaking Afro-Caribbeans significantly altered socioeconomic relationships in Bocas del Drago and the wider Bocas del Toro province, which became a trade hub. The presence of English-speaking Afro-Caribbeans provided Indigenous peoples with intermediaries in new trade opportunities, fostering new relationships between these groups. By the 1880s, bananas emerged as a crucial resource in the Bocas del Toro trade economy, ultimately leading to the establishment of the United Fruit Company (Alphonse 1938; Heckadon Moreno 2011; Howard 2014: 4).

According to Ephraim Alphonse (1938), a Bocatoreño Christian minister, many of the Criollos who settled in Bocas were either migrants seeking work with the United Fruit Company or Protestant missionaries. Today, many Bocatoreños are trilingual, speaking English, Spanish, and the local dialect known as Guariguari (Alphonse 1938; Heckadon Moreno 2011; Howard 2014, 2019). The relationship between the Criollo and the Indigenous Ngäbe-Buglé-Guaymí people was initially strained but began to change in the 20th century. Carlos Reid attributes these changes in relationships to the growing presence of Christian missions in the area and to the Criollo community's practice of fostering Ngäbe-Buglé-Guaymí children, taking them into their homes and teaching them English and Christianity. Missions led by Afro-Caribbeans gained acceptance as they provided Indigenous people with new opportunities to engage in trade and commerce (Alphonse 1938; Heckadon Moreno, 2011).

The United Fruit Company brought about economic, social, political, and physical changes in the region. The company headquarters, located at the southern tip of Isla Colón, provided direct access for shipping through the Caribbean Sea. Bocas became a crucial hub between the mainland Panamánian banana plantations in Bastimentos and ports across the Caribbean (Heckadon-Moreno 2011; Howard 2014: 5-6). The Company's transformation of the southern tip of Isla Colón from a wetland into a structured town attracted people from all over the province, offering employment opportunities. Consequently, due to this geographic shift, the population in Bocas del Drago (Sitio Drago) declined. This change created new spaces for cultural exchange, ultimately forming the modern Bocatoreños community.

Sitio Drago

Panamá is a rich and diverse country with over 8,250 plant and animal species. The Bocas del Toro province in Panamá encompasses a variety of environments. The archipelago has been likened to the Galápagos of the Caribbean (Martin 2015: 75, 45). Within this chain of islands, Isla Colón stands out for its diverse landscapes, including mangrove estuaries, reefs, freshwater creeks, and tropical rainforests. Additionally, parts of the island's interior are utilized for livestock grazing and farming. The island provides economic benefits through its flora and fauna and is also home to the provincial capital, Bocas Town. The island chain and Almirante Bay shield the province from the open waves of the Caribbean (Figure 2.1), creating favorable conditions for various marine life habitats to thrive (Martin 2015: 44-46).

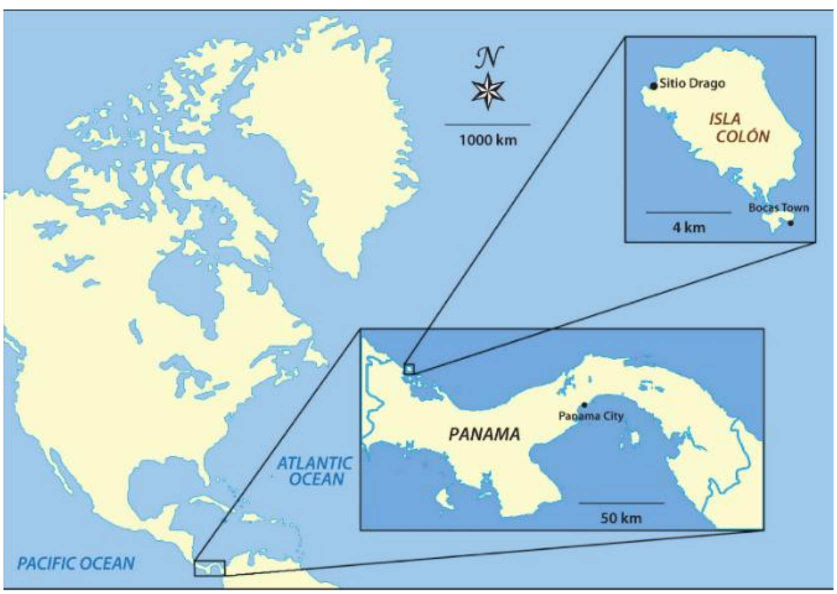

Figure. 2.1 Sitio Drago location and the Bocas del Toro Archipelago (Martin 2015: 45).

The earliest archaeological explorations in Panamá primarily focused on central and Western Panamá (Stirling and Stirling 1964; Linares 1968, 1976, 1977; Martin 2015: 26). In 1964, Stirling and Stirling conducted the first archaeological expedition in Isla Colón and the Almirante Bay regions. Their work involved identifying and documenting locally crafted ceramics to establish an occupation timeline in Bocas del Toro. Their findings suggested that early cultural artifacts were associated with small-scale, temporary settlements along coastlines. Subsequent investigations by Linares (1968, 1976, 1977) revealed numerous instances of an agricultural practice known as garden farming in the region. This process involved clearing small forests to cultivate plants that would attract wild game. Furthermore, Linares documented evidence indicating that early Spanish explorers had encountered established villages with chiefdom hierarchies in the area, as supported by Helms (1979), Linares (1977, 1976, 1968), Martin (2015), and Wake et al. (2004, 2006, 2013).

In 2002, Thomas Wake of the Zooarchaeology Laboratory at the University of California, Los Angeles (UCLA) and Christina Campbell, professor of Anthropology at California State University, Northridge (CSUN), conducted further archaeological investigations (Wake et al. 2004). In collaboration with Panamánian archaeologist Dr. Tomás Mendizábal, Wake initiated the Sitio Drago Archaeological Project to systematically collect materials through multiple excavations of 51 1x1 meter units from 2003 to 2012. Additionally, an archaeological survey was conducted within Isla Colón as part of the comprehensive recovery plan. Sitio Drago is in the northwestern region of Isla Colón and is known locally as Bocas del Drago (Figure 2.1).

Surveys and excavations took place from 2002 to 2009 on land owned by Don Aristides "Bolo" Serracín, a Bocatoreño who worked for the United Fruit Company. During construction on the Serracín property, Columbian and pre-Columbian artifacts were discovered mixed within the backfill from the excavation for a new house foundation. Subsequent archaeological excavations were initiated to recover and preserve these artifacts. The Serracín property encompasses 15 low mounds spread across 18 hectares, with cultural artifacts from inside the mounds dating from 750 AD to the present. These mounds are located near a cemetery used during prehistoric and historic periods of occupation of Sitio Drago (Howard 2014: 55-57).

In 2006, Howard established the Sitio Drago historical archaeological project, which built upon previous archaeological work on Isla Colón and concentrated on the post-Columbian period in Sitio Drago. The project employed an ethnographic approach, engaging with the Bocatoreño community to interpret the site. Howard's research delves into questions about cultural change and the development of an African Diasporic community in Bocas del Toro in the 19th century (Howard 2014: 54, 2019). The initial phase of the project involved gathering oral histories of Sitio Drago and using ethnographic data to conduct a surface survey. The surface collection extended to a restaurant owned by the Serracin family near the beach in Bocas del Drago. Artifacts such as ceramics, glass, beads, and bone were identified at the site (Howard 2014: 55). Following the surface survey, Howard delineated an area for a total station survey, focusing on a location 50 meters east of the Drago Historic Cemetery on the Iglesias property.

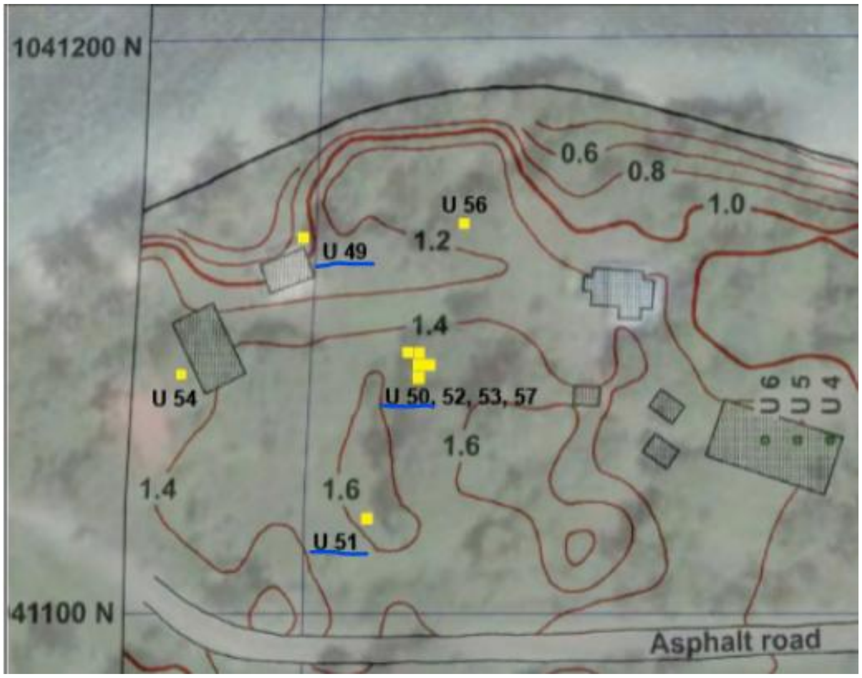

Figure 2.2 Bocas del Drago map and total station survey (Howard 2014).

Figure 2.3 Road through Bocas del Drago (Sitio Drago).

Howard revisited Sitio Drago in the summer of 2009, embarking on a more extensive historical archaeological research endeavor three years after his initial fieldwork. During this season, he utilized electrical resistivity surveys to inform the excavation of test pits. In addition to fieldwork, Howard focused on the project's historical and ethnographic aspects by interviewing older locals and gathering narratives. Notably, he observed significant beach erosion in Sitio Drago, with a 20-meter decrease from three years prior, exacerbated by a tropical storm in 2008 (Howard 2014: 55). The erosion issues led the Sitio Drago historical project to become a salvage project. Howard leveraged an existing survey datum established by land developers to delineate the site area. By integrating the datum and analyzing historical materials from previous units on Sitio Drago, Howard outlined an excavation site on the Iglesias property, adjacent to Sitio Drago and separated by a modern road (Figure 2.2, 2.3).

Howard's team conducted a pedestrian survey to identify clusters and patterns of surface artifacts along a grid within 30 meters of the shore. Following the surface survey, a grid of shovel test pits was dug southwest of the shoreline. The test pits were dug 100 meters inland from the shore in 5-meter intervals, from north to south and west to east. The. The test pits that yielded artifacts were expanded into 1 x 1-meter units and excavated in 10 cm arbitrary levels (Howard 2014: 56). From the STP survey, four test units were opened, with varying artifact assemblages. Test unit 1 produced few artifacts, while test unit 3, located on the shoreline, revealed a feature of an old road, although scarce with artifacts, providing evidence of the site shoreline erosion. Test unit 2 was denser with artifacts, specifically beads and pipe stems. Test unit 4 yielded the most variety in artifacts, including earthenware, whiteware, metals, glass, bone, and shell (Howard 2014: 57).

Howard revisited the site in the summer of 2010 to continue mapping the emerging historic site. His team integrated the 2009 field surveys with GPS and total-station-recorded spatial data to establish clear boundaries for the site. In 2010, the Sitio Drago historical archaeology project expanded its scope by identifying the foundations of historic structures through a magnetometer survey. The survey involved laying out six grids across the site: one on a low earthen mound near the Drago Historic Cemetery and two more inside the cemetery. Howard decided to survey the cemetery after discovering that its boundary had been more extensive in the past. The survey results were crucial in ensuring that the site boundary did not encroach upon the land around or within the cemetery, which had become overgrown and where many headstones were in disrepair. Mapping the boundary was a significant contribution to the community stakeholders. In the spring of 2011, Howard returned for a three-week geophysical survey as part of a community project to restore the deteriorated historic cemetery. The cemetery provided Howard with additional ethnographic data on the population and changes in life in Bocas del Drago and the greater Bocas del Toro region. The magnetometer survey also found anomalies on the Iglesias property, leading Howard to expand excavations to another field season in the summer of 2012 (Howard 2014: 60-61).

The summer 2012 excavation was focused on the adjacent property, owned originally by Alonso Iglesias. The Iglesias property is located across the modern street from the Serracin property (Figure 2.2). The Iglesias ancestors were some of the earliest Spanish speakers to settle in the region in the mid-1800s. The Iglesias homestead was occupied from the mid-19th century until 2003 (Howard 2014, 60). Howard used surveys and test unit excavations to identify artifact-dense areas on the Iglesias property. From these surveys, three 1 x 1 meter excavation units were opened on the Iglesias property. These units were identified as 49, 50, and 51, and all artifacts were sifted through a 3mm screen (Table 2.1) (Howard 2014: 60). The shells analyzed in this thesis were excavated in the summer of 2012 from units 49, 50, and 51 located on the Iglesias homestead in Sitio Drago.

Unit	*Location*	*Context*	*Depth*
49	Iglesias property near home structure and beach	Trash midden	97 cm
50	Iglesias property near the modern road	Low earthen mound	110 cm
51	Iglesias property near the modern road	Low earthen mound	132 cm

Table 2.1 Unit location, context, and maximum depth.

Unit 49 was selected for excavation because of its proximity to the original Iglesias home structure, where a new building was planned. Due to the construction of the new building, unit 49 was the first unit excavated to salvage and preserve its context. This unit was the shallowest excavated and was situated at the lowest elevation relative to sea level. It consisted of five natural stratigraphic layers but was excavated in arbitrary 10 cm levels. While attempting to adhere to a standard of 10 cm per level, the natural changes in the stratigraphy caused some levels to be less than 10 cm, resulting in the first level, located 8 cm below the surface, consisting of lightly colored, dry sand with numerous roots and crab holes. Artifacts recovered from this level included plastics, ferrous material, glass, bone, and fractured shells (Howard 2014: 62).

