

An Examination of Cuban Migrant Craft: Rafts, Chugs, and Boats

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Cuban Migrant Craft, known colloquially as Chugs, is a unique type of vessel that needs study. Made famous by the media, this type of vessel is barely studied. By studying vessels and the demographics, this thesis is one of the building blocks for future studies and a call to action. This thesis found that the vessels generally used are of similar size many are between 4 and 7 meters. Also, most of the vessels appeared to be homemade. These vessels also had pieces and materials added to allow the vessels to be seaworthy. To propel the vessels, a majority of the vessels used combustion engines that were not originally intended for marine use and as such had special modifications to allow the engines to function. This thesis seemed to suggest that the demographics are not important to the overall design, but this needs to be studied in more depth.

An Examination of Cuban Migrant Craft: Rafts, Chugs, and Boats

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Chapter 1 Introduction:

The boat was 23-feet long, powered solely by two small sails. There were 41 people below and 5 above. All but myself and a photographer were Haitian citizens fleeing their country, hoping to start a new life in the United States. The hold was lined with scrap wood and framed with hand-hewn joists, as in an old mine tunnel, and when I looked into the darkness it was impossible to tell where one person ended and another began. We were compressed together, limbs entangled, heads upon laps, a mass so dense there was scarcely room for motion. Conversation had all but ceased. If not for the shifting and blinking of eyes there'd be little sign that anyone was alive. Twenty hours before, the faces of the people around me seemed bright with the prospect of reaching a new country (*New York Times*, Michael Finckel, June 18, 2000).

Most accounts of these escape voyages, including that of embedded journalist and contributing editor to *National Geographic Magazine* Michael Finckel, focus on the human experience with a few cursory comments on the vessel design of refugee craft. The archeological work done on these vessels does not garner the same level of funding and nationalist interest that warships or merchant ships receive. However, a very vocal refugee community desperately want a study of these vessels. Many in the Cuban population of the United States had their lives or those of their loved ones defined by these boats and the escape. After the rise of the Castro Regime, there were numerous waves of Cuban migrations. In the early days, people would emigrate on Freedom Flights under duress by the Castro regime. This first migration consisted of the wealthy and intelligentsia. Unfortunately, this pathway to the United States had a long wait time, prompting some to make the voyage by sea. The later groups migrated due to economic reasons, most relied on migrant craft as the Freedom flights stopped in 1973. This has created two similar but very distinct groups in the Cuban American population with their own particular views about Cuba. Currently, there have been almost no studies done on the migrant craft coming from Cuba. The vessels have approximately fifty years of evolution and people constructed and used Cuban

Migrant Craft until early 2017. To study these communities and this iconic watercraft I will discuss several issues in the study.

Research Questions:

1. How have Cuban Migrant Craft changed over time to meet the challenges of material availability, natural factors, and increased interdiction technology?
 - a. Is there any design or material consistently used in successful crossings or unsuccessful crossings?
2. What is the profile of the migrants/refugees?
 - a. What are the demographics of the group in regard to age, gender, and occupation?

On September 10, 2017, Hurricane Irma made landfall on Cudjoe Key, located in the lower Florida Keys. The storm made landfall as a category four storm with winds of 209 kilometers per hour and brought between five to fifteen-feet of storm surge on different islands. The storm was responsible for at least 112 deaths across the Caribbean and the United States. Estimates of the damage in late September 2017 are in excess of 150 billion US dollars (Ahmed 2017) (Anon 2017). This storm was a tragedy for all those affected, and it will take years for some locations to recover. Irma also destroyed a part of American history that, so far, has not been properly studied, Cuban Migrant Craft. At least two vessels are completely gone due to the storm. There were a number of vessels abandoned on uninhabited islands before the storm. The status of these craft is currently unknown, but the odds of damage and destruction are high. The ephemeral nature of these vessels means that many are gone and will be missing from the historical record. These vessels are part of the unique history of the Cuban American population and the losses of these vessels will be a disservice to future historians. These vessels have no written history or plans. Historians will not be able to gather information from government

reports or primary sources to reassemble the vessels. Every time a hurricane comes through Southern Florida, these unprotected vessels will be damaged and removed as trash. It is important that archaeologists move with rapidity to gather information on the remaining vessels. Some of those vessels need to be preserved so that this unique piece of history can be shown to future generations.

Maritime archaeology, like terrestrial archaeology, focuses almost all efforts on artifacts that are over fifty years old as required by heritage legislation. Currently more archaeological efforts are being put into the study of artifacts from the Second World War. For events that occurred within the last 100 years, there is often a plethora of written records to be studied. On occasion, these records lead to archaeological studies being sidelined because, with such records, it appears that such studies are not needed. The study of recent artifacts is necessary, the written accounts can be wrong, and many unique examples of artifacts are lost in, what seems to be, a disposable age that humanity has entered. The migrant craft seen in the last century are part of that disposable culture. These types of craft are seen in many different parts of the world, and each group of migrant craft is a reflection of the culture from which it originates.

Migrant craft expeditions often originate from locations of great turmoil. The goal of those aboard is to escape the strife of their home and reach the safety and stability of a new nation. In the last century, small unique migrant craft were created independently many times; however, there are three places of origin which were/are more prolific: Cuba, South East Asia, and the Mediterranean. As the proverb states, "Necessity is the mother of invention;" this apt for these vessels. Each area uses the materials readily available, and often, include aspects showing what the migrants regard as important. Eventually, a study comparing the vessels of the three groups should be done, however, data on vessels originating from Cuba and vessels from the

Mediterranean are currently understudied. This thesis is an attempt to collect the data on migrant craft that originated in Cuba.

Cuban Migrant Craft, known also as Cuban Rafts and colloquially known as “Chugs” in Southern Florida, have not been researched in depth by archaeologists. These vessels arrived in Southern Florida with regularity since the late 1950’s. Laws passed in the United States provided preferential treatment to Cuban migrants compared to other migrant groups. These laws unintentionally encouraged people to attempt a dangerous crossing. However, at the end of 2016, those laws were changed, and Cuban Migrants no longer received preferential treatment. As of the summer of 2017, though no official reports have been published at the time that this thesis was written, it appears that the number of crossings has fallen greatly. Since the changing of the law, local newspapers in the Florida Keys have reported that there have been zero migrants since April of 2017 (Linhardt 2017). It is possible that the preferential status could be reinstated, which would possibly renew Cuban migration, though this does not appear to be an important issue for the Federal Government at this time. As of late June 2017, changes have occurred in the United States that possibly suggest a cooling of relations; however, the full impact will most likely not be seen until after this thesis has been submitted.

Though these vessels were constructed with modern resources, these craft are not designed to last. A majority of the vessels were designed only to make a one-way voyage and then were abandoned. The materials used in the vessels’ construction are often not ideal for marine situations. This results in rusting or rotting away. Also, many of the vessels were seen as a nuisance by the people of Southern Florida. An ad hoc vessel landing on a public or private beach and being left there would likely negatively affect the locals who use that resource. The vessels were often disposed of by Florida due to what is found aboard. Foodstuffs, which include

fruits and meats, and human waste were common and in South Florida, these items quickly begin to decompose and become a biohazard. There is also the issue of the fuel and oil on the vessels. With the use of terrestrial vehicle engines, fuel and oil have to be stored on the vessels in homemade fuel tanks. Often the containers used for fuel were not designed for holding fuel. When left on the beach or in estuaries, this becomes an ecological issue. Removal of the vessels generally means that the vessels were sent to waste management facilities. The end result is that very few of the craft are conserved or preserved.

Over the past sixty years, thousands of migrant vessels have been used in attempts to cross the Florida Straits, with an unknown number failing to make landfall either due to being interdicted by the United States Coast Guard, or by being lost at sea. This thesis will examine the vessels deemed successful, namely vessels that made it across the Florida Strait or were close enough that the US Coast Guard performed an interdiction. The theory that early vessels would rely on sails as the main source of propulsion and there would be a transition to vehicle engines was found to be false. Engines were used in some of the first vessels deployed. The reason for this belief is that the creation of a sail and a mast is simpler than extracting a motor and installing it with all necessary components. However, the theory that the materials used for construction were found to be accurate. It was suspected that wood will be used in early vessels and then a transition to metal and plastics. This was believed due to the ready availability of wood and the relative ease in which it can be worked. Plastics were not widespread until the 1960's. It should also be considered that, due to the treatment of these vessels, that even though twenty-three craft were examined, this is a small sample size as it is likely that a vessel can be found that contradicts the trends discussed.