The first natural stratigraphic layer consisted of sandy loam and ended once the soil became moist. The following stratigraphic layer contained levels 8 cm to 32 cm, which were also broken into 10 cm intervals. These levels exhibited significant root activity and a sparse presence of artifacts, including colored bottle glass, ferrous material, bullet casings, and additional bone (Howard 2014: 62). At a depth of 32 cm, a noticeable change in the soil was observed, revealing a denser composition and a new layer. The soil in the third layer required water screening to break it up, and it was found to be even denser with artifacts, including shell beads, worked stones, and ceramics. Layer four, beginning at 64 cm, consisted of loose sandy soil. A grey ash feature was observed in the northwest corner, extending 2 cm before ending. The density of artifacts in layer four decreased significantly, but there was a noteworthy abundance of complete and unfractured shells. This layer also contained bone fragments and ceramic pieces. This stratigraphic layer continued to 97 cm, at which point the excavation of the unit ended due to flooding from the water table. (Howard, 2014: 62).

Unit 50 was opened at the base of a low earthen mound. Unlike unit 49, the surface layer of unit 50 was situated half a meter above sea level, on the edge of the mound. Unit 50 was also excavated at arbitrary 10 cm levels, while following the natural stratigraphy. The initial stratigraphic layer in unit 50 was 13 cm thick and consisted of sandy loam. Artifacts found in this layer included imported whiteware, locally crafted earthenware, glass, buttons, bones, shells, net sinkers, and ferrous material (Howard 2014: 63).

In the northwest corner of the unit, a second layer was discovered at a depth of 11cm, distinguished by a transition from dark loam to lighter soil. Artifacts recovered from this layer included ferrous material, glass, bone, and locally crafted ceramics. Stratigraphic layer three consisted of grey sand exposed in the northwest corner. The artifact assemblage in this layer comprised locally produced ceramics, bone, and shell. Importantly, imported artifacts, particularly ceramics and glass, were predominantly found in the southwest corner (Howard 2014: 63).

The fourth stratigraphic layer began at a depth of 40 cm and consisted of sandy loam similar to layer two. Within this layer, the artifact collection consisted predominantly of shells. Like the previous layer, the imported artifacts were concentrated in the southwest corner. Layer five commenced at 43 cm and displayed a distinctive feature in the northwest corner at 49 cm. This feature, mainly consisting of shell and fish bone, was excavated and sifted separately from the rest of the layer. Layer 6, spanning levels 70 cm to 91 cm, contained shells, bones, and locally crafted ceramics, coinciding with the increase in the water table. Unit 50 was identified as a partial historic midden in the southwest corner and was expanded to investigate it further.

Unit 51 consisted of four distinct stratigraphic layers and was also excavated at arbitrary 10 cm levels. The uppermost layer was sandy loam with a relatively low density of artifacts, including bone, shell, and imported glass. Below a depth of 3 cm, all imported artifacts and ceramics were absent, leaving the layer composed mainly of shells, with occasional fragments of locally made ceramics. The shells recovered from this layer underwent thorough water screening to remove soil residue (Howard 2014: 64).

The second layer started at a depth of 30 cm, where the soil changed from silt to a sandy loam. Artifacts found in this layer included locally made earthenware, bone, coral slabs, and shells. This layer extended to 50 cm before transitioning to the moist, color-changing soil of the third layer. The third layer contained lighter artifacts such as shells, ceramics, and bone and reached a depth of 122 cm. Most of the unit was in the third layer, except for the southeast corner, where layer four began at 72 cm. Layer four was characterized by grey ash and contained basalt flakes, extending to 92 cm before transitioning to yellow sand. Howard's analysis of the historic period excavations at Sitio

Drago suggested that the artifacts indicated a prolonged period of food-related activity. His examination of the imported ceramics from the site revealed diverse, colorful designs, emphasizing vessels suitable for cooking and consuming stews and other communal-type meals that incorporated many ingredients, such as marine mollusks, fish, and amphibians (Howard, 2014: 64).

Temporal Periods

Archaeological evidence from previous excavations and analyses at Sitio Drago was used to identify three distinct periods of occupation: pre-Biscuitware (800-1200 AD), Biscuitware (1200-1492 AD), and the Pirata period (1492 -1900AD) (Howard 2014; Wake et al. 2013). The periods of occupation for the site and assemblage were determined by combining ceramic analysis and radiocarbon dating (Howard 2014; Martin 2015; O'Dea et al. 2014; Wake et al. 2013). These occupation periods were established by analyzing local ceramics, which included a locally made ceramic known as Biscuitware (1210 AD-1450 AD). Using local ceramic analysis and 15 radiocarbon dates collected from Sitio Drago, the earliest period was defined as spanning from 800 AD to 1170 AD (Wake 2006: 14; Wake et al. 2013; O'Dea et al. 2014: 83). This earlier period of occupation, known as the pre-Biscuitware period (800 AD to 1200 AD) for its lack of local Biscuitware ceramic (Martin 2015: 57).

The Biscuitware Period (1200 AD – 1492 AD) marked a significant transformation in soil composition and the emergence of a distinctive type of fine, thin-walled, high-fired ceramic. These ceramics featured uniform beige hues complemented by geometric patterns and decorative motifs. Artifacts from the Biscuitware period have been found exclusively within the upper 30 to 40 centimeters of soil layers (Martin 2015: 58; Wake et al. 2013: 4), with deposits halting 10 to 20 centimeters below the surface.

In addition to the Biscuitware periods, Howard (2014) identified four distinct carbon dated layers, two dating to a pre-Columbian era (800-1492 AD) and two to a later period. Howard renamed these periods in his research as pre-Pirata 3 (800 AD- 980 AD), pre-Pirata 2 (AD 1040 – 1200), pre-Pirata 1 (1200 AD -1492 AD), Pirata 2 (1492 - mid to late 19th century), and Pirata 1 (mid to late 19th century - early 20th century). The pre–Pirata 2 and 3 were carbon dated between AD 1041 – AD 1206 and overlap with the pre-Biscuitware period (Howard 2014: 87). The periods Pirata 1 and 2 extended 0-40 cm and consisted of imported livestock bones in the assemblage, specifically pig and sheep bones. Howard also identified historic ceramics — refined earthenware such as stoneware, ironstone, pearlware, and creamware — in these levels (Howard 2014: 70, 139). In this thesis, these two periods are combined into a single period, known as Pirata (1492-1900 AD), to pay homage to the Bocatoreño oral histories and folklore relating to piracy. These phases highlighted key events told in local historical narratives and sought to connect the archaeology to the long presence of Indigenous and Afro-Caribbean people at Sitio Drago. This research uses the same naming conventions for temporal periods as those used by Howard and Wake to further highlight the rich history of Indigenous people and the African Diasporic community at Sitio Drago. Further sections refer to 800-1200AD as the pre-Biscuitware period, 1200-1492 AD as Biscuitware, and 1492-1900AD as the Pirata period.

Foodways and Zooarchaeology at Sitio Drago

The results of a previous zooarchaeological analysis at Sitio Drago indicated that shellfish were a prevalent resource at the site during the pre-Biscuitware and Biscuitware periods (Wake 2013: 5). Before the Pirata period (1492-1900AD), Sitio Drago's foodways relied heavily on the exploitation of mollusks (Martin 2015; Wake et al. 2013). According to Wake et al. (2013), the most collected mollusks required various labor and processing techniques, including the use of tools to extract bivalves from the seafloor and to harvest oysters from mangrove roots. Large-scale harvesting involved the use of rakes or openwork baskets, targeting species such as Venus clams and *Donax* sp. (coquina) (Wake et al. 2013: 5).

In addition to food sources, some of the marine mollusks identified at Sitio Drago during the pre-Biscuitware periods were related to adornment and expression. Martin (2015) noted that certain shells, particularly gastropods, were harvested for crafting into beads. Identified species included *Conus* sp. (cone snails), *Cypraea* sp. (cowries), and *Oliva reticularis* (olive snails). Some species were also determined to be used for making dyes, specifically *Purpura patula* (*Murex* or rock snail). Additionally, other mollusk taxa, such as *Lobatus gigas* (queen conch) and *Charonia variegata* (Atlantic trumpet), were noted for their dual purpose: providing a substantial food source while also being valued for making musical instruments (Martin 2015: 237).

While these findings revealed a diverse and abundant range of marine mollusks in the daily harvesting practices at Sitio Drago, there is also evidence of possible overharvesting. According to O'Dea et al. (2014), by the Biscuitware period, a noticeable decline in size selection and overall consumption of *Strombus pugilis* (fighting conch) was observed. This conch is a common and popular mollusk in Caribbean foodways (O'Dea et al. 2014: 8). Martin (2015) suggests that the overharvesting of preferred marine mollusks correlated to over harvesting of preferred species of mollusk, indicating that the villagers of Sitio Drago would have been compelled to compensate for this loss by supplementing their diets with less desirable species (Martin 2015: 238-239).

Most previous archaeological projects at Sitio Drago have focused on pre-Biscuitware and Biscuitware periods. However, Howard's (2014) research revealed artifacts from a later post-Columbian context that extended into the early 20th century. He determined that during the Pirata period, 100% of cooking wares were locally made (Howard 2014: 90, 142). Among the imported ceramics, 96% were cups and bowls intended for table service. His ceramic analysis highlighted a reliance on hollowware vessels for preparing and serving stews. Howard used local ethnographies and historical cultural contexts to interpret the findings of his ceramic analysis. He concluded that this dependence on hollowware was linked to a tradition of communal stew cooking stemming from Caribbean and West African influences (Howard 2014: 64).

Howard's findings indicated that the Bocatoreño community identity was shaped by food-related practices resonant with West African customs, such as communal eating and stew preparation (Howard 2014: 90). Additionally, his analysis of imported ceramics revealed a preference for vibrant, colorful designs. He suggested that this tradition of colorful expression remains significant in Bocas del Toro, particularly evident in the area's brightly painted buildings. This appreciation for color is a common characteristic among both the Bocatoreño people and the Indigenous Ngäbe-Buglé-Guaymí community in the region. Such shared admiration for color further supports the idea that cultural exchanges between African and Indigenous populations have profoundly influenced modern Bocatoreño culture (Howard 2014: 90).

This thesis draws on previous archaeological findings at Sitio Drago, specifically those of Howard (2014, 2019), to interpret the results of the analysis of marine mollusks excavated from units 49, 50, and 51 at Sitio Drago. The culinary traditions of the Bocatoreño people reflect their unique practices, including gathering shellfish and using locally crafted ceramics for preparing stews. They also have a notable preference for vibrant imported ceramics, particularly hollowware, which are associated with their communal, stew-based cuisine.

CHAPTER 3
METHODS

The previous botanical, faunal, and ceramic analyses conducted at Sitio Drago provided evidence of complex long-term foodway practices (Howard 2014, 2019; Martin 2015; Wake et al. 2004, 2006, 2013). This thesis sought to further understand changes and continuities of foodway practices through the analysis of shellfish deposits from Sitio Drago units 49, 50, and 51. An essential aspect of any shellfish analysis is determining the taphonomic processes affecting a shell deposit. Various taphonomic processes, such as fragmentation, boring, encrustation, and calcification, can alter the appearance of a shell (Claasen 1998: 54-57).

Shells found in deposits cannot be considered solely as foodway assemblages based on context alone. Taphonomic processes can indicate how different shell species may have ended up in the deposit. Mollusks with encrustation are less likely to be gathered for food because the presence of encrustation can indicate that the mollusk was dead (Adomat et al. 2016; Claassen 1998: 55). These markings can help differentiate shells related to food processing from those found in the assemblage due to environmental factors. Additionally, drilling occurs when parasitic species bore into the shell of a mollusk to obtain calcium and other nutrients. Boring or drilling can cause a shell to fracture and kill the mollusk. Dissolution is another process that leads to fracturing and can also provide clues to the origin of shells in an assemblage. Dissolution can occur when tropical mollusks grow in calcium-rich waters and are then displaced into low calcium-rich water, such as freshwater, resulting in weathering (Claassen 1998: 54-67).

The examination and classification of shell-bearing contexts is crucial for understanding the cultural uses and deposition of mollusks. According to Allen (2017), there are four main types of shell deposits: shell-rich scatters, homogeneous shell-rich masses, middens, and outlier deposits. Shell-rich scatters are shell patches from a single event, such as a yard surface or path. Homogeneous shell-rich masses are identified by their depth — generally deeper than a shell-rich scatter —and by their inconsistent structure in the deposit, unlike a shell midden. Middens result from repeated periods of deposition and can be formed from various activities such as foodways, tool making, and construction (Allen 2017: 219). The last deposit type is the outlier or unusual deposit, which may have significance beyond food or daily activities. These deposit classifications were employed to identify the individual deposits in the three units analyzed in this thesis. The shell deposit samples from units 50 and 51 represent middens due to the consistent presence of shells in every horizon and depth. Unit 49, on the other hand, exhibited differing consistency and shell deposit patterns, likely related to a smaller period of midden use or individual deposit events. While the size of a shell assemblage can vary, a typical rule is that it should comprise at least 200 shells to be a valid sample (Allen 2017: 219). All three-unit assemblages meet these criteria.

Shell Identification

After sorting and determining context, the next step in a shell analysis is taxonomic identification and the calculation of a minimum number of individuals. This calculation provides the base data for determining frequency and taxonomic representations. Several factors, such as weathering, can lead to misidentification, skewing the count of the minimum number of individuals in a shell assemblage. A traditional MNI count relies on a standardized system of diagnostic elements. Traditionally, a mollusk MNI count uses one diagnostic element from bivalves and gastropods. Bivalves are counted based on the presence of an umbo or connecting hinge between the two sides of the mollusk. Gastropods are counted by the presence of a columella or center spiral (Allen 2017; Bowdler 2009; Claassen 1991, 1998). While archaeologists use other diagnostic elements to measure size and growth, these two distinct elements are consistent when calculating the number of individuals present. Bivalves have a further step in identifying the side and size of the umbo to match individuals. This method accounts for shell fragmentation in counts to accurately represent individuals (Allen 2017; Bowdler 2009; Claassen 1991, 1998; Glassow 2000).

Harris et al. (2015) proposed a more accurate approach for attributing multiple Non-Repetitive Elements (NREs) to an MNI protocol. However, this method might result in overestimating the number of individuals within a particular assemblage (Bowdler 2009; Claassen 1991, 1998: 56-57; Glassow 2000). The decision to use multiple NREs and shell marks for analyzing shell deposition depends on the size of the shell assemblage. While this technique is suitable for smaller assemblages, it is not practical for larger data sets.

Glassow (2000) expressed concerns regarding using NRE-based MNI counts, suggesting that weight provides a more accurate indication of a species' representation within an assemblage. While this may apply to more significant midden sites, relying exclusively on weight to sample an assemblage could bias results and limit specific research opportunities by constraining the time available to note details and markings (Claassen 1998; Harris et al. 2015; Waselkov 1987). Additionally, Claassen (1998) stressed that, for bivalves, it is not prudent to assume the presence of both valve surfaces. Counting and measuring umbos provides a more precise representation of individuals (Claassen 1991, 1998; Harris et al. 2015; Woo 2016). I adopted this approach in this analysis, matching right bivalves with left ones based on the measured umbonal lengths to generate the MNI.

Lab Analysis

The first step in data collection involved consulting the field specimen catalog from Howard's 2012 excavation to select the samples for the assemblage. The shells used in this study were stored from 2012 to 2017 at the Smithsonian field station on Isla Colón in Bocas del Toro. These shells were in the same condition as when excavated and had not yet undergone processing in a lab. The field catalog linked field specimen numbers to unit numbers, excavated depth, and material identification, which provided valuable context for interpreting the excavation results. This analysis only included shells from Howard's 2012 excavation of Sitio Drago units 49, 50, and 51.

The initial sorting of the shells occurred during the field excavation. All excavated material underwent wet screening with a 3mm mesh, facilitating the separation of shells from other midden materials. Subsequently, the shells were collected in artifact bags of varying sizes, each labeled with a unique field specimen number; in total, 65 field specimen bags containing shell material were collected from units 49, 50, and 51. Given the samples' substantial volume and the shell's minimal fracturing, the lab analysis methodology focused on identifying and measuring distinct diagnostic elements to conduct an MNI count.

Although various mollusk classes can be discovered at archaeological sites, the shell assemblage excavated from Sitio Drago was comprised solely of bivalves and gastropods. For bivalves, I focused on identifying and measuring the length and precise location of the umbo hinges, as hinge location is essential for determining whether an umbo is from the left or right side. This distinction is critical for calculating the (MNI) within bivalves. In the case of gastropods, the columella count was the sole element necessary for MNI determinations. For unfractured or only slightly fractured specimens, I measured the gastropod's total length (including the spire) and the dimensions of the aperture opening and the lip thickness. These measurements facilitated a size-selection analysis, which I subsequently compared with the findings of O'Dea et al. (2014) on size selection in fighting conch resulting from prehistoric subsistence harvesting.

In both mollusk classes, it was determined that any diagnostic elements must be complete to qualify for inclusion in the assemblage's MNI calculation. However, incomplete or fractured NREs with at least 60% present were also documented in the laboratory catalog. All diagnostic specimens were precisely measured using a digital caliper to the nearest tenth of a millimeter. Throughout the sorting process, I relied on the taxonomic identification resources from the Smithsonian Tropical Research Institute's field species database (Smithsonian Tropical Research Institute 2020). However, it is important to note that not all species in the database have accompanying images. Many species were cross-referenced in *A Field Guide to Shells: Atlantic Gulf Coasts and the West Indies* (Abbott and Morris 1995), the World Register of Marine Species database (2019), and *Guide to Seashells of the World* (Oliver and James 2004). Due to external weathering factors, identification markers were not always present at the species level; however, during the identification process, taxa that could not be classified to genus or species were identified down to the taxonomic family.

Using the field specimen numbers assigned to the sorted shells, I accurately identified the excavation unit and its corresponding level. These field specimen numbers helped me organize the shells into unit-specific catalogs. Before calculating the MNI, I first determined the Number of Identified Specimens (NISP). The bivalves MNI count relied on the presence of left and right valves of the same size corresponding to the same excavation level. Only complete specimens were included in the MNI count, while all noted fractured pieces were recorded in the NISP. The MNI for gastropods was determined solely based on the presence of the columella.

In addition to MNI counts, the lab analysis noted measurements of diagnostic pieces to assess changes in the average size of taxa over different periods. Size distribution was chosen for this analysis because it correlates with external factors such as overharvesting and environmental change. Based on previous findings by Wake et al. (2013) and O'Dea et al. (2014), the *Strombus pugilis* (fighting conch) showed a decline in size selection from the pre-Biscuitware to the Biscuitware period. This was determined to be part of a larger pattern of decline in the exploitation of specific resources, in correlation with a community overextending its environment's carrying capacity. Based on this observation, this analysis focused on measuring the most common gastropod taxa (*S. pugilis*, *Lobatus raninus*, and *Cittarium pica*) to determine whether a decline in size selection was also observed in other species and to identify the impacts of such a decline on the assemblage. Gastropod size was measured by the length of the columella, including the spire (Figure 3). The measurements were rounded to 10mm intervals.

Figure 3. Example of protocol for measuring gastropod length, photograph by Melody Henkel.

Due to the collection's extensive size, identifying specific shell species proved challenging at times, as the tropical climate and acidic soils could alter shell colors and patterns. When exact species could not be determined, they were categorized by family or genus. This method streamlined the data collection process while still providing valuable information for analysis.

After consolidating all the data into a primary catalog, three sub-catalogs were created for units 49, 50, and 51. These units varied in terms of deposit size, volume, location, and depth. Separate shell catalogs were developed for each unit to facilitate comparisons and address unit-specific research questions. The grouped data was then analyzed using pivot tables to generate statistics and visual representations. In addition to utilizing Howard's catalog for field specimen data, it was also employed to compare findings with other materials related to foodways, such as ceramics and animal bones.

CHAPTER 4
RESULTS

The 2012 excavation of the Iglesias property in Sitio Drago led to the sorting and cataloging of 141 field specimens, resulting in a total of 7,094 NISP across 71 identified taxonomic categories. These categories included 2 classes, 4 families, 9 genera, and 56 species. Notably, bivalves accounted for 89% of the assemblage NISP and 82% of the assemblage MNI. Although bivalves exhibited a higher MNI than gastropods, their species diversity was comparable, with bivalve species representing 55% of the identified species (see Table 4.1). Remarkably, 81% of the total assemblage MNI was attributed to just 10 species (see Table 4.2). All identified taxa were organized into a comprehensive site assemblage, including calculated MNI, and were further categorized into specific units and temporal period assemblages for detailed analysis.

Mollusk Class	NISP		MNI		Identified Taxa
	Count	%	Count	%	Count
Bivalves	6,349	89	3,492	83	31
Gastropods	744	11	711	17	25
Total	7,094	100	4,203	100	56

Table 4.1 NISP and MNI of mollusk class.

Mollusk Classification	
Bivalve Taxon	MNI Count
Anadara notabilis (eared ark)	1,178
Arca zebra (turkey wing ark)	748
Anomalocardia cuneimeris (pointed Venus)	125
Crassostrea rhizophorae (mangrove cupped oyster)	519
Codakia orbicularis (tiger lucine)	105
Donax sp.	239
Tivela mactroides	101
Gastropod Taxon	MNI Count
Lobatus raninus (hawkwing conch)	164
Cittarium pica (West Indian top snail)	118
Murex sp.	112
Total MNI of Assemblage	4,237

Table 4.2 Top ten identified taxa in assemblage.

Taxonomic Family	Taxon	pre-Biscuitware	Biscuitware	Pirata	Total MNI
Arcidae (ark clams)					2,027
	Anadara Chemnitzii (Chemnitz ark)	12	7	4	23
	Anadara notabilis (eared ark)	258	215	705	1178
	Anadara transversa (transverse ark)	7	6	12	25
	Arca zebra (turkey wing ark)	238	132	378	748
	Barbatia candida (white-bearded ark)	7			7
	Barbatia sp. (bearded ark)	16	1	4	21
	Barbatia tenera (Doc Bales ark)	14	4	7	25
Cardiidae (cockle)					22
	Cardiidae sp. (cockle)			1	1
	Americardia media (Atlantic strawberry cockle)	6	2	4	12
	Laevicardium crassum (egg cockle)			1	1
	Trachycardium muricatum (yellow prickly cockle)	1	2	5	8
Chamaidae					
	Chamaidae sp. (jewel box)	20	12	14	46
Donacidae (clam)					
	Donax sp. (coquina)	95	81	63	239
Isognomonidae (oyster)					58
	Isognomon alatus (flat tree oyster)	2	6	4	12
	Isognomon radiatus (radial purse oyster)	29	10	7	46
Lucinidae (lucine clam)					107
	Codakia orbicularis (tiger lucine)	35	19	51	105
	Phacoides pectinatus (thick lucine)			2	2

Table 4.3 Comparing bivalve taxon MNI totals compared by temporal periods.

Table 4.3 continued					
Taxonomic Family	Taxon	pre-Biscuitware	Biscuitware	Pirata	Total MNI
Mactridae (clam)					16
	Mactroma fragilis (fragile surf clam)	1			1
	Mactrellona alata (Caribbean winged mactra)	6	2	1	9
Mytilidae (mussel)					17
	Brachidontes sp. (mussel)	4	1		5
	Brachidontes domingensis (Santo Domingo mussel)	11			11
	Brachidontes exustus (scorched mussel)		1		1
Ostreidae (oyster)					
	Crassostrea rhizophorae (cupped mangrove oyster)	384	106	29	519
Pectinidae (scallop)					
	Euvola ziczac (zig zag scallop)	2	1	7	10
Plicatulidae (clam)					
	Plicatula gibbosa (kittens' paw)		1		1
Pteriidae (oyster)					
	Pteria colymbus (Atlantic winged oyster)	17	8	1	26
Tellinidae (tellin)					4
	Tellinidae sp. (tellin)		2	1	3
	Tellina alternata (alternate tellin)		1		1
Veneridae (Venus clam)					400
	Anomalocardia cuneimeris (pointed Venus)	51	64	10	125
	Chione cancellata (cross-barred Venus)	16	27	38	81
	Hysteroconcha dione (elegant Venus)	16	40	5	61
	Lirophora paphia (king Venus)	10	4	14	28
	Periglypta listeri (princess Venus)	3		1	4
	Tivela mactroides	44	51	6	101
	Total number of specimens	1,305	806	1,381	3,492

Taxonomic Family	Taxon	pre-Biscuitware	Biscuitware	Pirata	Total MNI
Bullidae (bubble snail)					
	Bulla occidentalis (bubble snail)			1	1
Cassidae					
	Semicassis granulata (scotch bonnet)		1		1
Cerithiidae					
	Cerithiidae sp. (cerith)	3	9	12	24
Charoniidae					
	Charonia tritonis (tritons trumpet)	1			1
Conidae (cone)					26
	Conasprella jaspidae (jasper cone)		2		2
	Conidae sp. (cone)	5	6	11	22
	Conus mus (mouse cone)			2	2
Cypraeidae					
	Cypraeidae sp. (cowry)	1		7	8
Fasciolariidae					56
	Cinctura lilium (banded tulip)			4	4
	Fasciolaria tulipa (tulip)	13	5	28	46
	Leucozonia nassa (chestnut latirus)		3		3
	Polygona angulata (spindle snail)			1	1
	Terebra salleana (auger snail)			1	1
	Triplofusus giganteus (horse conch)			1	1
Littorinidae					
	Littoraria angulifera (mangrove periwinkle)			1	1
Melongenidae					
	Melongena melongena (Caribbean crown conch)	15	5		20

Table 4.4 Comparing gastropod MNI totals compared by temporal periods.

Table 4.4 continued					
Taxonomic Family	Taxon	pre-Biscuitware	Biscuitware	Pirata	Total MNI
Muricidae (*Murex*)					
	Murex sp.	32	13	67	12
Nassariidae					
	Nassarius albus (white nassa)			1	1
Naticidae					
	Polinices lacteus (moon snail)		2	3	5
Neritidae					
	Nerita sp.		1	1	2
Olividae (olive)					
	Oliva reticularis (olive snail)			1	1
Pisaniidae					
	Cantharus multangulus (ribbed Cantharus)	1			1
Strombidae (conch)					301
	Lobatus gigas (queen conch)	1	2	2	5
	Lobatus raninus (hawkwing conch)	45	55	64	164
	Macrostrombus costatus (milk conch)	3	2	2	7
	Strombidae sp. (conch)	5	4	37	46
	Strombus pugilis (fighting conch)	37	16	26	79
Tegulidae (top snail)					149
	Cittarium pica (West Indian top snail)	3	2	113	118
	Tegula viridula	1		22	23
	Trochoidea sp. (top snail)	4	2	2	8
Turbinidae					
	Astraea americana (American star snail)			1	1
	Total number of specimens	170	130	411	711

Identified Taxa

The most identified bivalves were from the Arcidae family, also known as ark clams. Ark clams live in shallow water and burrow in sandy silt, mud, and seagrass beds (Locally Managed Marine Area Network 2023). Seven species of ark clam were identified: *Anadara chemnitzii* (Chemnitz ark), *A. notabilis* (eared ark clam), *A. transversa* (transverse ark), *Barbatia barbata* (ark clam), *B. cancellaria* (red brown ark clam), *B. tenera* (bales doc ark), and *Arca zebra* (turkey wing) (Table 4.3, Figure 4.1, Figure 4.2). Although species were identified, the MNI from *Anadara notabilis* (eared ark) and *Arca zebra* (turkey wing ark) contributed to 95% of all ark clams.

Ark clams are marine mollusks commonly found in coastal diets and widely distributed, growing in littoral sand and mud intertidal/marginally subtidal environments (Bar-Yosef 2005). Due to their broad habitat, they are common in all the tidal zones surrounding Isla Colón. Ark clams are a low-cost, readily gathered food source that can be used for cooking or as fishing bait (Allen 2017: 215; Carpenter and Volker 1998; Faulkner 2009). Many ark shells in the assemblage were not fragmented, indicating they were opened by heat.

Figure 4.1 Top eared ark clams. Bottom *Arca zebra* (turkey wing), photograph by Melody Henkel.

Figure 4.2 Umbo of ark clams, photograph by Melody Henkel.