The vessels documented in this study display a range of designs. Some appear to be simple combinations of available parts while others are professionally built using modern shipbuilding materials. Vessels that look extremely similar are, upon closer inspection in the archaeological record, different. Nothing on these vessels is frivolous, each part and paint color had a purpose and meaning to those who were aboard. This thesis looks at the vessels and identifies the unique features and design trends. The intent is to inform about the choices and innovations people made when constructing the vessels due to the environment they intended to leave, the working ability of the vessels on the voyage, and what the remnants relay about the voyage, experiences, and preparations.

Chapter 2 History of Cuba:

Cuba is a country that has a long history of revolution, both successful and unsuccessful. To understand the Cuban migrant boats, it is necessary to understand the Cuban people. There is a long seafaring tradition on the island which comes from the indigenous peoples and the Spanish colonizers who controlled Cuba until the early twentieth century. There are four distinct periods in Cuban history: Pre-History, Spanish Colonial, American influenced, and Modern Communist. Understanding the island provides insight into the people and the lengths that those people are willing to go to attain a better life. It is important to state that this chapter does not intend to vilify or commend any part of Cuban history or any of the parties involved. It is a statement of what happened and how this has uniquely molded the Cuban people who created the vessels that are examined in this thesis.

Prehistory:

There is limited information about the prehistory of Cuba. The information from Christopher Columbus does tell historians that, when he arrived, he was greeted by the Taíno people (Sale 1990:100). There are no modern estimates on the size of the indigenous population of Cuba; however, it is estimated that the Taino population on Hispaniola was about 500,000 at maximum, which is much smaller than Spanish estimates (Anderson-Córdova 1990:156). Cuba, at that time, was home to two distinct indigenous peoples, the Taíno and the Guanahatabey (Rouse 1992:5). The Taíno were an agrarian society that also appears to have a strong seafaring tradition. The Guanahatabey were a hunter-gather society of which little is known. Estimates place the population of the Guanahatabey at 10% of the total indigenous population. The Taíno translator that Columbus used was unable to communicate with the Guanahatabey (1992:20). Unfortunately, it does not appear that the Guanahatabey people had a written history and the

Spanish had little interaction with the Guanahatabey people before the Guanahatabey became extinct.

Cuba has not recently been connected to either mainland North or South America. The estimate is that the lowest sea levels were around 20,000 B.C.E. This was the middle of the last ice age and sea levels were 120 meters lower (Gornitz 2007). The Florida Straits are about 1,829 meters deep (NOAA 1983). The earliest evidence of people living in Cuba is about 4,190 B.C.E (Saunders 2005:84). The lack of a land bridge means that the peoples of Cuba had to use watercraft to reach the island.

The origin of the indigenous Cuban people is a debated topic; however, the use of modern DNA studies, along with linguistics and studies of agricultural practices have produced interesting theories. The results of these studies suggest two possible origin locations for the Taíno people. The two locations postulated as the origination point of the Taíno people are the Orinoco river basin and the Andes Mountains. This data comes from studies that used DNA from people of Taíno descent in the Dominican Republic and Puerto Rico (Martínez-Cruzado et al 2001). DNA markers found in Taíno descendants are also found in people living in the Orinoco Basin of South America (2001). This area is found in modern Venezuela and has some tributaries that are not far from the Amazon River. This is important because the Arawak family of languages originated from the Amazon River basin (Pet 2011). The Taíno language, as well as the Carib language, is an Arawak language. This lends support to the DNA evidence that postulates an origin in the Orinoco region. The second area suggested were the Andes Mountains (Rouse 1992:30-48). The Arawak language was also spoken in this region (Hammarström et al 2016). Another piece of evidence that supports this location as a point of origin is the crops that were grown by the Taíno. The Taíno grew sweet potatoes and introduced them to the Spanish

(Rouse 1992:170). The origin of the sweet potato and, in fact, all potatoes, is the Andes region of Peru (Spooner et al 2005). The oldest evidence of cultivation of sweet potatoes dates to around 8000 B.C.E (National Research Council et al 1989). Unfortunately, this is not definitive evidence. Trade is still another major possibility for how the Taíno people obtained sweet potatoes. Regarding the origin of the Guanahatabey people, DNA evidence is unclear. It is suggested that these people came from either Mesoamerica or North America, but no modern people claim descent (Marcheco-Teruel et al 2014)

The Taíno people are considered extinct. However, studies suggest that parts of the present population on other islands where the Taíno lived have DNA markers that are possibly from the Taíno (Martínez-Cruzado et al 2001). The data available for the Cuban population at this time shows indigenous DNA markers; however, no study available makes connections between the Cuban people and a location of origin (Marcheco-Teruel et al 2014). Examining census reports from the Spanish about the colonial holdings shows that 40% of the Spanish population took Taíno women as wives (Guitar 2000). The Taíno people, the first peoples contacted by Christopher Columbus, succumbed to many of the same problems that affected other indigenous peoples after European contact. Epidemic disease, slavery, and warfare decimated the population. During the 1500's, the Spanish reports began to claim that the Taíno were extinct (2000). The Taíno language seems to have lacked a written component or written examples were destroyed by Conquistadors as they took over Cuba and the other islands that the Taíno inhabited.

The Taíno people were unique in the Caribbean and Mesoamerica. They were a peaceful people, compared to some of the other peoples in the Caribbean. It does not appear that the Taíno had ritualistic killings and warfare was limited to mostly defense against the raiding Carib

(Rouse 1992:22). This was exploited by the Spanish. The name of the people roughly translates to “the good people,” this distinguished them from the Carib people who raided the Taíno (1992:5). This seems to be the only people with whom the Taíno had a problem coexisting. The Taíno seemed to coexist with the Guanahatabey people on Cuba (1992:20). The Taíno told the Spanish that the Guanahatabey lived in caves and there was no indication of open hostility (1992:20). This is not the case when the Carib were discussed (1992:22). This peaceful nature did leave more opportunity for trading. It is unlikely that the powerful empires of the Americas, the Maya, and the Aztecs, would have had a large interest in conquering the Taíno, who would have been quite distant. The possibility remains, however, that the Taíno did engage in warfare with other groups, but the information has been lost due to the Spanish Conquest and the lack of a written language.

The evidence suggests that the Taíno people moved into the Caribbean from South America and had to use some form of watercraft. Perhaps, this type of craft was used for trade between the islands and South and possibly Central America. The only issue with the trade theory is that there is no “smoking gun” evidence to support it. The Taíno were a mobile people that appear to have been able to navigate the Caribbean, so it is possible that trade between islands was occurring. The Mayan people were trading along the Yucatan peninsula and were growing sweet potatoes during their classical period, approximately 250 to 900 C.E (Hillel 1992:126). It is possible that these two groups could have interacted.

The reason for the Taíno people’s mobility was the direct threat of constant raids by the Carib (Saunders 2005:48). The Spanish found that many Carib women could speak Taíno and were actually captive Taíno or their descendants (Rouse 1992:22). This predatory relationship pushed the Taíno continually northward through the Caribbean (1992:73). Eventually, they

reached Cuba, where Columbus found them. This migration most likely occurred over hundreds of years. It is the initial story of the Cuban seafaring tradition, which was eclipsed by the Spanish seafaring tradition, which Cubans can also claim as heritage.

Colonial Era 1492- 1894:

During the Spanish colonial era, the slave trade brought a number of different peoples to Cuba. After early colonization, most of the indigenous peoples of Cuba were wiped out. To maintain a workforce on the island, indigenous peoples from other Spanish colonies were brought to Cuba. Later, after the Seven Year's War, the African slave trade was introduced to Cuba. DNA studies show that the population of Cuba is an amalgamation of many different groups; however, there were a few distinct trends. Throughout the history of Cuba, immigration to the island was dominated by males from Spain (between 60% and 85%) and mixed marriages were quite common (Marcheco-Teruel et al 2014). This is supported by evidence showing that paternal DNA of many Cubans is of European origin while maternal DNA suggested either African or indigenous descent (2014). This is still represented by the Cuban census. The census asks Cubans to identify themselves as "Blancos" ("White"), "Mestizos" ("Mixed") and "Negros" ("Black") (Alfonso 2009).

During the Colonial era, Cuba remained a key Spanish colony. In Cuba, the Spanish could resupply their vessels for the Atlantic crossing. The size and positioning of the island made it a desirable and strategic base. The British wanted to oust the Spanish and spent much of the colonial era in the attempt. The British allowed privateers to work freely in the waters around the island. The British were finally able to capture Havana and the Western half of Cuba during the Seven Years' War, at which point the island was opened to trade (Childs 2006:24). However, the British did not retain control of Cuba. The Treaty of Paris ceded Spanish Florida to the British in

exchange for Cuba returning to the Spanish (Office of the Historian 2017). British control of Cuba lasted only for about a year but changed the island forever. The introduction of African slaves made the sugar plantations much more profitable and increased the importance of Cuba in the Spanish empire (Childs 2006:32-34).