A significant presence of individuals from the Arcidae family (ark clams) characterized the bivalve assemblage, but Venus clams, from the Veneridae family (Table 4.3, Figures 4.4, 4.5), stood out, with an MNI count of 400. Venus clams share similar habitats with ark clams, typically found along coastlines, where they burrow in littoral zones and reef environments (Bowdler 2009; Conteras 2008; Carpenter and Volker 1998). Furthermore, the Lucinidae family (Figure 4.3) played a significant role in the assemblage, comprising 107 individuals and two species, *Codakia orbicularis* (tiger lucine) and *Phacoides pectinata* (thick lucine) (Table 4.3). Lucines are generally located in littoral and sublittoral zones (Denadai 2015; Patrick 2015; Turgeon et al. 2009; Conteras 2008; Carpenter and Volker 1998; WORMS 2019). The assemblage contained smaller bivalves, such as *Donax* sp. (Figure 4.3), also known as coquinas, totaling 239 individuals (Table 4.2 and 4.3). *Donax* habitats range from near the shore to deeper waters and are often used as bait for fish (Turgeon et al. 2009; Carpenter and Volker 1998).

Figure. 4.3 Top lucine. Bottom *Donax*, photograph by Melody Henkel.

Figure 4.4 Venus clams, photograph by Melody Henkel.

Figure. 4.5 Umbos of Venus clams. Photograph by Melody Henkel.

A significant presence of individuals from the Arcidae family (ark clams) characterized the bivalve assemblage, but Venus clams, from the Veneridae family (Table 4.3, Figures 4.4, 4.5), stood out, with an MNI count of 400. Venus clams share similar habitats with ark clams, typically found along coastlines, where they burrow in littoral zones and reef environments (Bowdler 2009; Conteras 2008; Carpenter and Volker 1998). Other common families of bivalves included: the Lucinidae family (lucines) (Figure 4.3). Lucines played a significant role in the assemblage, comprising 107 individuals and two species, *Codakia orbicularis* (tiger lucine) and *Phacoides pectinata* (thick lucine) (Table 4.3). Lucines are generally located in littoral and sublittoral zones (Denadai 2015; Patrick 2015; Turgeon et al. 2009; Conteras 2008; Carpenter and Volker 1998; WORMS 2019). The assemblage contained smaller bivalves, such as *Donax* sp. (Figure 4.3), also known as coquinas, totaling 239 individuals (Table 4.2 and 4.3). *Donax* habitats range from near the shore to deeper waters and are often used as bait for fish (Turgeon et al. 2009; Carpenter and Volker 1998).

Figure 4.6 Map of Isla Colón estuaries.

Although bivalves were the most common mollusk class in the assemblage, gastropods had an MNI count of 711, with 25 different identified species (Table 4.1). The conch shell was the most prevalent gastropod taxonomic group, with four identified species. The species *L. raninus* (hawkwing conch) had the highest count with 164 individuals (Table 4.2, 4.3), followed by *S. pugilis* (fighting conch) with 79 individuals (Table 4.3). Notably, *L. gigas* (queen conch), known for its large size, only had a count of five individuals in the assemblage. The scarcity of queen conch shells was unexpected, given their high value as a marine resource in the Caribbean (Doerr and Hill 2018). According to O'Dea et al. (2014), the lower count of queen conches in the area and in previous assemblages from Sitio Drago may be due to queen conch being rarer in the region than other conch species. Another possible explanation for this lower count is the weight of the queen conch. Larger conchs are often removed from the shell on the shore immediately after harvesting (NOAA 2022; O'Dea et al. 2014; Sullivan et al. 2021). The absence of the queen conch suggests the possibility of conch shell middens further down the coast near the seagrass beds and sand flats. Although this is also possible, it seems implausible due to the lack of conch middens found in coastal surveys around Sitio Drago (O'Dea et al. 2014).

In addition to conch, the assemblage includes other common gastropods such as *Cittarium pica* (West Indian top snail) (Figure 4.7) with a count of 118 individuals (Table 4.2, 4.4) and the *Murex* sp. with 113 individuals (Table 4.2 and 4.4). Both species thrive in intertidal and subtidal zones (Carpenter and Volker, 1998; Robertson 2003). Just south of Sitio Drago, near the estuary's opening on the island's eastern side, there is a shallow reef and sandy area (Figure 4.6). The environmental conditions in this location create ideal habitats for many of the gastropod species represented in the assemblage.

Figure. 4.7 *Cittarium pica* (West Indian top snail). Photograph by Melody Henkel.

Spatial Distribution of Mollusks

Following the calculation of the MNI values for the assemblage, additional spatial and temporal comparisons were conducted. The spatial distribution analysis of the units at Sitio Drago revealed a significant concentration of activity around unit 51. Units 51 and 50 are located on a low earthen mound at the edge of the Iglesias property, adjacent to the modern road adjacent to the site. Remarkably, 74% of the total shell material was identified within unit 51 (Table 4.5). While this unit contained the highest overall percentage of shell material, unit 49 demonstrated the most substantial percentage of oyster shells, indicating a potential spatial pattern in oyster distribution (Figure 4.8).

Level (cm)	Unit 49		Unit 50		Unit 51		Total
	Count	%	Count	%	Count	%	
0-10	10	2	26	5	117	4	153
10-20	6	1	88	16	732	24	826
20-30	17	3	63	12	523	17	603
30-40	17	3	36	7	158	5	211
40-50	90	6	21	4	52	2	163
50-60	118	1	11	2	113	4	242
60-70	-	0	16	3	139	4	155
70-80	90	16	55	10	231	7	376
80-90	64	11	35	6	166	5	265
90-100	145	26	89	16	122	4	356
100-110	-	-	106	19	452	15	558
112-122	-	-	-	-	2	-	2
122-132	-	-	-	-	294	9	294
Unit Total	557	100	546	1.00	3,101	100	4,204

Table 4.5 Comparing percentage of MNI by unit and level.

Taxonomic Family	Unit 49		Unit 50		Unit 51	
	Count	%	Count	%	Count	%
Bullidae (bubble snail)	-	-	-	-	1	-
Cassidae (Scotch bonnet)	-	-	-	-	1	-
Cerithiidae (cerith)	3	3	5	7	16	3
Charoniidae (Tritons trumpet)	-	-	-	-	1	-
Conidae (cone)	8	8	3	4	15	3
Cypraeidae (cowry)	1	1	3	4	4	1
Fasciolariidae (tulip)	5	5	5	7	46	8
Littorinidae (periwinkle)	1	1	-	-	-	-
Melongenidae (crown conch)	2	2	1	1	17	3
Muricidae (M*urex*)	7	7	9	13	96	18
Nassariidae	1	1	-	-	-	-
Naticidae (moon snail)	2	2	-	-	3	1
Neritidae	1	1	-	-	1	-
Olividae (olive snail)	-	-	-	-	1	-
Pisaniidae	-	-	-	-	1	-
Strombidae (conch)	60	63	30	44	211	39
Tegulidae (top snail)	4	4	12	18	133	24
Turbinidae	-	-	-	-	1	-
Unit Total MNI	95	100	68	100	548	100

Table 4.6 Comparing percentages of total gastropod MNI within units.

Taxonomic Family	Unit 49		Unit 50		Unit 51	
	Count	%	Count	%	Count	%
Arcidae (ark clam)	123	27	252	53	1652	65
Chamaidae (jewel box)	4	1	3	1	39	2
Cardiidae (cockle)	2	0	4	1	16	1
Donacidae (*Donax*)	56	12	73	15	110	4
Isognomonidae (oyster)	23	5	6	1	29	1
Lucinidae (lucine)	11	2	15	3	81	3
Mactridae (duck clam)	1	0	-	-	15	1
Mytilidae (mussel)	6	1	4	1	7	0
Ostreidae (oyster)	171	37	44	9	304	12
Pteriidae (oyster)	12	3	1	0	13	1
Pectinidae (scallop)	-	-	-	-	10	0
Plicatulidae (kittens' paw)	-	-	-	-	1	0
Tellinidae (tellin)	1	-	-	-	3	0
Veneridae (Venus clam)	52	11	76	16	272	11
Unit Total MNI	462	100	478	100	2,552	100

Table 4.7 Comparing percentages of common bivalves MNI within units.

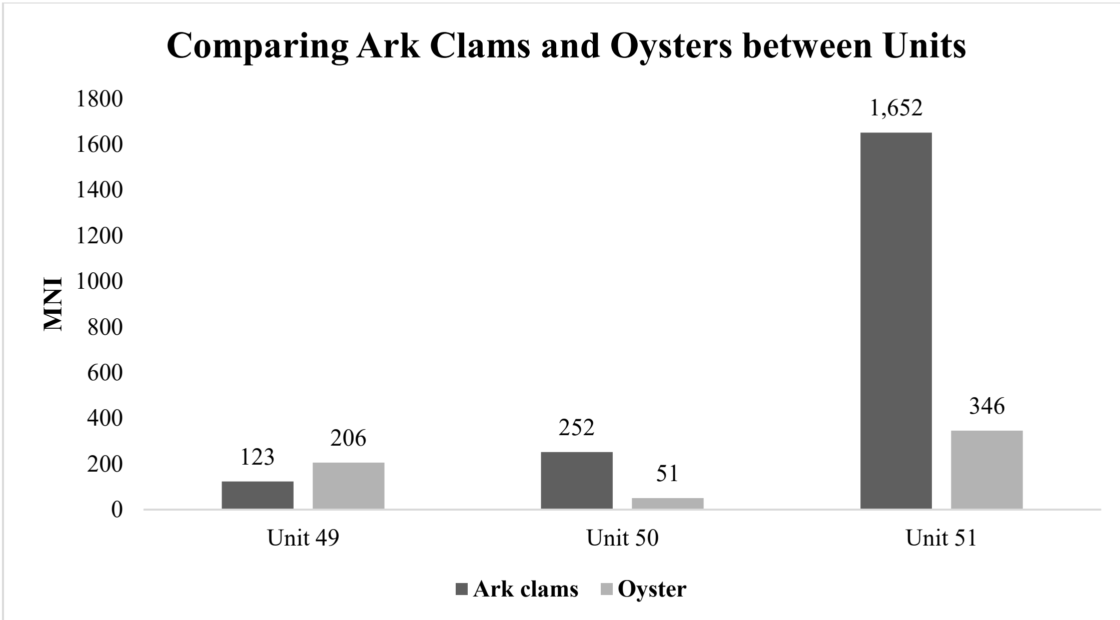

Figure 4.8 Comparing percentages total ark clams and oysters MNI across site units.

Comparing Taxa MNI between Units

The assemblages from each unit were compared, revealing that units 49 and 50 had similar depths and volumes of deposited shells. Unit 49 had a total count of 557, and unit 50 had a count of 546 (Table 4.5). Additionally, unit 49 had 39 families, genus, and species, three exclusive taxa to this unit. The less frequently encountered taxa were evenly distributed between bivalves and gastropods. The unique taxa specific to this unit includes one *Tellina alternata* (alternate tellin), three *Leucozonia nassa* (chestnut latirus), and one *Littoraria angulifera* (periwinkle).

In addition, the unit produced 206 oysters, 44% of the unit's bivalves (Table 4.7, Figure 4.8). The oysters were collected during the pre-Biscuitware period, from layers 77 to 97 cm, with minimal associated artifacts. An ash feature at 64-66 cm covered the oyster deposits, suggesting that unit 49 might have been linked to a small shell midden that was later filled with ash and used as a trash scatter (Howard 2014: 62). The conch species made up 67% of unit 49 gastropods (Table 4.6).

Unit 50 exhibited a shell composition similar to that of unit 49, accounting for only 13% of the overall shell assemblage. This unit comprises 35 families, genera, and species, 3 of which are unique to this unit. The unique taxa identified included *Triplofusus giganteus* (horse conch), *Conus mus* (mouse cone), and *Terebra salleana* (auger snail). Units 51 and 50 shared spatial similarities and artifact deposits. This is because unit 51 was opened to follow the features within unit 50. Unit 51 contained 72% of the total shell assemblage. Unit 51 had 55 families, genus, and species. Unit 51 had 20 taxa specific to the unit; notable among them were *Tegula viridula* with 23 individuals, *Euvola ziczac with* 10, and *Barbatia cancellaria* with 7. The unit 51 specific taxa were concentrated in levels 10-40 cm, with a significant amount found at 10-20 cm. These levels also saw an increase in marine snails, including West Indian top snails, tulips, murex, and *Tegula viridula* (Table 4.6). In addition to the *Tegula viridula*, the *E. ziczac*, commonly called the zigzag scallop, was another taxon unique to unit 51, that was heavily concentrated in levels 20-40 cm (Table 4.7).

The most observed difference among units 49, 50, and 51 was the presence of oysters. While units 50 and 51 contained more ark clams (Table 4.7), unit 49 comprised 44% oysters compared to only 25% ark clams (Figure 4.8, Table 4.7). In addition to bivalves, all three units demonstrated a significant prevalence of conch shells, with unit 49 accounting for 67% of the total (Table 4.6). Although unit 51 exhibited the highest concentration of ark clams among the three (Table 4.7 and Figure 4.8), substantial quantities of ark clams were present in each unit. Moreover, these clams were collected with minimal signs of fragmentation, suggesting that the shells may have been opened using steam or heat (Figure 4.1, 4.2).

The most significant variation in shell deposits was observed between units 49 and 51. Unit 49 contained a relatively small number of shells, primarily retrieved from depths of 40 cm to 132 cm, with a noticeable decline in quantity observed in deeper levels (Table 4.5). Beyond the density of deposits in the deeper levels, unit 49 also demonstrated a more significant disparity in shell taxa diversity when compared to units 50 and 51. Units 50 and 51 were found to be part of a shared low earthen mound and exhibited similar deposit patterns of shellfish (Tables 4.5 and 4.6, 4.7). Although unit 50 shared the same low earthen mound context with 51, the shell deposits in unit 51 had a greater depth spanning 132 cm (Table 4.5). Based on these findings, it can be inferred that unit 51 was the initial midden, with the surrounding area, including unit 50, gradually expanding the midden's boundaries over time through continued use.

Comparing Taxa MNI Between Temporal Periods

During the Pirata period, there was a notable increase in the utilization of ark clams as a food source compared to other bivalves. Additionally, there was a shift in gastropod consumption, with a preference for the West Indian top snail over the conch (Figure 4.10, Table 4.4). This shift contrasts with the earlier pre-Biscuitware period, during which only a limited percentage of the West Indian top snail was consumed. Moreover, there was a decrease in the consumption of the fighting conch and an increase in the consumption of the hawkwing conch (Table 4.10, Table 4.4). These changes coincided with significant shifts in occupation at Sitio Drago.