After the Seven Years War, Cuba was much more profitable, however, difficulties were soon to arise. The revolutions in the thirteen colonies and France disseminated radical ideas throughout the world. The Haitian slave revolt of 1791 also had a major impact on Cuba. It first made the slave trade in Cuba even more profitable, but ideas of freedom and equality began to circulate around the island (2006:35). The earliest conspiracies occurred in 1795 (Gott 2004:48). Nicolás Morales, a free black, led this conspiracy. The goal of the conspiracy was to make people of mixed heritage and whites equal as well as abolishing certain taxes. This conspiracy was discovered, and Nicolás Morales and other leaders were arrested (2004:48). The island experienced no further upheaval until 1809. In that year, a group of Creoles from the aristocracy of Cuba started a separatist movement (Navarro 2001:35). This separatist movement drafted the first constitution for Cuba. This constitution divided the people into racial categories, made Catholicism the official religion, and stated that slavery would be legal until it was no longer necessary for agriculture (2001:35). This movement failed, and the leaders were sent to Spain and imprisoned (2001:35). The island had a brief respite before the next upheaval. In 1812, an abolitionist group under the leadership of José Antonio Aponte, a free black, tried to lead a slave rebellion. This was the largest rebellion of the time in Cuba. However, the rebellion failed, and the leaders were summarily executed (Childs 2006:173-174). The reason for the failure of both revolts was a lack of support from a majority of the population.

While Ferdinand VII was in exile and the Cortes of Cádiz was in power, Cuba was granted a number of new liberties. Cuba was allowed to send delegates to the legislative body in Madrid and was able to form a provincial assembly (Navarro 2001:36). Combined with the Spanish Constitution of 1812, the liberties gained were greatly appreciated by the Cuban people (2001:36). Slavery was not abolished during this period. Unfortunately for Cuba, the Cádiz Cortes and the Spanish Constitution only lasted until 1814. At that time, Ferdinand VII was returned to the throne. The liberties granted to Cuba were rescinded (Olson 1991:206). It was not long after Cuba was returned to its 1808 status, that Cubans decided there needed to be changed on the island.

After 1820, Cubans had a number of ideas about increasing their own freedoms and autonomy. At this time, the Spanish constitution was restored (Navarro 2001:36). This was not seen as going far enough by the Cuban people. Many who had been watching the success of Simón Bolívar were inspired and formed secret groups with the goal of Cuban autonomy. The most important, which started the move towards Cuban independence, was *Soles y Rayos de Bolívar* (2001:36-37). This group wanted independence from Spain. There was no mention of abolishing slavery because the people of Cuba believed that it was necessary for the island's continued economic success. The group formed in 1821 and was quickly suppressed. In 1823, many of the leaders of these independence groups were eventually exiled when the Spanish constitution was abolished for the second time. This also abolished the militia that had been formed on the island as Spanish officials feared it could be used to liberate the island. After this, Cuba experienced a number of independence conspiracies which formed and failed (2001:37).

Though Cuba was a hotbed for conspiracies, actual rebellions were not common. The first uprising with the goal of gaining independence for Cuba occurred in 1836. This was led by

Francisco de Agüero and Andrés Manuel Sánchez (Simons 1996:138-139). The uprising failed and both men were executed. However, the men were seen as heroes in Cuba to all parts of the Cuban population because Francisco de Agüero was white and Andrés Manuel Sánchez was of African descent (1996:139). The movement for independence was forced underground until the 1860's. However, during this time, the Cuban people still desired change (Navarro 2001:41-42).

Slavery was a contentious issue among Cubans. In the early 1800's, Cubans were very pro-slavery. This caused difficulties because England forced Spain to sign the Anglo-Spanish treaty of 1817, which limited slavery and the slave trade (Lovejoy 2000:135, 284). This was promptly ignored by Spain but still caused fear in Cuba. In an attempt to circumvent this treaty, the plantation-owning aristocracy of Cuba pushed for the United States to annex Cuba in 1823 (Caldwell 1915:25). This request was one of the factors that led to the Monroe Doctrine (Boyer 2001:513-514). Slavery became an even greater issue after the British forced Spain to sign a second treaty in 1835 (Navarro 2001:39). Spain began to stop the importation of slaves to Cuba (2001:39). This greatly disturbed the Cuban nobility because the economy of Cuba was heavily dependent on slavery. It is at this time that talk of joining the United States increased in Cuba. This was solely due to slavery being legal in the United States (2001:40-41). However, the closest that Cuba ever came to annexation by the United States was in the 1840's. Narciso López tried to form a number of unsanctioned expeditions in the United States with the objective of starting an uprising in Cuba. This would be done by bringing supporters from the United States to Cuba and inciting rebellion (Caldwell 1915:49-50). Two expeditions were stopped by the United States, but two others succeeded in landing in Cuba. However, Narciso López could not gain popular support, was captured by the Spanish and executed (1915:112).

Cubans in the 1860's resumed the movement for independence. First, liberal governors granted liberties to the island. The reactionary governor, Francisco Lersundi, then repressed these liberties and supported slavery in Cuba (Navarro 2001:42). A major event occurred in October 1868 during Francisco Lersundi's governorship. Carlos Manuel de Céspedes declared independence for Cuba and freed all his own slaves (Thomas 1998:245). This began the Ten Years War between Cuba and Spain. It was the first of three wars that would occur over the next thirty years. The war lasted ten years and failed in achieving Cuban independence. This was in part due to the disparate groups that attempted to form a government in Cuba but could not agree. By 1878, the war resulted in 150,000 Cubans dead and the Pact of Zanjón which ended the fighting for most Cubans (Clodfeter 2001:343). This gave Cuba representation in the Spanish parliament and looked to abolish slavery by 1888. The Pact also granted amnesty, and included the release of prisoners, for all political offenses that had occurred since Cuba had declared independence (Navarro 2001:50). Political prisoners were allowed to leave Spain and Cuba and some prisoners set about gathering support and supplies for another conflict (Villafana 2012:112).

The Pact of Zanjón started an era called "the rewarding truce" (Navarro 2001:53). This was a period of seventeen years in which the Spanish colonial government remained in control of the island. These seventeen years were not peaceful. In 1879, the "Little War" started (2001:54). However Cuban forces had no support from foreign nations or from the majority of Cubans. This war lasted until 1880 and resulted in the defeat of Cuban forces (2001:54). This was the last major insurrection before the Cuban War of Independence. The reforms promised by the Spanish after the Pact of Zanjón never went into effect and led to economic depression and, in 1895, the Cuban War of Independence which became the Spanish American War (Olson 1991:218).

Early Modern 1895-1958:

Cuba's relationship with the United States is complicated. The countries have a history prior to the Spanish American War. The United States first became involved in Cuba's history with the Monroe Doctrine. However, that was the extent of sanctioned United States interventions. The expeditions led by Narciso López were known as "filibuster expeditions" (Caldwell 1915). A filibuster, in military terms, is a group of people in an unauthorized military expedition into a foreign country or territory to foment or support a revolution. The term is most often used to describe people from the United States involved in Latin America during the mid to late 1800's (Safire 2008:244). The Spanish American War did play a major part in achieving Cuban independence from Spain. However, Cuba had started the struggle years before the United States went to war with Spain. The United States did not take the former colony as a territory, as was the case with Puerto Rico. The Spanish American War was only a small part of the struggle for Cuban freedom. Cubans had begun the war for independence in 1895 (Navarro 2001:61). During the early parts of the war, before the United States became involved, Cuban supporters in the United States tried to send weapons and volunteers to Cuba. In the inverse to the Cuban migrant craft story, supplies and volunteers would launch by boat from Florida and try to make the voyage to Cuba. Similar to the modern Cuban migrant craft in objective, the vessels were tasked with evading the United States Coast Guard and the Spanish authorities to deliver the supplies and people carried aboard. This was necessary because the United States was able to support the independence movement financially, but support in the form of weapons and personal was illegal (Thomas 1998:305). Those that wanted to see an independent Cuba needed to find a way to resupply the rebel movement. There were a number of attempts to send supplies

to Cuba from Florida. Many were caught by American authorities before leaving Florida (1998:305).

The United States was interested in intervening in the war for Cuban independence. However, there were no legal ways to become directly involved. Some in Congress believed that the United States had to step in to enforce the Monroe Doctrine (King 1973:94-95). There were also important economic concerns held by the United States. The longer the conflict continued, the more trade and business were negatively affected. The media at the time were painting Spain as a colonial tyrant similar to England and urged the United States to intervene on the side of Cuba. The Spanish government became more liberal and began to change many of its policies regarding Cuba (Tone 2006:46). Spain also recalled the governor, Valeriano Weyler, causing Cubans loyal to Spain to protest (2006:49). These protesters worried the United States' consul in Havana, Fitzhugh Lee, leading to the request for an American warship to be sent to Havana harbor (Thomas 1998:356). The warship chosen was U.S.S. *Maine*.