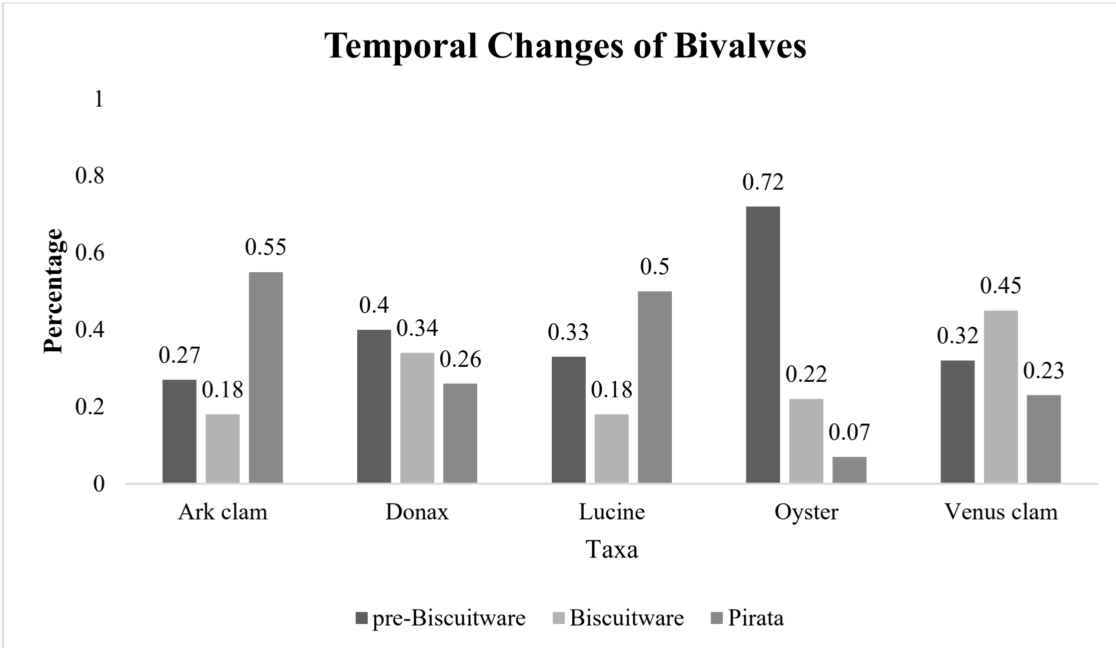

Figure 4.9 Comparing changes to the percentage of common bivalve taxa between temporal periods.

Taxa MNI percentages were calculated for each period, and the proportional representation of these families was subsequently compared across three distinct temporal phases in Sitio Drago. The bivalve groups examined included ark clams, *Donax*, oysters, lucines, and Venus clams. The MNI percentages revealed changes to consumption trends: ark clams increased over time, while oysters and *Donax* diminished. Lucines experienced a decline leading into the Biscuitware period, whereas Venus clams increased during the Biscuitware period before decreasing into the Pirata period (Figure 4.9, Table 4.3).

A notable relationship emerged in the shifting percentages of ark clams and oysters throughout each period. Ark clams remained consistently present in larger percentages across all levels. Still, they exhibited a steady increase into the Pirata period, while oyster shells, prevalent in the earlier period, showed a significant decline in the later phases (Figure 4.9, Table 4.3). Venus clams, the third most abundant bivalve taxa, mirrored an inverse trend to ark clams, attaining their highest percentage in the Biscuitware period before decreasing in the subsequent period. This trend may suggest an increase in the consumption of less commonly eaten clam species in response to the declining availability or population sizes of traditionally favored species, such as ark clams and oysters.

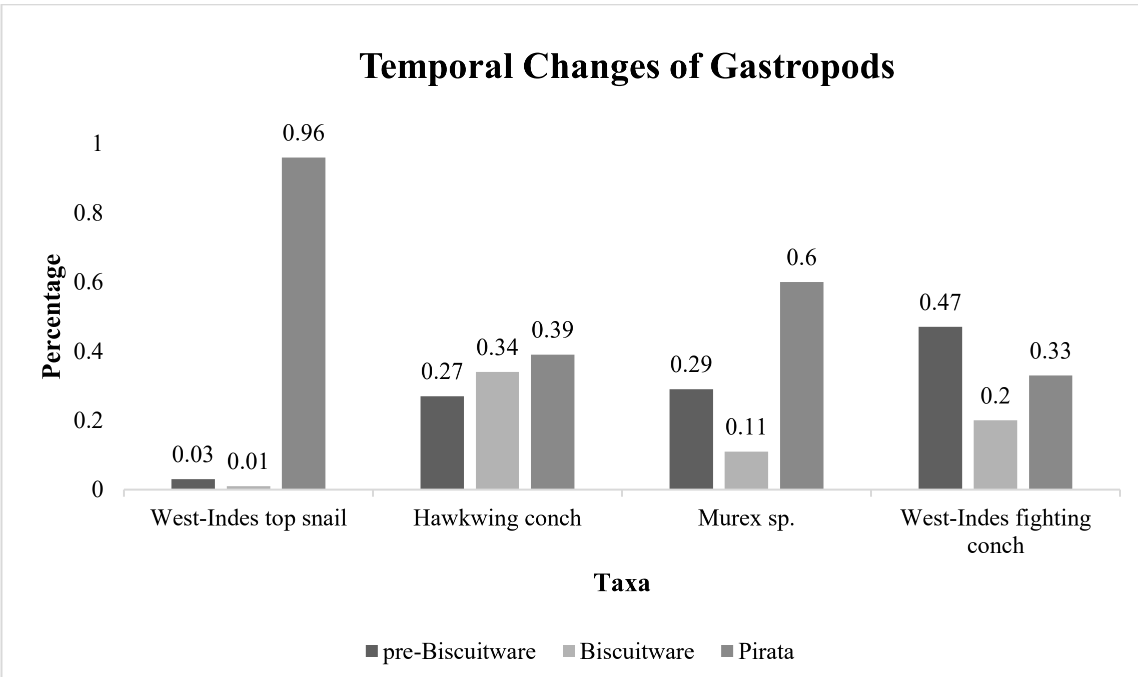

Figure 4.10 Comparing changes to percentage of common gastropod taxa between temporals periods.

Although bivalves represented a larger portion of the overall site assemblage, gastropods made up 18% of identified individuals and 25 identified taxonomic classifications. The three predominant groups of marine snails are *C. Pica* (West Indian top snails), conch, and *Murex* sp. (Figure 4.10, Table 4.4). The presence of gastropods remained stable across all deposits; however, notable variations were evident. Among these, conch shells accounted for the highest percentage in the combined assemblage (Table 4.6). Among the conch shells, *L. raninus* (hawkwing conch) saw a steady increase from the pre-

Biscuitware period into the Pirata period. At the same time, there was a decline in *S. pugilis* (West-Indian fighting conch) into the Biscuitware period and an eventual increase into the Pirata period (Figure 4.10, Table 4.4). This shift could reflect changes in dietary preferences or environmental pressures. *Murex* saw a similar decrease during the Biscuitware period, followed by an increase in the percentage of *Murex* MNI during the Pirata period. The *C. pica* (West Indian top snail) recorded the lowest MNI during the earliest period but saw an increase during the Pirata period (Figure 4.10), suggesting a heightened preference for this species in the later periods and eventual shift to an Afro-Caribbean community.

Size Distribution of Gastropods

In addition to calculating MNI, a size analysis was conducted to compare changes or continuities among gastropods, particularly highlighting the conch shell, comprising 301 individuals in the combined assemblage. The analysis revealed that over 50% of the conch reached lengths of 40 mm across all three temporal periods (Tables 4.8 and 4.9). During the Pirata period, there was a slight increase in the harvesting of *L. raninus* (hawkwing conch), accompanied by a rise in the percentage of hawkwing conchs that reached 50 mm in length (Figure 4.10 and Table 4.8). In contrast, the *S. pugilis* (West Indian fighting conch) experienced a decrease in the MNI during the Biscuitware period. Still, they later showed an increase in the Pirata period. (Table 4.4, Figure 4.10) Although there was an uptick in this later period, it was notable that over 50% of the *S. pugilis* fell within the 40 mm to 50 mm range (Table 4.9). This indicates that although the consumption of *S. pugilis* decreased during the Biscuitware period, the impacts of overharvesting may still be evident in the following period, as primarily smaller sizes of this species were harvested. The *C. pica*, primarily found in the later Pirata period, showed that over 85% of individuals reached a length of 20 mm to

30 mm (Table 4.10, Figure 4.10), which is a healthy size for maturity in that species. Overall, the finding revealed a healthy size distribution across the three most identified gastropod species in the assemblage.

	Pre-Biscuitware (800AD – 1200AD)		Biscuitware (1200AD-1492AD)		Pirata (1492AD-1900AD)	
Size Interval (mm)	Count	%	Count	%	Count	%
10.00mm-20.00mm	1	2	1	2	-	-
20.00mm-30.00mm	3	7	5	9	1	2
30.00mm-40.00mm	4	9	10	18	14	22
40.00mm-50.00mm	14	31	16	29	17	27
50.00mm-60.00mm	16	36	20	36	27	43
60.00mm-70.00mm	7	16	2	4	4	6
70.00mm-80.00mm	0	-	1	2	-	-
Total MNI *L. raninus* (hawkwing conch)	45	100	55	100	63	100

Table 4.8 Compared percentage of *L. raninus* (hawkwing conch) length measured in 10 mm intervals distribution across temporal periods.

	Pre-Biscuitware (800AD – 1200AD)		Biscuitware (1200AD-1492AD)		Pirata (1492AD-1900AD)	
Size Interval (mm)	Count	%	Count	%	Count	%
30mm-40mm	-	-	1	6	-	-
40mm-50mm	9	25	5	31	15	58
50mm-60mm	26	70	9	56	10	38
60mm-70mm	2	5	1	6	1	4
Total MNI *S. pugilis* (West-Indian fighting conch)	37	100	16	100	26	100

Table 4.9 Compared percentage of *S. pugilis* (West Indian fighting conch) length measured in 10 mm intervals across temporal periods.

Size Interval (mm)	Pre-Biscuitware (800AD – 1200AD)		Biscuitware (1200AD-1952AD)		Pirata (1492AD-1900AD)	
	Count	%	Count	%	Count	%
0-10mm	1	33	-	-	3	3
10mm-20mm	-	-	1	50	14	12
20mm-30mm	2	67	-	-	53	47
30mm-40mm	-	-	1	50	33	29
40m-50mm	-	-	-	-	10	9
Total MNI *C. pica* (West Indian top snail)	3	100	2	100	113	100

Table 4.10 Compared percentage of *C. pica* (West Indian top snail) length measured in 10 mm intervals distribution across temporal periods.

Shells and Adornment

Apart from foodways, the assemblage also revealed nonfood-related marine mollusks that may be linked to other activities. Martin's (2015) previous findings from the early periods of occupation at Sitio Drago indicated that some excavated mollusks, specifically *Conus* spp., *Cypraea* sp., and *Oliva reticularis*, were harvested for decorative beads. This thesis noted some of these taxa, though in lower counts (Figure 4.11).

Notably, there was a slight increase in the number of these mollusks in the Pirata period, with *Conus* spp. - consistent across all periods with 26 individuals. *Cypraea* sp. or cowries had a lower overall count with eight individuals, though seven of which were found in the Pirata period (Figure 4.11). Cowries are commonly used in West African cultures and Indigenous cultures for trade and adornment (Agorsah 2006, Koerper and Whitney-Desautels

1999; Haour and Christie 2019). In addition to adornment, the assemblage also identified two species of large marine snail that are both valued for their meat yield as well as shell used for trumpets, *L. gigas* (queen conch) and *Charonia tritonis* (Triton's trumpet). Although these species were present, *L. gigas* had a count of five and *C. tritonis* had a count of one (Table 4.4).

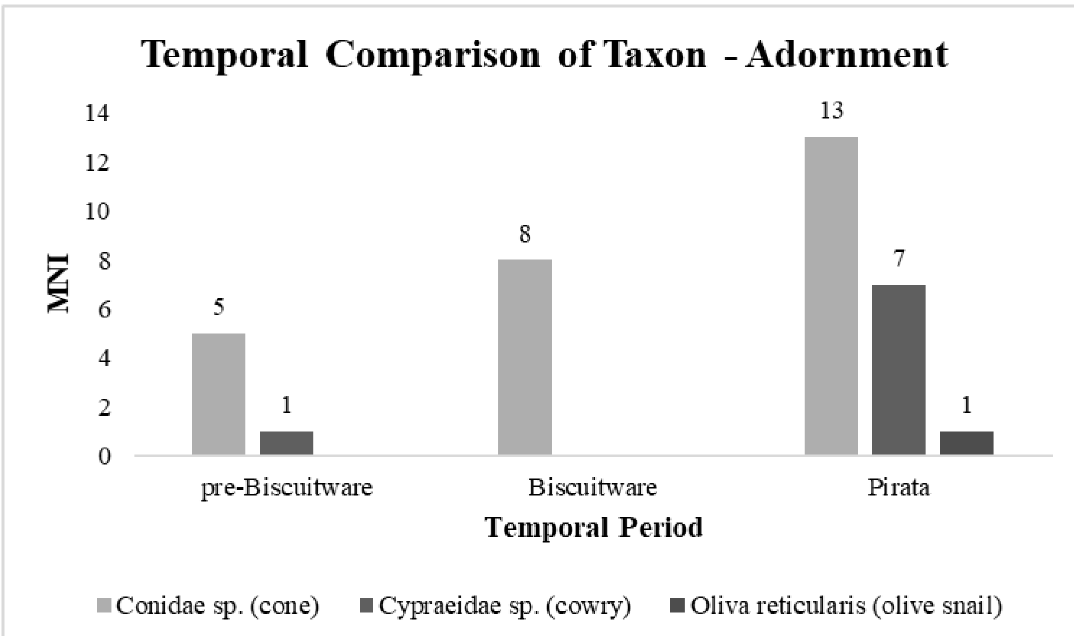

Figure 4.11 Temporal comparison of adornment related taxa.

While some outliers in the assemblage suggest the use of shells for various forms of expression, the vast majority, related to foodways, were deposited in contexts associated with food preparation practices. Although the three-unit assemblages varied in size and composition, over 50% of the total shells examined were intact and showed no signs of fracturing, suggesting that the mollusk meat was extracted through steaming rather than shucking while raw. Upon reviewing the mollusks identified in the assemblage, 83% MNI were bivalves (Table 4.1), representing 31 distinct species. This underscores their significance as a readily available resource within Bocas del Toro's local foodways.

In contrast, gastropods such as conch, which are prevalent in Caribbean foodways, constituted less than 20% of the assemblage. The lower representation of gastropods may be partially due to the labor required to obtain and process these species. Preferred gastropods, including conch and top snails, are highly valued for their meat yield, making it challenging to transport large quantities to inland food processing areas. As a result, processing sites for gastropods closer to the shoreline would likely lead to larger shell middens located further down the coast. Whereas bivalves would have been harvested closer into shore, using baskets, nets, or rakes, making them more accessible and fished in larger yields (Wallman 2020: 1-4, Wake et al. 2013: 5). Another potential explanation for the diminished percentage of gastropods may reflect broader shifts in foodways, possibly due to overharvesting or changing community preferences for imported fauna.

CHAPTER 5
ANALYSIS

The results of this thesis's shell analysis were compared to previous archaeological findings and material analyses related to foodways at Sitio Drago. This comparison identified patterns of change and persistence of shellfish consumption from the pre-Columbian period to the Pirata period in Bocas del Toro. The occupation of Sitio Drago underwent significant changes, beginning as a pre-Columbian Indigenous chiefdom around 800 AD and evolving into a diverse Afro-Indigenous-Latin Caribbean community known today as Bocatoreño (Howard 2014: 87). Bocatoreños define their culture through their food traditions. The formation of this identity through local foodways transitioned over time through shared knowledge and individual choices. Community formation is shaped over time by factors such as socioeconomic necessity, environment, the sharing of cultural traditions, and the intersections of identity.

While Sitio Drago eventually becomes a demographically diverse Afro-Indigenous-Latin Caribbean community known as Bocatoreño in the 19th and early 20th century, the pre-Pirata cultural history of Sitio Drago, the presence of the Indigenous Ngäbe-Buglé-Guaymí people in Bocas del Toro, and the region's history as a trade outpost all come together to impact the food and cultural choices that led to the formation of the modern Bocatoreño community. Food is a common need, and foodways create spaces for cultural exchanges, often unifying community through food centric traditions (Diaz-Andreau et al. 2005; Graff 2020; Mintz and Dubois 2002; Pavao-Zuckerman and Loren 2012; Pezzarossi et al. 2012). The accessibility of marine mollusks as a low-cost resource made them a valued and essential part of Bocas' foodways, which persisted for centuries among Indigenous communities and eventually among Afro-Caribbeans in Bocas del Toro.

Shellfish and Community at Sitio Drago

This thesis explored the results of three analyses: a spatial distribution of mollusks within three units at Sitio Drago, a comparison of MNI counts for mollusks over three temporal periods at Sitio Drago, and a size distribution of three common gastropod taxa. The assemblage's top five most common shell species included *A. notabilis* (eared ark), *A. zebra* (turkey wing ark), *C. rhizophorae* (mangrove cupped oyster), *Donax* sp., and *L. raninus* (hawkwing conch) (Table 4.2). Differences in taxon counts were observed between unit assemblages over time, indicating persistence and changes in the spatial use of the site. The most notable finding revealed that 74% of all shell deposits were found in unit 51 (Table 4.5). This finding corresponded with previous studies at Sitio Drago, identifying unit 51's association with a low earthen mound. The continued use of the low earthen mound and the high percentage of shells deposited in this area of the site indicate a continued shared space for food processing and cooking. This shared use of space continued into the Pirata period at Sitio Drago, further illustrating the role of foodway-related spaces for cultural encounters and community formation between Afro-Caribbeans and Indigenous people in Bocas del Drago.

In addition to space, this analysis identified that ark clams had the highest MNI among the examined mollusks, constituting 48% of the total shells in the assemblage (Table 4.3). This consistency across all periods of occupation suggests that ark clams were a valued marine resource shared across time in Sitio Drago. Another species that demonstrated consistency in the assemblage was the *L. raninus* (hawkwing conch), which was found in every unit across all periods of occupation. There was a slight increase in MNI during the Pirata period, indicating a growing value for this resource.

In addition to consistency in mollusk deposits, the analysis also revealed changes in mollusk taxa identification and consumption during the Pirata period. Notably, 96% of the *C. pica* (West Indian top snail) were found during the Pirata period, compared to only 3% in the pre-Biscuitware period (Table 4.4, Figure 4.10), indicating a clear preference for this species into the 19th and early 20th century. Additionally, other species, such as oysters, showed significant changes. Most oysters were discovered in Units 51 and 49, with 56% found in unit 51 and 34% in unit 49 (Figure 4.8). Oysters accounted for 37% of all mollusks and 44% of all bivalves identified in Unit 49 (Table 4.7). A substantial concentration of oysters was observed in unit 49 (Table 4.7, Figure 4.8) at depths ranging from 77 to 97 cm, which were later covered by an ash layer found at 64-66 cm (Howard 2014: 62). These deeper levels, dating back to the pre-Biscuitware period, suggest that oysters were a valued resource in Sitio Drago's early foodways.

The ash layer in unit 49 that subsequently covered these earlier deposits aligns with the onset of the Biscuitware period, during which there was a 30% decrease in shell presence compared to the pre-Biscuitware levels (Table 4.5). Howard (2014) noted that unit 49 had low artifact density from the surface to 30 cm, consistent with this thesis's findings that only 9% of all mollusks in unit 49 were found in that depth range. This suggests that unit 49 was utilized more consistently as a midden during earlier Pirata period, with its use diminishing, likely following the construction of the previous home structure found on the Iglesias property (Howard 2014: 62). The changes noted in the midden from unit 49 and the consistencies found in unit 51 reinforce the findings that mollusk distribution across the site reveals a relationship between foodway practices and spatial use at Sitio Drago over time. While the building of the Iglesias home altered the use of the adjacent midden in unit 49, the low earthen mound in the center of unit 51 continued to serve as a shared space for shell discarding and foodways practices into the Pirata period at Sitio Drago.

Early archaeological studies in Bocas del Toro, dating to the pre-Biscuitware and Biscuitware periods, conducted by Stirling and Stirling, suggested that Sitio Drago was a seasonal trading post rather than a long-term settlement. However, subsequent research by Wake et al. (2004, 2006, 2013) presented a different interpretation, indicating a sustained occupation of a pre-Columbian Indigenous chiefdom, which flourished in the Bocas del Toro region, particularly on the Island of Colón, for over 300 years before experiencing a gradual decline in population around 1200 AD. Wake noted that, at the same time, they saw a decrease in site use and an increase in locally made ceramic called Biscuitware, noted for its distinct weave pattern. The use of the Biscuitware ceramic lasted till the beginning of the Pirata period in 1492 AD.

Before the observed population decline, archaeological evidence from Wake et al. (2013) and Wake (2004) suggests that the community at Sitio Drago was heavily involved in plant cultivation, fishing, and shellfish harvesting. Combined with ceramic analysis, this evidence depicts a thriving community engaged in regional trade. Wake et al. (2013) posited that the eventual decline in material activity at the site may be linked to overexploitation of local resources. This thesis used the findings of Martin (2015) and Wake et al. (2013) to establish the socioeconomic and subsistence structures that influenced shellfish consumption from the pre-Biscuitware and Biscuitware periods.

The findings of this thesis also indicate that marine mollusks were a significant part of the early diets of Sitio Drago's inhabitants. However, there was considerable variation in the species of shellfish harvested. Furthermore, the comparison reveals a consistent trend of declining marine mollusk consumption from the pre-Biscuitware phase to the Biscuitware phase, followed by an increase during the Pirata period (1492 AD –1900 AD).

The rise in shellfish consumption during the Pirata period, as indicated in this thesis, can likely be linked to the advent of colonial trade and the influx of Europeans and Afro-Caribbeans into the region. The findings suggest that various factors influenced the shifts in shellfish consumption during this era. Earlier environmental conditions and human activities likely affected the marine resources available at Sitio Drago during later periods of occupation. Evidence from the pre-Biscuitware period at Sitio Drago reveals a clear preference for certain marine mollusks, particularly oysters. However, oysters appeared to be scarce in the shell assemblages from the Pirata period. Before the Biscuitware period, large-scale fishing served as a crucial food source, with bottom-dwelling oysters often inhabiting the same environments as other valuable marine species. This overlap contributed to the overexploitation of oysters while targeting additional food sources (Martin 2015: 202).

Findings from Wake et al. (2013), O'Dea et al. (2014), and Martin (2015) suggest that consumption of high-value marine mollusks decreased during the Biscuitware period, likely due to overharvesting. The population then turned to harvesting less desirable marine mollusks to compensate for the scarcity of previously sought-after mollusks. Additionally, the influence of colonial trade in the later Pirata period coincided with a change in dietary habits, as new high-protein animal species, such as pigs and sheep, introduced through this trade, became preferential and replaced a reliance on the diverse marine and local faunal diet (Howard 2014: 87). Howard (2014) interpreted the presence of pig bone in levels 30-40 cm to indicate early encounters with Europeans and trade in the region. This thesis found that 30-40 cm saw the beginning of an increase in *C. pica* (West Indian top snail) in the assemblage, indicating that this change occurred at levels coinciding with these early colonial demographic shifts to Sitio Drago.

In addition to the increase in *C. pica* in the Pirata period, the *S. pugilis* (fighting conch) declined in size and consumption into the Biscuitware period. Furthermore, the results of this thesis showed that the *S. pugilis* were lower in MNI across all periods (Figure 4.10), with a decrease in the Biscuitware period, concluding that the *L. raninus* was a preferred conch species than the *S. pugilis.* The *L. raninus* increased consistently from the pre-Biscuitware period into the Pirata period (Figure 4.10). At the same time, the *S. pugilis* decreased from the pre-Biscuitware period into the Biscuitware, with a slight increase into the Pirata (Figure 4.10). This thesis did see the same change in size selection of *S. pugilis*, while the size selection of *L. raninus* remained consistently healthy (Tables 4.8, 4.9).

Along with shifts in mollusk preference, Howard (2014) observed that the local ceramics unearthed during the Pirata periods at Sitio Drago were mainly associated with cooking, with 96% of the imported ceramics being bowls and cups (Howard 2014: 142). Howard also noted burn marks on some locally produced earthenware, interpreting them as evidence of stew cooking and boiling (Howard 2014: 70, 142). The analysis of shells in this study indicated that they were opened using heat, as evidenced by the absence of marks and fragmentation. These findings align with Howard's ceramic analysis, suggesting reliance on steaming and stew-cooking practices during the Pirata period at Sitio Drago.

Howard's (2014) analysis of ceramics revealed that 100% of cooking vessels used during the Pirata period were locally made ceramic pots, while many serving ceramics were brightly colored imported hollowwares. Stewpot cooking is a common practice across the Caribbean and within African Diaspora communities. Archaeologists have uncovered evidence of communal stew cooking across settings ranging from plantations to maroon communities (Brunache 2011; Steen and Barnes 2010). In these communities, food served as both a form of cultural expression and a means of forming kinship bonds. Along with the emphasis on stew pot cooking, Howard noticed a shared practice of brightly colored architecture across Bocatoreño and Ngäbe-Buglé-Guaymí homes. This further emphasized shared community expression using color seen across both Bocatoreño and distinctly Indigenous spaces in Bocas (Howard 2014: 90).

Shell assemblages from the Pirata period at Sitio Drago revealed that marine mollusks, particularly clams, played a significant role in the diet throughout the site's extensive occupation. Despite Sitio Drago's transition from a pre-Columbian Indigenous chiefdom during the pre-Biscuitware period to an Afro-Latin Caribbean community, reliance on shellfish remained consistent. Notably, 94% of the ark clams were found in units 51 and 50 (Table 4.7), underscoring the importance of these areas for food-related activities.

Howard (2014) utilized land documents and oral histories gathered by the Iglesias family to determine that the property had diminished in size from 15 hectares to a 97-meter lot. By employing magnetometers, Howard identified the outline of a previous structure on the property (Howard 2014: 54-68, and 120-122). He concluded that the Iglesias family had been, and continued to be, significant pillars within the community. The extensive activity in units 50 and 51, dating to the Pirata period and subsequently the preexisting earthen mound at the edge of the modern Iglesias property, suggests that the Iglesias homestead may have served as a center for community activity and exchanges during the Pirata period at Sitio Drago (Howard 2014: 83-85).

The continued use of space for cooking and processing food from the pre-Biscuitware period to the Pirata period emphasizes the influence of earlier cultural groups on the site's spatial organization. This influence is particularly evident in the practices of the Indigenous peoples living during the pre-Biscuitware and Biscuitware periods, as well as the eventual encounters with the Ngäbe-Buglé-Guaymí people in the Pirata periods. Additionally, the sustained presence of preferred species, such as ark clams, in the archaeological record—along with evidence of potentially overharvested mollusks from earlier periods—demonstrates both the direct and indirect impact of Indigenous peoples on the choices made by Afro-Caribbeans living in Drago.

In addition to foodways, this thesis's shell analysis found possible evidence of identity and cultural expression through adornment. Martin (2015) previously identified species associated with shell-bead crafting in pre-Biscuitware and Biscuitware. This thesis found three of those same taxa in the assemblage from units 49, 50, and 51: *Conus* spp. (cone snails), *Cypraea* sp. (cowry), *O. reticularis* (olive snails) (Figure 4.11). Of those three taxa, the cone snails had the highest MNI across the assemblage with 26 individuals (Figure 4.11), the cowry had the second most significant number with a total MNI of 8, and only 1 olive snail was identified overall, located in the Pirata period (Figure 4.11). Interestingly, all but 1 of the 8 cowries were found in the Pirata period (Figure 4.11). Cowrie shells have historical significance in West African economic and trade practices, valued for their beauty and used as currency or for jewelry making (Koerper and Whitney-Desautels 1999; Moffett and Haour 2024). The use of shells as beads for adornment in Sitio Drago during the pre-Biscuitware, Biscuitware, and Pirata periods illustrates the diverse ways shellfish were valued and underscores the shared practices between Indigenous and African Diaspora groups in Bocas del Toro.