When the Spanish American War started, Cuba was a major theater. Conflict on the island had a major impact on the United States. The Rough Riders became famous for their heroics, and Theodore Roosevelt would use the fame he garnered during the war to propel himself to the Presidency of the United States. Cubans joined with American forces in many battles. This was because part of the expressed reason that the United States joined the war was to help Cuba achieve independence from Spain. This resulted in the war being very costly to Cuba. Cuban casualties amounted to more than eight thousand (Clodfelter 2002:345). This was the largest number of casualties of any of the belligerents involved. The destruction of the Spanish Caribbean fleet was a key battle in the theater. It was the last major action around the

island (Nofi 1996: 208-210). The United States then occupied Cuba and debated the future of Cuba.

At the end of the Spanish American War, both countries had to make a decision. Some politicians and people in both Cuba and the United States were pro-annexation. The United States saw the wealth Cuba could produce and wanted part of that wealth (Navarro 2001:73). In Cuba, there was a very vocal segment that believed Cuba needed to become an independent nation (2001:77). Ultimately, the annexation of Cuba would have been illegal for the United States due to the Teller Amendment being passed five days before war was declared on Spain (Beede 1994:120). This amendment stated that the United States was sending troops to help Cuba fight for independence, withdraw after the war, and let the Cuban people decide their future (1994:120-121). This did leave the option for annexation open if the Cuban people did request to join the United States. Cubans, however, desired to be their own independent nation. Politicians in the United States still believed that Cuba should fall under American influence. After the war, the United States appointed occupation governors for the island until 1902 (Navarro 2001:81). Shortly after the war, the Cuban people demanded a constitution and, in 1899, the Cuban constitutional assembly formed, and the structure for early twentieth century Cuba was determined. When the United States felt that Cuba was stable enough, Congress passed the Military Expenditures Law, which listed the requirements Cuba must meet for the occupation to end and included the Platt Amendment (2001:79-80).

The Platt Amendment determined how the United States and Cuba would interact until 1934. The Amendment had seven provisions. The Amendment can be found in Appendix 3. These provisions allowed the United States to have great control over Cuba without annexing it.

The Platt amendment was completely removed from the Cuban constitution in 1934 (National Archives 2006).

After the American occupation, Cuba was prosperous but faced hardships. In the first half of the twentieth century, Cuba became the playground for many of the richest Americans. American industry was helped significantly by the Platt Amendment and flourished on the island (Navarro 2001:84). There was a brief occupation by the United States again in 1906. This was to stop Cubans from fighting and to protect American interests on the island. The occupation lasted until free elections were held and the new government was stable (Beede 1994:144). It was during this occupation that the Cuban Communist party began to form. The occupation lasted until 1909 when the United States felt the Cuban government, led by the freely elected José Miguel Gómez, was sufficiently stable (1994:141). The government and the island flourished. Cuba was stable, but the nation still had problems. During the presidency of José Miguel Gómez, the ability to vote and take part in government was drastically diminished for people of Afro-Cuban descent (Gott 2004:108).

Cuba was essentially controlled by the United States until the mid-1930s. In 1933, Fulgencio Batista led a coup against the authoritarian rule of Gerardo Machado (Whitney 2001:85). Immediately following the coup, Cuba was governed by a five-member council known as the Pentarchy of 1933. However, Batista was in control of the government because he appointed himself head of the army (Argote-Freyre 2006:74). He also conspired with the United States envoy, Sumner Wells, and was able to replace the government of Ramón Grau San Martín. Conspiring with the United States allowed Batista to gain increased control over the government and stopped the United States from intervening in Cuba which would have been necessitated by the third provision of the Platt amendment of 1901. The United States did not

want to intervene in 1933 (Hinton 1933). Between 1934 and 1940, Batista controlled the government through a series of presidential puppets. In 1940, Batista was popularly elected into office (Argote-Freyre 2006:273). During his first term as president, he did show favoritism towards American companies. At the end of his presidency, his handpicked successor lost the election to Ramón Grau San Martín. Batista set out to make it difficult for Ramón Grau San Martín to run the government. The United States Ambassador Spruille Braden wrote in a dispatch, “It is becoming increasingly apparent that President Batista intends to discomfit the incoming administration in every way possible, particularly financially. A systematic raid on the Treasury is in full swing with the result that Dr. Grau will probably find empty coffers when he takes office on October 10. It is blatant that President Batista desires that Dr. Grau San Martin should assume obligations which in fairness and equity should be a matter of settlement by the present Administration.” (United States Department of State 1944) This attempt to damage the incoming government led to Batista leaving Cuba and living in the United States out of fear of retribution. He would remain in the United States until 1952 (Dominguez et al. 2008:34).

Batista returned to Cuba in 1952 and ran for president; however, his United Action Coalition was lagging behind other parties in the race (2008:34). On March 10, 1952, Batista, with the support of the army, staged a coup and removed outgoing president Carlos Prío Socarrás (2008:34). Elections were canceled, and the dictatorship of Fulgencio Batista began. During the dictatorship, Batista showed great favoritism to American corporations at the cost of the Cuban people. Poverty increased as well as unrest. The United States supported the regime because of the benefits that it provided to business (Kennedy 1960). He also kept the island pro-United States, though this was artificial and not the view of the Cuban people. Batista also allowed organized crime to operate in Cuba (Detzer 1979:16-17). Cuba became a favorite vacation

destination due to the availability of illicit items, and corruption was the norm (Geiling 2007).

Cuba, during the whole of Batista's rule, was in constant revolution though it was not until 1956 that Fidel Castro and his supporters started the guerrilla campaign which led to Batista's ousting in 1959. The people of Cuba celebrated the overthrow of Batista at the time and accepted Fidel Castro as the new leader of the country (Thomas 1998:1193). It is under the Castro regime that the Cuban migrant craft were created and deployed by the desperate people of Cuba.

Modern era 1959- Present:

Cuba's most recent history has been its most difficult or most prosperous, depending on the source. After the Batista regime was removed, the Communist Party of Cuba took full control. Under the leadership of Fidel Castro, the island nation began to change. Fidel Castro was able to rise to power because of the overwhelming socioeconomic issues facing the island. Laws that increased the rights of Cubans of African descent and women were passed along with reforms to education and the medical system. Though these shifts started to help a majority of the Cuban people, those who had benefited under the Batista regime were the first affected negatively (Lazo 1970:199-204). The reform that had the greatest effect was the land reforms. Because so much of Cuban land was held by foreign corporations the communist regime took those lands and redistributed it to Cuban people creating communes on which Cubans lived and worked (Kellner 1989:57). Unlike other communist regimes, there is no written or spoken desire by the Castro regime to create an agricultural utopia. The desire was to put Cuba under the control of the Cuban people (Staten 2005:91). To this end, the Castro regime was successful. However, during this era of communist rule people have been imprisoned and persecuted by the regime. These persecutions cause the perception of Cuba to be very fluid depending on the

source. The United States has an obvious bias against Cuba, while nations such as Venezuela have a very positive view of Cuba and the communist regime.

Relations with the United States after the Cuban Revolution were damaged. Initially, the United States was willing to recognize the Communist government on the island as the legitimate government (Gleijeses 2002:12). However, as the fear of Communism rose in the United States, along with a number of hard feelings (the seizure of American company land and assets, and the support the United States provided to Batista) on both sides caused the nations to break off relations (Faria 202:105) (Robles 2015). The Communist government nationalized all American owned property. This led to the United States starting an embargo against Cuba. The embargo was put in place by President Eisenhower. It halted the import and export of all goods except medicine and food (Fabry 2015). The embargo is still in effect today, but only affects imports and exports between the United States and Cuba. The embargo does not stop third-party nations from trading with Cuba.

American and Cuban relations broke down completely after January 1961. The United States closed the embassy in Havana and severed all ties with the Cuban Government (BBC 2015). The Cuban government had begun to receive support from the Soviet Union in the form of military equipment, training, and advisors (Thomas 1998:1314). This was seen as unacceptable by the United States and, in 1960, President Eisenhower approved plans for the infamous Bay of Pigs Invasion (Chomsky 2003:82). The plan called for the combined efforts of Cuban exiles and CIA personnel to land on the island and create a coup with the help of the local population. The invasion took place on April 17, 1961. The failed invasion lasted only two days and strengthened the Cuban government while it created an embarrassment for the Kennedy Administration (Kennedy 1961).

Relations were further strained in 1962. In October 1962, the Soviet Union approved Cuba's request to station intermediate-range nuclear missiles on the island. This was in direct response to the Bay of Pigs invasion and the placement of American ballistic missiles in Turkey and Italy (Andrew 1996:688). The Soviets began construction of missile bases in Cuba after July. The plan was for forty launchers in Cuba (Barlow 2007:158-159). The United States was able to identify the early stages of construction and, in October, photographs of the missiles were taken via spy plane. This led to the only actual blockade of an independent Cuba by the United States. The crisis was resolved between the Soviet Union and the United States. Cuba was not at the negotiating table (Hershberg 1995).

The communist government of Cuba has had a history of repression and human rights abuses. Political repression and imprisonment were and, to some extent, are still common. These abuses are one of the reasons that some of the Cuban people have taken steps to leave the island (Human Rights Watch 1999). Immediately before and after the fall of the Batista government, many of his supporters and some of the wealthiest people fled by air to the United States (Gonzalez-Pando 1998:20-21). This group is not given its own distinction. However, a second group that fled by air does have a unique distinction. This group of migrants is the people who fled to the United States aboard the Freedom Flights. People aboard the Freedom flights were more likely to be members of the working class (Anton 2002:172:173).

The Freedom Flights were an interesting form of migration, not because of the method used, but because of the responses of the governments involved. The flights were funded by the United States and operated with the consent of the Communist government in Cuba. The flights lasted from 1965 to 1973 (Engstrom 1997:28). This seems odd when compared to the actions of almost any other communist nation. Some nations, such as Albania, went to great lengths to stop

people fleeing to capitalist nations (Turnock 1997:219). However, it seems as if the Cuban government was happy to be rid of the dissenters. The flights were very popular, this led to long wait times that some Cuban refugees felt were too long. Eventually, the Communist regime in Cuba began to dislike the Freedom Flights, but there was no attempt to stop them from occurring. The strategy that was employed was to try to intimidate the people who wanted to take the flights (Gonzalez 1998:45). This resulted in some success but the intimidation of the refugees, for the most part, drove the people to be more determined to leave the island nation. Towards the end of the Freedom Flights, more people began to look toward the sea as their only option.

The first large wave of the migrant craft was during the Camarioca boatlift (Engstrom 1997:24-25). The term boatlift is used twice in discussing Cuban migration: first, with the Camarioca lift and, second, the Mariel boatlift. These are distinct waves because of the numbers involved. At these two points, the number of migrants was much higher than normally seen and was attributed to a particular event. The increased numbers being reported by local papers in Southern Florida seem to suggest a new wave is currently underway. The papers hypothesize that the reason behind the wave is fear that the “wet foot/dry foot” policy may be repealed (Potter 2016). However, this current wave is not a boatlift.

The Camarioca boatlift was attributed to people becoming disillusioned with the Cuban government. Cubans had been traveling to the United States via the Florida straits for years before this boatlift. The United States Coast Guard reports having assisted the first group in January of 1959; by June of 1965, the Coast Guard had assisted just under seven thousand refugees (USCG 2016). The oppression and policies that, were being enacted were disagreeable to the populace. In response to this opposition, Fidel Castro announced that on October 10, 1965,

the port of Camarioca would be opened so that any Cubans who wish to leave to the United States could do so by boat. However, to do so, the Cubans had to fill out paperwork and forfeit all property to the Cuban government. It was also announced that any Cuban in exile could come by boat and pick up their family from Camarioca (Engstrom 1997:19). The rush to take advantage of this allowance by the Cuban government led to Cubans, living in both Cuba and the United States, searching for vessels. Boats of all types were used. Condemned fishing boats and pleasure craft were employed along with a number of homemade craft. There are many photographs in the Coast Guard archives showing many of the craft used by Cubans (USCG 2016). During this boatlift, the number of Cubans that crossed was just under 3,000 (2016). After the Castro regime closed the port on November 10, 1965, there were still thousands of Cubans who were stranded in Camarioca. Eventually, the Cubans who were left at the port were transported to the United States via charter vessels (2016). Most of the vessels used during this period were professionally built. This is a major difference from the later craft. A majority of recent craft are purpose-built.

After this mass migration, there was a steady trickle of Cubans fleeing Cuba. Included in these numbers are people who used the Freedom Flights. Cubans do not seem to make a distinction between those who came by boat and plane. This is not the case, however, with later Cuban migrants. Between April and October of 1980, a second mass exodus occurred. This wave is called the Mariel boatlift. This was very similar to the Camarioca boatlift. However, it differed due to the actions of the Cuban government and the reason behind its start. The initiating factor of the boatlift was due to a large number of people seeking refuge in the embassies of other countries (Thomas 1980a). The announcement about the boatlift by the Cuban government was broadcast abroad (Tamayo 2008). The reason the Cuban government opened the port of Mariel

was that, in April, over 10,000 Cubans had been seeking refuge in the Peruvian embassy (Thomas 1980b). The people who made up this second boatlift were part of the working class in Cuba. The Cuban government released a number of political prisoners and urged these people to go to the United States (New York Times 1978). Once begun, the number of people who left the island was greater than the Camarioca boatlift. This second boatlift is the most remembered in the United States. It had an impact on American cinematography. The film *Scarface*, written by Oliver Stone and directed by Brian De Palma, often considered one of the greatest crime movies of all time, used the boatlift as a tool and backstory for the main character. This movie, along with statements from the Cuban government, has resulted in the American public misinterpreting some of the people who took this opportunity to come to the United States. The boatlift lasted for six months and saw 125,000 Cubans arrive in Florida (Chardy 2016). Of these, only 2,746 were determined to be criminals and were not granted asylum in the United States (Robles 2017). The boatlift was ended when the port of Mariel was closed by the Cuban Government (Larzelere 1988: XXXII)



FIGURE 1 Map with the origin points for the Boatlifts. Mariel is circled in black while Camarioca is circled in red. Made from Google maps satellite image 2017.



FIGURE 2 Fishing boat used during the Mariel Boatlift (Taken by author)

No boatlifts have occurred since the Mariel lift. There had been a steady trickle of refugees of between a few hundred to a few thousand each year. Cubans who successfully made the journey received preferential treatment by United States Immigration and were treated as refugees fleeing a totalitarian regime. The law that gives Cubans this status is termed the “wet

foot/dry foot” policy and is a modification of the Cuban adjustment act of 1966 (Wasem 2006). There have been some high-profile cases involving Cuban migration, the most famous being the case of Elián González in 2000. The saga of Elián González illustrates the dangers faced by the refugees. The vessel that was used had a faulty engine and resulted in the deaths of eleven of the fourteen people aboard (de la Cova 2015). Beyond this case, Cuban immigration has not been an issue on the national stage. It has been an issue for Floridians and people have differing opinions. However, in the last two years, there has been a rise in the number of migrant vessels that have been arriving in Florida (Robles 2014). It seems that the increase in vessels and migrants is due to a fear of the warming relations between the United States and Cuba (Block 2016).

There has been no statement by the Cuban government of an open port as with the two previous boatlifts. At the onset of writing this thesis, there had been no changes to the immigration status of Cuban people. This has changed, in January 2017, President Obama announced that he was ending the “wet foot/dry foot” policy. This decision had a mixed reception (Labott 2017). As of late 2017, the administration of President Trump has not shown any sign of reversing this decision. It seems unlikely that Cubans will receive preferential immigration status again in the near future.

Chapter 3 Theory

The vessels used by Cuban refugees are a unique expression of the people aboard the vessels. However, these vessels are not created in a vacuum. These vessels were a product of the environment. A suitable theoretical framework to study migrant vessels is Cultural Ecology, defined as the study of human adaptations to social and physical environments (Gunn 1980:19). In this chapter, evidence will be provided to support and define this theory as applied to the topic of refugee boats.

Charles O. Frake provides a great example of using Cultural Ecology in the article "Cultural Ecology and Ethnology." This article integrates Cultural Ecology as a theory in Anthropology. The main argument is that the network of relationships among those of a social community is integrally connected to their biotic and physical environment. To support this theory, Frake examines the Subanun people and their settlement pattern. The Subanun are a tribe indigenous to the Zamboanga peninsula. They are an extant group of people who use swidden agriculture. A swidden is an area of agriculture that is created by the practice of slash-and-burn agriculture. Frake does acknowledge that the Subanun people did not have a settlement pattern based on the spatial relationships of households. There does not appear to be a social reason for why structures existed where they did in the Subanun society. However, the pattern exhibited by the Subanun people was different from other swidden farming people of South East Asia. Frake determined three rules that could be used to determine the settlement pattern along ecological means. By following the three rules, Frake determined that the positioning of the home structure is to protect the swidden from animal pests. Frake's work used Cultural Ecology to determine that the position of the building was to allow the Subanun people to be most efficient in protecting their swiddens (Frake 1962).