By the early 16th century, notable changes began to impact the local Indigenous community in the region. These shifts were the result of early colonial interactions and the conflicts among the Doraces, Changuenas, and Téribes groups, which ultimately led to their decline in the area. Eventually, the Ngäbe-Buglé-Guaymí migrated to Isla Colón, further transforming the cultural landscape during the early Pirata period in Bocas del Toro (Martin 2015: 73-74).

The Pirata period saw the arrival of various cultural groups into the region, united by a common pursuit of economic opportunities and a desire for freedom from colonial structures. The Ngäbe-Buglé-Guaymí migrated from the highlands of Panamá, while Afro-Caribbean people came to Bocas in search of new trade and financial opportunities (Heckadon-Moreno 2011; Montero 2014). These groups over time, forged new relationships out of economic necessity gradually evolving into kinship bonds. Diasporic communities are diverse and shaped by the experiences of displaced individuals seeking agency often through community. New identities emerge from the blending of cultures and are reinforced through daily practices, particularly relating to foodways, as illustrated by the development of a distinct Bocatoreño identity that is expressed and celebrated through food.

African Diaspora and Indigenous Communities in Latin America

The earliest evidence of African cultural presence in the Western Hemisphere can be traced to the Spanish Empire, with records indicating Spanish involvement in the Trans-Atlantic slave trade as early as the early 16th century (Gomez 2005: 95; Gaitán Ammann 2012). This trade facilitated centuries of forced migration of African individuals throughout the Caribbean and the Americas. Over time, these displaced groups forged new relationships and kinship ties, creating complex identities. African Diaspora archaeology is a field that examines the experiences of dispersed African communities within a racially structured context. Scholars in this discipline utilize archaeological findings to gain insights into the daily lives of these African-descendant communities, as well as their strategies for asserting agency and resisting enslavement, marginalization, and racially motivated violence (Bilby 1981; Bilby and Baird 1992; Brunache 2011; Franklin and Lee 2019; Houston 2007; Kelly and Wallman 2014; Wallman 2020).

While African Diaspora archaeology has evolved into a significant body of academic work in North America, the application of Diaspora studies in Latin America has progressed more slowly (see Balanzátegui 2017, 2018, 2022). Investigating African Diaspora communities within a Latin American context presents new opportunities to understand the experiences of African-descendant groups across diverse colonial settings, as well as the intricate intersections of identity and relationships formed under various systems of racialization (Pavao-Zuckerman and Loren 2012; Pezzarossi 2017; Sampeck 2018; Singleton and De Souza 2009: 462-463; Weik 2004, 2009).

The Spanish approach to racial identities, articulated through the casta system and the concept of mestizaje, facilitated greater fluidity in racial identity. The casta system was frequently employed to reinforce labor roles among Indigenous and African peoples while simultaneously celebrating the acculturation associated with whiteness. In certain instances, mestizaje within the casta system obscured the historical presence of African people and overlooked the complex relationships they maintained with Indigenous communities (DiPaolo Loren 2007; Pezzarossi 2017; Sampeck 2018; Singleton and De Souza 2009: 462-463).

Communities such as the Bocatoreños emerged from socioeconomic relationships within these racialized structures, eventually establishing themselves as trade intermediaries between the Ngäbe-Buglé-Guaymí people and English-speaking merchants and traders. This relationship, which began out of mutual benefit, gradually evolved into a community with strong kinship ties and a shared identity. As Howard (2014) concluded, this community drew strength from its cultural diversity and complex history, utilizing their shared sense of identity to navigate European racial structures.

Accessible and affordable resources within local foodways, such as shellfish, play a crucial role in shaping food-related traditions and shared identities among marginalized communities. Evidence from shared cooking practices and the continuity of the Sitio Drago mollusk assemblage illustrates the persistence of these foodway traditions, underscoring the cultural influences from shifting demographics that shape a new community identity. Contexts like Bocas del Toro exemplify the complexity of identity and the experiences of communities of African descent and Indigenous groups throughout Latin America. Food is essential for sharing and preserving traditions in Bocas del Toro and across broader regions of Panamá.

This thesis further explores the role of foodways in shaping the relationships between African and Indigenous communities, emphasizing the importance of food in identity formation. Building upon Howard's (2014) foodway studies conducted in Sitio Drago, this research offers a comprehensive analysis of one of the most significant resources within Bocas' foodways: shellfish. By examining shellfish consumption and community dynamics in Bocas del Toro, this study enhances our understanding of the role of marine mollusks in foodway research, particularly in 19th- and early 20th-century Central and Latin America.

The findings highlight how accessible and forageable foodways contribute to the fostering of cultural exchanges among Indigenous and Afro-descendant groups. Additionally, the continuity of specific food practices over time illuminates the processes of identity formation and the shared cultural heritage within these communities.

BIBLIOGRAPHY

Abarca, Meredith
2004 Authentic or Not, It's Original. *Food and Foodways* 12 (1):1–25.

Abbott, R. Tucker, and Percy A. Morris
1995 *A Field Guide to Shells: Atlantic and Gulf Coasts and the West Indies*. Houghton Mifflin, Boston.

Adomat, Friederike, Eberhard Gischler, and Wolfgang Oschmann
2016 Taxonomic and Taphonomic Signatures of Mollusk Shell Concentrations from Coastal Lagoon Environments in Belize, Central America. *Facies* 62(1):1-29.

Agorsah, Kofi E.
2006 Reconstructing the African Diaspora: Evidence and Interpretation. *In Africa and the African Diaspora: Cultural Adaptation and Resistance,* Kofi Agorsah and Tucker Childs, editors pp.57-96. Author House Publishing, Bloomington, IN.

Aldeias, Vera, Shira Gur-Arieh, Raquel Maria, Patricia Monteiro, and Pedro Cura
2016 Shell We Cook It? An Experimental Approach to the Microarchaeological Record of Shellfish Roasting. *Archaeological and Anthropological Sciences* 11(2): 389–407.

Allen, Michael J., eds.
2017 *Molluscs in Archaeology: Methods, Approaches and Applications*. Oxbow Books, Havertown, PA.

Alphonse, Ephraim S.
1938 *Among the Valiente Indians; The Story of a Pioneer Mission in the Forests of Panamá*. Cargate Press, London.

Ammann, Felipe Gaitán
2012 An Archaeological Glimpse of the Slave Trade in Late-Seventeenth Century Panamá. *Historical Archaeology* 46(3): 27–46.
2022 Trading Tones: Exploring the Soundscape of Human Trafficking in Spanish Colonial Panamá." *Historical Archaeology* 56(2): 199-216.

Atalay, Sonya, and Christine A. Hastorf
2006 Food, Meals, and Daily Activities: Food Habitus at Neolithic Çatalhöyük. *American Antiquity* 71(2): 283-319.

Balanzátegui, Daniela C.
2012 *Colonial Indigenous and Mestizo Foodways: Ceramic Analysis and Ethnoarchaeology in the Highlands of Ecuador.* M.A. thesis, Simon Fraser University, Burnaby, BC.
2017 *Archaeology of the Afro-Ecuadorians in La Concepcion, Ancestral Territory of the Chota-Mira Valley (Carchi-Ecuador).* Doctoral dissertation, Simon Fraser University, Burnaby, BC.
2018 Collaborative Archaeology to Revitalize a Historic Afro-Ecuadorian Cemetery, La Concepción, Chota-Mira Valley (Carchi-Ecuador). *Journal of African Diaspora Archaeology and Heritage* 7(1): 42-69.
2022 African Diaspora Archaeology in Latin America: Advances and Future Debates. In *Routledge Handbook of Afro-Latin American Studies*, Bernd Reiter and John Anton Sanchez, editors, pp. 70-78. Taylor and Francis Group, New York, NY.

Ballbè, Ermengol Gassiot
2013 Prehistoric Shell Middens on the Caribbean Coast of Nicaragua: Food Production, Structures and Site Formation. In *Archaeomalacology: Molluscs in Former Environments of Human Behavior,* Daniella bar-Yosef, editor, pp. 69–82. Oxbow books, Oxford.

Barima, Kofi Boukman
2013 Caribbean Migrants in Panamá and Cuba, 1851–1927: The Struggles, Opposition and Resistance of Jamaicans of African Ancestry. *Journal of Pan-African Studies* 5(9): 43.

Bilby, Kenneth M.
1981 The Kromanti Dance of the Windward Maroons of Jamaica. *Nieuwe West-Indische Gids/New West Indian Guide* 55(1): 52-101.

Bilby, Kenneth, and N'Diaye Diana Baird
1992 Creativity and Resistance: Maroon Culture in the Americas. *The Smithsonian Festival of American Folklife*: 54-61.
<https://festival.si.edu/articles/1992/creativity-and-resistance-maroon-culture-in-the-americas>. Accessed 15 October 2025.

Bouzouggar, Abdeljalil, Nick Barton, Marian Vanhaeren, Francesco d'Errico, Simon Collcutt, Tom Higham, Edward Hodge
2007 82,000-Year-Old Shell Beads from North Africa and Implications for the Origins of Modern Human Behavior. *Proceedings of the National Academy of Sciences* 104(24): 9964-9969.

Bowdler, Sandra
2009 Mollusk and Other Shells. *Archaeology in Practice: A Student Guide to Archaeological Analyses,* Jane Balme and Alistair Paterson, *editors* pp. 316-337. Blackwell Publishing, Malden, MA.

Brunache, Peggy Lucienne
2011 *Enslaved Women, Foodways, and Identity Formation: The Archaeology of Habitation La Mahaudière, Guadeloupe, circa Late-18th Century to mid-19th century*. The University of Texas at Austin, Austin, TX.

Carney, Judith A.
2017 Shellfish Collection in Senegambian Mangroves: A Female Knowledge System in a Priority Conservation Region *Journal of Ethnobiology* 37(3): 440-457.

Carpenter, Kent E. and Volker H. Niem (editors)
1998 The Living Marine Resources of the Western Central Pacific. *Seaweed, Corals, Bivalves and Gastropods*. Food and Agriculture Organization of the United Nations.

Claassen, Cheryl.
1991 Normative Thinking and Shell-Bearing Sites. *Archaeological Method and Theory* (3): 249-298.
1998 *Shells*. Cambridge University Press, New York, NY.

Davis, David Brion
2006 *Inhuman Bondage: The Rise and Fall of Slavery in the New World*. Oxford University Press, New York, NY.

Díaz-Andreu García, Sam Lucy, Staša Babić, and David N. Edwards
2005 *The Archaeology of Identity: Approaches to Gender, Age, Status, Ethnicity, and Religion*. Routledge, New York, NY.

Doerr, Jennifer C., and Ronald L. Hill
2018 Spatial Distribution, Density, and Habitat Associations of Queen Conch Strombus Gigas in St. Croix, US Virgin Islands. *Marine Ecology Progress Series* 594:119–133.

Dugard, Martin
2005 *The Last Voyage of Columbus: Being the Epic Tale of the Great Captain's Fourth Expedition, Including Accounts of Swordfight, Mutiny, Shipwreck, Gold, War, Hurricane, and Discovery*. Hachette, UK.

Earle, Peter.
2007 *The sack of Panamá: Captain Morgan and the Battle for the Caribbean*. Thomas Dunne Books, New York, NY.

Equiano, Olaudah
1837 *The Life of Olaudah Equiano or Gustavus Vassa, The African*. Isaac Knapp, Boston.

Faulkner, Patrick
2009 Focused, Intense and Long-Term: Evidence for Granular Ark (*Anadara granosa*) Exploitation from Late Holocene Shell Mounds of Blue Mud Bay, Northern Australia. *Journal of Archaeological Science* 36(3): 821-834.

Finneran, Niall, and Joyce Sarpong
2025 Entangled Roots. Heritage and Identity in the African 'Mesa-Diasporas': Community Case Studies for the 2020s. *Azania: Archaeological Research in Africa* 60(3): 516–533.

Franklin, Maria, and Nedra Lee
2019 Revitalizing Tradition and Instigating Change: Foodways at the Ransom and Sarah Williams Farmstead, c. 1871–1905. *Journal of African Diaspora Archaeology and Heritage* 8(3): 202-225.

Fanon, Frantz
1967 *Black Skin White Masks.* Grove Press Inc. New York, NY

Funari, Pedro A.
2003 Conflict and the Interpretation of Palmares, a Brazilian Runaway Polity. *Historical Archaeology* 37(3): 81-92.
2006 Conquistadors, Plantations, and Quilombo: Latin America in Historical Archaeology Context. In *Historical Archaeology*, Martin Hall and Stephen Silliman, editors, pp. 209–229. Blackwell Publishing, New York, NY.

Glassow, Michael A.
2000 Weighing vs. Counting Shellfish Remains: A Comment on Mason, Peterson, and Tiffany. *American Antiquity* 65(2): 407-414.

Gomez, Michael A.
2019 Reversing Sail: A History of the African Diaspora. Cambridge University Press, New York, NY.

Goody, Jack
1982 *Cooking, Cuisine and Class: A Study in Comparative Sociology*. Cambridge University Press, New York, NY.

Graff, Sarah R.
2018 Archaeological Studies of Cooking and Food Preparation. *Journal of Archaeological Research* 26: 305-351.

Hall, Stuart.
1994 *Cultural identity and Diaspora*. In Colonial Discourse and Post-Colonial Theory, Patrick Williams and Laura Chrisman, editors, pp. 392-403. Colombia University Press, New York, NY.

Harris, Marvin, and Eric B. Ross, (editors)
2009 *Food and evolution: Toward a theory of human food habits*. Temple University Press, Philadelphia, PA.

Harris, Matthew, Marshall Weisler, and Patrick Faulkner
2015 A Refined Protocol for Calculating MNI in Archaeological Molluscan Shell Assemblages: A Marshall Islands Case Study. *Journal of Archaeological Science* (57): 168–179.

Haour, Anne, and Annalisa Christie
2019 Cowries in the Archaeology of West Africa: The Present Picture. *Azania: Archaeological Research in Africa* 54(3): 287-321.

Hastorf, Christine
2015 Steamed or Boiled: Identity and Value in Food Preparation. In *Between feasts and daily meals: Toward an archaeology of commensal spaces.* Susan Pollock (editor) pp. 243-276. Berlin: Edition Topoi, Berlin.