In the work by Kay Milton, "Cultural Theory and Environmentalism," Cultural Theory is used to disprove statements made by environmentalists about "going back to nature." Milton sets out three points which support this argument. The first is that some cultures are closer to nature. Milton believes that this reinforces prejudices and is damaging to cultural and environmental discussions. The second point is that people need to know the "fundamental character of culture." This is important because cultures vary in how they perceive aspects of the world and their interaction with the world. The third point is that the "different components of cultural perspectives" need to be understood. Milton's reasoning for this is that the people accept environmentalism based on their understanding of power and allocation of responsibility to both human and non-human factors, and how the people plan for the future. These points are important because understanding cultural analysis can have an impact on the global environmental discourse. Milton believes that both those for and against environmentalism should examine cultural ecology because both sides use fallacious arguments that are disproved by using Cultural Ecology (Milton 2006:351:354).

"The Concept and Method of Cultural Ecology" by Julian Steward provides another lens to examine Cultural Ecology. Steward defines Cultural Ecology as examining the cultural features and patterns which characterize different areas. Steward continues, "Cultural ecology is less concerned with the origin and diffusion of technologies and more with the fact they may be used differently and entail different social arrangements in each environment." Steward acknowledges that cultural diffusion is always affecting cultures, but they believe that the effect of cultural diffusion is "overestimated." This article identifies three procedures of Cultural Ecology. The first is the relationship between technology that is either exploitative or productive and the environment and the culture. The second procedure identified by Steward is to determine

the behavior patterns occurring in an area of exploitation by the technology. The third is to determine how much the behavior that exploits the environment has an effect on other parts of the culture. In closing, Steward discusses where Cultural Ecology should be used in anthropological studies. Cultural Ecology studies are beneficial when attempting to determine how a culture has adapted to the environment in which it exists (Steward 2006:5-9).

A final article of note is by Karl Butzer: "Ecology in the Long View: Settlement Histories, Agrosystemic Strategies, and Ecological Performance," is an examination of the ecological practices of the New World. This was to correct the notion that New World peoples existed in an ecological balance that almost had no impact on the environment. This fallacy is often promoted by environmentalist groups as an ideal that should be modeled in modern agriculture. To disprove this theory, Butzer compares the practices that archaeology has found in the New World to the practices of Mediterranean Agrosystem (western European agriculture). Butzer was able to determine that New World practices were not any less impactful on the environment compared to European practices. New World agriculture practices often included slash and burn clearing to create fields. The study found that after the introduction of the Mediterranean Agrosystem there was no major decline in New World ecosystems until the 18th century. This decline is attributed to an increase in population and introduction of proto-industrialization (Butzer 1996).

In the application of Cultural Ecology theory, the intent is to show how the environment affected the creation of the Cuban migrant craft. Materials and currents, along with the political landscape, all changed how the vessels were designed. Examining the political landscape provides an explanation for vessel design while the availability of materials in Cuba changed material usage in the vessels. The most obvious example is the changing size of the vessels. The

size of the vessels seems to be most dependent on the political climate. The largest vessels were seen during the two boatlifts. This was because Cuba was letting people leave and the “Wet Foot/Dry Foot” policy was not in place. The people who left Cuba during these periods did not have to be clandestine, so large vessels that could carry a large number of people were preferable. Material availability has led to the use of material often considered trash to be used in the construction of the vessels. Oil drums and flotsam, in the form of polystyrene foam and empty bottles, have been used for added buoyancy or hull structure. The natural environment itself does not have as large an impact on the design of the craft. The current in the Florida Straits is beneficial to those that are attempting to cross by bringing the people towards the northeast. The current is not enough to have people land in Florida, but the current does have the possibility of bringing migrants within range of rescue or landing if the craft does have some form of propulsion. The natural environment in Cuba has likely not been greatly affected by the creation of Cuban Migrant Craft. Combined with the use of non-natural materials, it is likely that too few craft have been made by people to impact the environment in a way that could be detected and determined to be solely the responsibility of migrant craft creation.

Cultural ecology can be applied directly to the vessels used by Cuban Refugees to cross the Florida Straits. The people in Cuba, who become refugees, find the communist regime (the social environment) so deplorable that change is necessitated. However, due to the imbalance of power and the lack of political alternatives, the only choice some people feel is to leave. It should be noted that this is likely not the only reason for Cubans becoming refugees; however, other motivations are not readily mentioned. The government of Cuba had, in the past, strict rules about leaving the country. Those caught trying to flee or even caught speaking about illegal emigration could face prison time (Beyer 2016). It was not until 2012 that the act of leaving the

island without permission was repealed (Rainsford 2013). This was not always enforced by the government because the Castro regime saw emigration as an opportunity to have those most likely to cause trouble to leave the island. This was preferable for the government because it meant that harsh crackdowns, frequently seen in dictatorships, were avoided. It should be stated that such crackdowns have happened in Cuba. This law forced the people to be clandestine in their actions, limiting the materials available and size. An example of failure and what can happen if caught is the Tugboat "13 de Marzo" massacre. This was an attempt to use a large boat to flee the island. The result was the vessel being sunk and 41 Cubans drowned (McLennan 2015). The Cuban Coast Guard was interdicting the boat when it sank. The Cuban Government denies any wrongdoing (Werlau 2007). This failure shows that those that wish to flee must often use small craft to avoid Cuban authorities. The majority of the Cuban population is poor, which increased the difficulty for those who wished to leave the island due to being unable to purchase resources.

The physical environment of Cuba is a tropical Caribbean island. Cuba does import about 580 million USD worth of vegetable products (Simoes 2017). However, Cuba has fertile soil and is able to grow enough cash crops (tobacco and sugar) to offset the imports with about 717 million USD worth of exports (2017). Cuba has had food shortages in the past; however, Cuba does not have a reputation of a starving population (Garth 2009:178). The Embargo on Cuba has had an effect on the physical environment of the island as well. Newer American cars are rare and have to be imported from a third country. American companies have not been able to sell goods to Cuba with the exception of food products and medical materials. The physical island has not been overdeveloped. Cuba's infrastructure is considered obsolete and much needs to be replaced (Belt 2007:8). This limits the use of certain modern technologies, especially outside the

major population centers such as Havana. The positioning of Cuba gave the people who were willing to risk their lives a chance to travel 144 kilometers, land in the Florida Keys and receive asylum. The position of the island was also important because it caught flotsam which was used in the construction of the rafts.

The cultural ecology surrounding these vessels is not only limited to the physical island of Cuba but also the United States of America. The laws that the United States had put in place had encouraged Cuban migration. Cubans have had an easier path to refugee status and eventually citizenship. It was easier for Cubans to gain refugee status than people coming from Syria, Iraq, or Afghanistan. Previously, flights between Cuba and the United States did not occur and examples of Cuban people traveling somewhere else, such as Canada or Mexico have not been found. The “Wet Foot/Dry Foot” policy directly encourages Cubans to come to the United States via boat. The law states that any Cuban refugee who makes it to American soil can apply for refugee status. There was also an agreement between Cuba and the United States which sets aside 20,000 refugee spots just for Cubans. This quota has not been reached in recent years. Cubans must reach dry land. A recent case decided in Florida stated that a number of Cubans who arrived at American Shoal lighthouse did not meet the qualifications of "dry foot". The lighthouse is a screw-pile style. Therefore, it is not on dry land. This case better defines where Cuban migrants must land to be considered refugees. American policy change has caused changes in the number of migrant craft. Two well-known examples of migrant numbers increasing due to a change in policy by the United States government are the change in 1994 to the Cuban immigration act and the 2014 warming of relations with Cuba. The changes in 1994 caused a jump in migration, which is another distinct wave, though not as large as the boatlift waves. The exact numbers on the current wave of migration are unclear. This is due to a lack of

published data from the United States federal government. However, the United States Coast Guard has stated that they are seeing an increase in the number of Cuban migrants who state that they are worried about the changes warming relations will have on the preferential immigration status currently held by Cubans who come by sea (Potter 2016).

The more people trying to cross the Florida Straits causes a drain on the available resources. The resulting shortage caused people to have to use different materials for the boats. During the boatlifts, the availability of professionally manufactured boats has been limited. It seems that the idea of "one last voyage," can be applied to some of the boats. This has resulted in boats being used that, under normal circumstances, would not be used by people. The purchase of vessels which could not serve their original purpose was common, and it is possible, that many of the failures migrants experienced could be due to these unfit vessels. Purchasing unfit vessels occurred in both Cuba and the United States. Family members in the United States would purchase any available vessel and rescue those that were still in Cuba. During the major waves of migration, people were forced to use different materials. During these periods, secrecy was ignored, and almost anything that floated was deployed. This is where the stereotype of people floating on doors originated. Mass migration is not the norm. Every year the number of people who successfully made the voyage was sometimes less than 50. Vessels during these years of lower migration often are more detailed in design and construction. This might be due to a greater availability of resources or the longer planning period.

The supplies required to make these rafts are diverse, but often share the characteristics of being readily available, and not being materials that would be monitored by the government of Cuba. This caused the most common to be construction materials or items that were seen as trash. Common materials from construction sites were foam insulation, aluminum siding, wood,

canvas tarps, and machine bolts. The security of Cuban construction sites was unknown. It is quite possible that these materials could have been taken from such sites. The closed-cell extruded polystyrene foam, commonly referred to by the brand name Styrofoam, found on a number of vessels have other sources beyond construction. Closed-cell extruded polystyrene foam can be gathered from the shore either as flotsam or trash. However, the wood used in vessel construction was likely not collected as flotsam. The wood aboard did not show the signs of distress, such as bleaching and cracking, that are normally associated with wood that has been in the ocean or on a beach for extended periods. This suggests that the wood must be collected from a source of milled lumber that has not been exposed to the elements for extended periods. This wood can then be shaped to fit inside a vessel. The rebar that was used on some vessels most likely originated from construction sites. Most rebar pieces seen were between 0.3 meters and 1 meter in length. Weld marks have been seen on the rebar pieces as well as bailing wire. These techniques suggest that the ability of those building the vessels, as well as access to tools, varies greatly. It is possible that there is some shaping of rebar once it has left a construction site. Rebar does not require specialized tools for shaping. A simple hacksaw can cut rebar, and a hacksaw was found aboard one vessel. The power sources of the rafts are also variable. The selection to use a sail over an engine could be due to an inability to scavenge an engine or a desire for greater discretion. Sails are handmade and, often made from bedsheets, which are readily available to migrants. The tarps seen on various craft are often used for cover from the elements rather than as a sail. However, some vessels use the tarps as a skin for the hull. Spray foam is often inside the hull structure and the tarps are hand sewn shut. These tarps are likely available at many local stores for people to purchase. The most common tarps are made from canvas with polyethylene tarps being in the minority. The canvas tarps have also been modified by those aboard into

clothing. Most of the engines used on vessels tend to be from smaller cars. Migrants have used engines from lawnmowers and refrigeration trucks to power rafts. Smaller engines are probably easier to obtain and install on a vessel.

It is difficult to determine where the supplies used in construction originated. Since Cuba is not completely isolated from the world community, modern materials are found on the island. Those materials, however, may not be purchasable by the common Cuban citizen. It is likely that the most difficult materials to obtain are the large pieces of construction materials. Since the construction industry in Cuba is state-controlled, obtaining construction materials such as lumber, rebar, and foam insulation could be difficult. To obtain these materials it was likely that bribing, theft, and salvaging were the most probable methods employed. The salvage of materials can clearly be seen in the oars found on the vessels. Fenceposts, cut pieces of rigid plastics, pieces of lumber, and randomly assorted bolts, are all materials that could be salvaged from a home that was going to be abandoned by migrants. It is also quite likely that materials could be salvaged from a junkyard or dump. It is also possible that a boat could have been built using no illegal methods. The ocean has more debris in it than people realize. This is often made of floating plastics and foam. Large amounts of this trash are deposited on beaches every day and, could have been collected by migrants and used in construction. Cuba's location is a natural catch for floating materials. No law was found prohibiting the people of Cuba from cleaning the beaches of garbage. This can possibly explain where some of the materials used were sourced.

The oil drums that can be found on numerous rafts were most likely scavenged from junkyards, storage facilities, and around homes. It is only since the 2000's that Cuba has increased domestic oil production. The majority of the oil reserves Cuba controls are in deep water around the island. Cuba still imports a majority of the oil and refined petroleum required to

sustain the nation. During the Cold War era, Russia supplied Cuba with oil (Frank 2017). In recent years Venezuela and Algeria have traded oil to Cuba. However, since Venezuela has seen falling oil production, the nation has reduced trade with Cuba (2017). Cuba only has 230 km of oil pipelines. This often means that petroleum products have been, and still must be, delivered to rural parts of Cuba by vehicle (Central Intelligence Agency 2013). Oil drums have been used for this, and after being emptied, repurposed around Cuba. To a migrant looking to leave Cuba, the buoyancy provided by the barrels can allow a car to float or can be cut and rewelded to create a completely new vessel.

It is just as difficult to determine the origin of the engines found on the vessels. The degradation seen on many of the engines means that the serial numbers are often covered with rust and hard to read, if not degraded completely. Often the only identifying marks are the maker's mark. It is probable that these engines were removed from working vehicles that someone on the raft owned. Gathering an engine from a junkyard could have been possible, however, to rely solely on an engine of questionable origins seems improbable. Stealing an engine is highly unlikely because such an act would have led to investigations, and if caught, imprisonment. Also, considering that those leaving would be abandoning any personally owned objects in Cuba, removing an engine from a vehicle owned by the migrants was a more likely scenario. This would guarantee a working engine for the voyage. Another supporting piece of evidence is the inclusion of exhaust systems and gearboxes. These systems could be collected separately, but this again seems unlikely due to the increased risk of detection by Cuban authorities. The desire to avoid apprehension by Cuban authorities forced those wishing to leave the island to keep their work as clandestine as possible. It is probable that migrants avoided bringing in people not directly involved in the attempt to leave the island. Though no reports

have been seen claiming that Cuba uses Orwellian styled surveillance of the people, there are people who support the ruling regime and would have likely reported people committing the crime of attempting to leave the island.

The materials available for vessels has changed over the last fifty years, partially due to the American embargo against Cuba. Due to positioning, and the post-war reconstruction in Europe and Asia, America was Cuba's largest trading partner before the embargo. After the embargo was instated, Cuba looked to the Soviet Union and Central and South America for most of its trade. These partners were limited in the amount that could be produced or delivered to the island. This has had the effect that on older craft the materials used tended to be older. Motors and boats that date to the prewar era were common, and the materials used on the homemade craft were limited to wood, iron, and sheet metal. Aluminum was an uncommon building material. This is due to the cost of refinement, which meant manufacturing plants could not be built in less developed nations. Aluminum in Cuba has come from another nation. The cost of early aluminum in Cuba was probably too high to be used by the common citizen, making it next to impossible to acquire to build a raft. In more recent years, the United States embargo against Cuba has become less effective in stopping modern materials from reaching Cuba. All nations that have the ability to trade with Cuba do so, except for the United States. This has brought many modern materials to Cuba. Those materials are then used in the construction of these rafts and also explain the appearance of modern engines and parts found on rafts.

Raft design has not only been affected by material availability, but also the introduction of new ideas. In the modern era, connectedness allows the passing of information to be much less difficult, it was possible for people in Cuba to see successful raft designs and modern boat designs. Even during the height of the Cold War, mail has been sent to Cuba from the United

States. The Internet is heavily limited in Cuba. This means that the sharing of information is more difficult. People might only have had an image of a vessel to base their own design off. Two case studies in this thesis seem to suggest that an image or visual cue was the origin of those particular raft designs. These two case studies are modeled directly after rigid hull inflatable boats (RHIBs). RHIBs were first designed in the late 1960's and did not see widespread use until the 1970's. RHIB boats were used by the United States Coast Guard and were likely seen in news articles about Cuban Migrants. This style of vessel was easy to make with materials available, albeit without the rigid hull, and this type of raft could also be hidden without much difficulty due to their size. It is probable that these RHIB styled vessels were not inflated with air or foam until immediately before departure. Similar to the RHIB case studies, there are three other case studies that are remarkably similar. The vessels were all made around the same time and share many similar traits. Each vessel had a similar skeleton of wood and iron brackets. The rafts use machine bolts as fasteners, of which the shape and size are similar. Each of these rafts also had extra flotation pontoons attached with aluminum sheets on the outside. These similarities suggest that ideas were passed between the builders of these vessels either directly or by seeing images of vessels that successfully land in the United States.

The economy of Cuba has an effect on the craft as well. When the Cuban economy was doing well the number of migrants trying to come to the United States was lower. People were less likely to take the risks associated with the voyage because the hardships faced were normal. However, when a downturn in the Cuban economy occurred, the people who were oppressed decide that the benefits outweigh the risks. As the Cuban economy slowed, industries on the island started taking losses and the construction industry is often an early indicator of a slowing economy. Similar to the economy of the United States, the construction industry is an indicator

of economic health. This industry is likely the point of origin for a large percentage of the materials. During economic depressions, it was possible that those materials were sold on the black market and were used for the construction of the boats. A downturn in the Cuban economy could also cause those who did not have strong ties to the communist system to leave. The promise of the United States of America was very tempting for people who had little. The benefits that the refugee program provided often involved housing and some initial monetary assistance. This would be provided until the refugee could become established in the United States. Cubans who have a strong close-knit community, an extended family already established in the United States could have provided aid. The economy of Cuba was the driving force during the Mariel boatlift. The Cuban economy was experiencing a downturn, and desperation led to the largest period of Cuban migration. This is also the most well-known period of Cuban migration.