Helms, Mary W.
1979 *Ancient Panamá: Chiefs in Search of Power*. University of Texas Press, Austin, TX.

Henderson, Malcolm
2012 *Superstition, Pirates, Ghosts and Folklore of Bocas del Toro, Panamá.* Impresos Modernas, Chiriqui, Republic of Panamá.

Houston, Lynn Marie.
2007 Making Do: Caribbean Foodways and the Economics of Postcolonial Literary Culture. *Melus* 32(4): 99-113.

Howard, Jerry J.
2014 *Emergent Identities in the African Diaspora: The Bocas Way*. Doctoral Dissertation. UC Berkeley.
2019 An Ethnographic Approach to African Diaspora Archaeology: The Bocas Way. *Transforming Anthropology* 27(2): 133-148.

Hunter, Ryan, Stephen W. Silliman, and David B. Landon
2014 Shellfish Collection and Community Connections in Eighteenth-Century Native New England. *American Antiquity* 79(4): 712-729.

Hutterer, Rainer, Oskar Schröder, and Jörg Linstädter
2021 Food and Ornament: Use of Shellfish at Ifri Oudadane, a Holocene Settlement in NE Morocco. *African Archaeological Review* 38: 73-94.

Jones, Michael Owen
2007 Food Choice, Symbolism, and Identity: Bread-and-Butter Issues for Folkloristics and Nutrition Studies. *Journal of American folklore* 120(476): 129-177.

Kelly, Kenneth G.
2008 Creole Cultures of the Caribbean: Historical Archaeology in the French West Indies. *International Journal of Historical Archaeology* 12(4): 388-402.

Kelly, Kenneth G. and Diane Wallman
2014 Foodways of Enslaved Laborers on French West Indian Plantations (18th-19th century). *Afriques Débats Méthodes Terrains D'Histoire* 5.

Koerper, H.C. and Whitney-Desautels, N.
1999 A Cowry Shell Artifact from Bolsa Chica: An Example of Prehistoric Exchange. *Pacific Coast Archaeological Society Quarterly* 35(2): 81-95.

Lightfoot, Kent G., Antoinette Martinez, and Ann M. Schiff
1998 Daily Practice and Material Culture in Pluralistic Social Settings: An Archaeological Study of Culture Change and Persistence from Fort Ross, California. *American antiquity* 63(2): 199-222.

Lightfoot, Kent G., Sara L. Gonzalez, and Tsim D. Schneider
2009 Refugees and Interethnic Residences: Examples of Colonial Entanglements in the North San Francisco Bay Area. *Pacific Coast Archaeological Society Quarterly* 42(1):1-21.

Linares, Olga F.
1968 Ceramic Phases for Chiriquí, Panamá, and Their Relationship to Neighboring Sequences. *American Antiquity* 33(2): 216-225.
1976 Garden Hunting in the American Tropics. *Human Ecology* 4(4): 331-349.
1977 Adaptive Strategies in Western Panamá. *World Archaeology* 8(3): 304-319.

Locally Managed Marine Area Network
2023 *Ark Clams*. *LMMA Network International.* <https://lmmanetwork.org wp-content/uploads/2021/08/Anon_12_ISFC_22_Anadara.pdf/> Accessed 14 June. 2025.

Loren, Diana DiPaolo
2007 Corporeal Concerns: Eighteenth-Century Casta Paintings and Colonial Bodies in Spanish Texas. *Historical Archaeology* 41(1): 23-36.

Martin, Lana
2015 *Forests, Gardens, and Fisheries in an Ancient Chiefdom: Paleoethnobotany and Zooarchaeology at Sitio Drago, a Late Ceramic Period Village in Bocas del Toro, Panamá.* PhD dissertation, UCLA.

Mayer, Daniella E. Bar-Yosef
2005 An Introduction to Archaeomalacology. In *Archaeomalacology: Molluscs in Former Environments of Human Behavior*, Daniella E. Bar-Yosef Mayer, editor, pp. 1–4, Oxbow Books, Oxford.

McGuinness, Aims
2008 *Path of Empire: Panamá and the California Gold Rush*. Cornell University Press, Ithaca, NY.

Menezes Ferreira, Lucio and Luis Symanski
2023 Transformation and Resistance: African Diaspora Archaeology in Brazil. *Journal of African Diaspora Archaeology and Heritage* 12(2-3): 108-136.

Mintz, Sidney W. and Christine M. Du Bois
2002 The Anthropology of Food and Eating. *Annual Review of Anthropology* 31(1): 99–111.

Mintz, Sidney W. and Richard Price
1976 *The Birth of African American Culture: An Anthropological Perspective.* Boston Beacon Press, Boston, MA.

Montero, Carla Guerrón
2014 Afro-Antillean Presence in the Latin American Melting Pot. In *African Diaspora in the Cultures of Latin America, the Caribbean, and the United States*, Persephone Braham, editor, pp. 45-64. University of Delaware Press, Lanham, MD.

Moreno, Stanley Heckadon
2011 *A Creole from Bocas Del Toro: The Story of Carlos Reid*. Editorial Exedra, Panamá.

Morrison, Kathleen D.
2012 Great Transformations: On the Archaeology of Cooking. In *The Menial Art of Cooking: Archaeological Studies of Cooking and Food Preparation*, Sarah R. Graff and Enrique Rodríguez-Alegría, editors, pp. 231–44. University Press of Colorado, Denver, CO.

Moss, Madonna L.
1993 Shellfish, Gender, and Status on the Northwest Coast: Reconciling Archeological, Ethnographic, and Ethnohistorical Records of the Tlingit. *American Anthropologist* 95(3): 631-652.

National Oceanic and Atmospheric Association (NOAA)
2022 *Queen Conch*.
<https://www.fisheries.noaa.gov/species/queen-conch.>
Accessed 18 Feb. 2020.

O'Dea, Aaron, Marian Lynne Shaffer, Douglas R. Doughty, Thomas A. Wake, and Felix A. Rodriguez
2014 Evidence of Size-selective Evolution in the Fighting Conch from Prehistoric Subsistence Harvesting. *Proceedings of the Royal Society B* 281(1782): 1-9.

Oliver, A. P. H.
2004 *Guide to Seashells of the World.* Firefly Books, Buffalo, NY.

Orser Jr, Charles E.
1998 The Archaeology of the African Diaspora. *Annual Review of Anthropology* 27(1): 63-82.

Orser Jr, Charles E. and Pedro P.A. Funari
2001 Archaeology and Slave Resistance and Rebellion. *World Archaeology* 33(1): 61-72.

Patrick, Laura
2015 Infaunal Benthic Invertebrate Community. *Smithsonian Environmental Research Center.*
< https://serc.si.edu/infaunal-benthic-invertebrate-community.>
Accessed 18 Feb. 2020.

Pavao-Zuckerman, Barnet and Diana DiPaolo Loren
2012 Presentation is Everything: Foodways, Tablewares, and Colonial Identity at Presidio Los Adaes. *International Journal of Historical Archaeology* 16(1): 199-226.

Pezzarossi, Guido, Ryan Kennedy, and Heather Law
2012 Hoe Cake and Pickerel': Cooking Traditions, Community, and Agency at a Nineteenth-Century Nipmuc Farmstead. In *The Menial Art of Cooking: Archaeological Studies of Cooking and Food Preparation.* Sarah R. Graff and Enrique Rodríguez-Alegría, editors, pp. 201–230. University Press of Colorado, Denver, CO.

Pinart, Alphonse Louis
1885 *Chiriquí: Bocas del Toro--Valle Miranda*. Société de Géographie, Paris.

Rahn, Millie
2006 Laying a Place at the Table: Creating Public Foodways Models from Scratch. *Journal of American Folklore* 119(471): 30-46.

Robertson, Robert
2003 The Edible West Indian "Whelk" *Cittarium pica* (Gastropoda: Trochidae): Natural History with New Observations. *Proceedings of the Academy of Natural Sciences of Philadelphia* 153(1): 27-47.

Rucker, Walter
2001 Conjure, Magic, and Power: The Influence of Afro-Atlantic Religious Practices on Slave Resistance and Rebellion. *Journal of Black Studies* 32(1): 84-103.

Sampeck, Kathryn E.
2018 Insights of Afro-Latin American Archaeology. *International Journal of Historical Archaeology* 22(1): 167-182.

Sampson, Christina Perry
2015 Oyster Demographics and the Creation of Coastal Monuments at Roberts Island Mound Complex, Florida. *Southeastern Archaeology* 34(1): 84-94.

Silliman, Stephen W.
2009 Change and Continuity, Practice and Memory: Native American Persistence in Colonial New England. *American Antiquity* 74(2): 211-230.

Singleton, Theresa, and Marcos André Torres de Souza
2009 Archaeologies of the African Diaspora: Brazil, Cuba, and the United States. *International Handbook of Historical Archaeology.* Teresita Majewski and David. Gaimster, editors, pp. 449-469. Springer, New York, NY.

Smith, Monica L.
2006 The Archaeology of Food Preference. *American Anthropologist* 108(3): 480-493.

Smith, Nicole F., Dana Lepofsky, Ginevra Toniello, Keith Holmes, Louie Wilson, Christina M. Neudorf, Christine Roberts
2019 3,500 years of Shellfish Mariculture on the Northwest Coast of North America. *PLOS One* 14(2): 1-18.

Smithsonian Tropical Research Institute
2020 *Scientific Databases*
<https://stri.si.edu/research-computing/databases>
Accessed 24 Jul. 2024.

Somerville, Liz, Janice Light, and Michael J. Allen
2017 Marine Molluscs from Archaeological Contexts: How They Can Inform Interpretations of Former Economies and Environments. In *Molluscs in Archaeology: methods, approaches and applications*, Michael J. Allen, editor, pp, 214-237. Oxbow Books, Oxford.

Spataro, Michael and Alexandra Villing (editors)
2015 *Ceramics, Cuisine and Culture: The Archaeology and Science of Kitchen Pottery in the Ancient Mediterranean World,* Oxbow Books*,* Oxford.

Stirling, Matthew Williams, and Marion Stirling
1964 Archeological Notes on Almirante Bay, Bocas Del Toro, Panamá. *Bureau of American Ethnology Bulletin* 191(72): 255–284.

Sullivan, Alexis P., Stephanie Marciniak, Aaron O'Dea, Thomas A. Wake, and George H. Perry
2021 Modern, Archaeological, and Paleontological DNA Analysis of a Human-Harvested Marine Gastropod (*Strombus pugilis)* from Caribbean Panamá. *Molecular Ecology Resources* 21(5): 1517-1528.

Tran, Damien, Nadau, Arnaud, Gilles Durrieu, Pierre Ciret, Parisot, Jean-Paul Parisot, and Jean-Charles Massabuau
2011 Field Chronobiology of a Molluscan Bivalve: How the Moon and Sun Cycles Interact to Drive Oyster Activity Rhythms. *Chronobiology International* 28(4): 307-317.

Turgeon, Donna D., William G. Lyons, Paula Mikkelsen, Gary Rosenberg, Fabio Moretzsohn
2009 Bivalvia (Mollusca) of the Gulf of Mexico. *Gulf of Mexico Origin, Waters, and Biota*, 1:11-744.

Trigg, Heather
2004 Food Choice and Social Identity in Early Colonial New Mexico. *Journal of the Southwest* 46(2): 223-252.

Twiss, Katheryn
2012 The Archaeology of Food and Social Diversity. *Journal of Archaeological Research* 20: 357-395.

Van Derwarker, Amber M., C. Margaret Scarry, and Jane M. Eastman
2007 Menus for Families and Feasts: Household and Community Consumption of Plants at Upper Saratown, North Carolina. In *The Archaeology of Food and Identity*, Katheryn C. Twiss, editor, pp. 6-49. Center for Archaeological Investigations, Southern Illinois University Carbondale.

Voss, Barbara L.
2005 From Casta to Californio: Social Identity and the Archaeology of Culture Contact. *American Anthropologist* 107(3): 461-474.
2008 Gender, Race, and Labor in the Archaeology of the Spanish Colonial Americas. *Current Anthropology* 49(5): 861-893.

Wake, Thomas A.
2006 Prehistoric Exploitation of the Swamp Palm (*Raphia taedigera*: Arecaceae) at Sitio Drago, Isla Colón, Bocas del Toro Province Panamá." *Caribbean Journal of Science* 42(1): 11.

Wake, Thomas A., Jason de León, and Carlos Fitzgerald Bernal
2004 Prehistoric Sitio Drago, Bocas del Toro, Panamá. *Antiquity* 78(300): 1-6.

Wake, Thomas A., Douglas R. Doughty, and Michael Kay
2013 Archaeological Investigations Provide Late Holocene Baseline Ecological Data for Bocas del Toro, Panamá. *Bulletin of Marine Science* 89(4): 1015-1035.

Waselkov, Gregory A.
1987 Shellfish Gathering and Shell Midden Archaeology. *Advances in Archaeological Method and Theory* 10: 93-210.

Wallman, Diane
2020 Subsistence as Transformative Practice: The Zooarchaeology of Slavery in the Colonial Caribbean. *Journal of African Diaspora Archaeology and Heritage* 9(2): 77-113.

Weik, Terrance
2004 Archaeology of the African Diaspora in Latin America. *Historical Archaeology* 38(1): 32-49.
2009 The Role of Ethnogenesis and Organization in the Development of African-Native American Settlements: An African Seminole Model. *International Journal of Historical Archaeology* 13(2): 206-238.

Wilkie, Laurie A. and Paul Farnsworth
2010 Those Who Were Traded: African Bahamian Archaeology and the Slave Trade. In *Social Archaeologies of Trade and Exchange: Exploring Relationships among People, Places, and Things*, Alexander A. Bauer and Anna Agbe-Davies, editors, pp. 43-163. Routledge, New York, NY.

World Register of Marine Species (WORMS)
2019 *Mollusca.*
< https://www.marinespecies.org/aphia.php?p=taxdetails&id=51>.
Accessed 24 July 2024.

Woo, Katherine, Patrick Faulkner, and Anne Ross
2016 The Effects of Sampling on the Analysis of Archeological Molluscan Remains: A Quantitative Approach. *Journal of Archaeological Science: Reports* 7:730-740.