The Cuban-American population was also welcoming to new migrants from Cuba. The family ties are deep and extended families are often in contact with each other. This means that those who were still in Cuba have heard about the benefits of living in the United States. In Southern Florida, there are a number of Cuban Community groups. These allow for Cubans to retain their culture. Grouping together is a common strategy in many migrant groups. This community safety net allowed Cubans to leave everything behind and make the voyage. However, there is some friction in the community. Migrants who came to the United States before the 1980's consider themselves political refugees, but they consider those who came after the 1980's to have moved for economic reasons. The two groups tend to view Cuba differently as well, migrants from before the Mariel Boatlift have a negative view of Cuba and returning to the island, while later wave migrants have more positive views of the island and hope for a future in which they return to it.

All these factors are the cultural ecology behind the Cuban Migrant Craft and without acknowledging the factors the upcoming analysis of the vessels would be an incomplete picture. The cultural ecology provides important context which is not readily apparent through the examination of the CMCs.

Chapter 4 Methodology:

The completion of this thesis involved two phases. Each phase collected unique data and contributed to existing knowledge about vessels and the people who used them to emigrate. The first study was an archaeological survey of Cuban migrant craft (CMCs), which are known as “chugs” in Southern Florida. This study applied a straightforward methodology. To complete this study, I employed traditional archaeological documentation methods of photography and measurements. All the craft I studied were located on land and not submerged. There are most likely examples of CMCs sunk throughout Southern Florida; however, known locations are not common. Because of the small size and clandestine nature of these craft, vessels sink without the knowledge of anyone but those who were aboard. There were few examples of vessels left *insitu*. In fact, authorities destroy many of these craft, as they were considered hazardous waste because of the fuel oil and other materials left aboard. A few of the vessels I studied were set to be destroyed shortly after my documentation. Other times, the city deemed the location where the boats came ashore to be detrimental to the economy; this has been the situation for a few craft that landed on South Beach Miami ([Cándido and Haseborgsc 2015](#)). The city could not leave wreckage that resembled trash on the beach, so it removed the craft. However, museums house several of the craft. Some craft have been removed from their landing site. This was quite common in the Florida Keys, and some residents here have extracted craft and placed them in front yards to serve as flowerbeds and decorations. Though not ideal, these vessels could still provide much of the desired information and develop a solid understanding in conjunction with the people who arrived in the craft and those who use them for decorative purposes.

Once I located a vessel, I performed a series of measurements using proforma (Appendix 1). After conducting field measurements, I photographed each watercraft and noted any key or

unique features of the vessel. If the vessel was interdicted or police were on scene to receive its occupants, I added this data. If no such information about the vessels was available, then it was omitted. If people aboard could provide this information, then I included it on the form. The selection of the craft was based on availability. I additionally documented several vessels that have been preserved in various museums and compiled curatorial records and measurements that these museums have provided.

Other CMCs were studied in situ on beaches or nearby sites. The goal was to have between 20 and 25 examples from throughout the past 60 years. In a perfect scenario, these examples would be evenly distributed, but early research identified only one vessel from the 1959-1960 period. This sample population included vessels that came ashore in 2016. The tools to complete this study were a camera, a measuring tape, and a notebook. All efforts were made to avoid damaging any of the sites and to assess the condition of boats by examining the area around the vessels. If a site was in danger of destruction, it was noted. However, this thesis does not intend to provide suggestions or recommendations regarding the preservation of vessels.

The vessels found in museums were conserved or preserved to some extent. Certain locations that currently hold vessels were not climate controlled, which is likely to increase the degradation rate of these vessels. Other examples were kept in highly controlled environments and have curatorial records. Some repositories store multiple migrant craft; for example, the Key West Botanical Gardens offered nine unique examples to study. The watercraft were stored outside, which caused a more rapid degradation process. At the time of the research, the botanical gardens had not installed any plants inside the boats and prevented plants from overgrowing into or over the vessels, although there were many leaves inside the boats. It appeared that trash had been deposited into the CMCs, and it is possible that damage to the craft

was due to the public. Visitors can approach and touch the CMCs, and they may even accidentally step on or damage a vessel trying to view the inside. The lack of climate-controlled storage and covering caused the vessels to be in a fragile condition, and I had to practice the utmost care to take measurements and photographs. These vessels have washed up on numerous islands and locations around Southern Florida and represent different time periods, so they comprised a suitable comparative collection for research. The boats have undergone little restoration work.

The second repository of vessels that had been identified was Dry Tortugas National Park. One vessel was currently on site, but more vessels were present in the past, and records were available. Currently, the park destroys most of the vessels that come to shore. However, the national park staff also monitors these vessels and continues to collect information about the new craft. This information was valuable because CMCs have been landing in the park since the earliest attempts made by Cubans. The remaining vessel was stored outside under an awning to protect it from the weather and was available for the public to touch.

Finally, there were several museums in Southern Florida and throughout the US that store or display between one and five vessels, namely the Ponce de Leon Inlet Lighthouse and Museum, the HistoryMiami museum, and the Mariners' Museum in Norfolk, Virginia. The Ponce de Leon Inlet Lighthouse and Museum has five vessels on its premises. The museum staff has taken precautions to keep the public off the vessels and has documented them in detail, including an excellent photograph log. Recent hurricanes have damaged some of the external features, but the photographs provide important missing information. These locations were also data repositories for CMCs.

Another method that this study employed was data collection from the Department of Homeland Security. This department is responsible for the Coast Guard, border control, and immigration services. Each of these offices collects demographic data that is available to the public or upon request. They contain pertinent information regarding the number of migrants and list their age, gender, and occupation. Along with this data, information was obtained from other sources, such as the Pew Research Center and the Migration Policy Institute. Both of these groups collected data about Cuban migrants and were significant for detecting any possible trends in the population.

Based on the two research phases, this thesis first contextualizes CMCs. This dataset also allows for a comparative study of CMCs and migrant craft from various parts of the world. This information establishes a baseline for future research and brings to attention to CMCs, which are valuable sources of material culture that represent Cuban Migrant history and are in danger of deterioration due to neglect. This research might even inspire the archaeology and museum community to encourage more museums to feature such vessels in exhibits. Preservation is key due to the ephemeral nature of these vessels. If no steps are taken to preserve examples, then it is highly unlikely that those remain on beaches will be there in as little as five years from now.

Chapter 5 Analysis:

The case studies supporting this research span the total time period in which people used CMCs to escape Cuba and travel to the United States. Appendix 2 contains a list of all case studies. Each vessel is unique in some form through a variety of design features or materials. It was necessary to examine vessels from multiple decades to identify changes that have occurred over the past 50 years. Thousands of these vessels have deployed, but many have been destroyed and lack documentation. The selected vessels have been preserved in some state or were examined prior to removal for destruction by the local authorities. The rationale for this removal was that the craft were damaging to both the ecosystem and tourism because migrants leave excess trash, food, clothing, and fuel in the vessels.

The craft were not limited to handmade rafts and dilapidated boats. During the two major boatlifts, Cubans living in the United States bought boats and traveled to Cuba to rescue family members. Some of these vessels were old, decrepit fishing boats, but others were modern and newly purchased boats that were used for this journey and then returned to their original function as pleasure or work craft. Images from the United States Coast Guard depict these vessels. One interviewee recalled that she fled the island on a vessel that her grandfather built and normally used for fishing. These vessels are nearly impossible to track down because they resumed their original functions after acting as a migrant craft. It is even possible that some of these vessels still function as a pleasure craft for original or different owners. A change of ownership might also mean that the history of the vessel is completely lost. Interviews suggested that refugees often abandoned the boats at the location where they disembarked. Thus, depending on the location and the vessel, CMCs may have been auctioned or scrapped. Nevertheless, some vessels could still be in place in out-of-sight areas.

The first vessel for this study, a homemade raft built by Consuelo Ricoy in 1959, is the oldest example as well as one of the smallest. Ricoy designed the vessel and constructed it in his garage from welded tin and other spare parts with the intention of transporting only himself and his wife from Cuba to Florida. Although the vessel did not land in Florida, it was close enough to the shore that the Coast Guard rescued the couple. The Coast Guard preserved the vessel, which appears to be the oldest example in existence. The couple painted the vessel a carbon gray hue to lower its chance of detection by Cuban authorities. The internal structure of the vessel consists of a wooden skeleton. The couple believed that the short voyage would only require a day, so they brought meager supplies. Consuelo Ricoy did not state if he based the craft on a specific type of vessel, but the Coast Guard has referred to it as a kayak. The vessel was powered by a lawnmower engine and steered by a hand tiller made from wood and sheet metal. Handles were fixed to the outside of the vessel to facilitate its transportation from the car to the water. The craft does not contain enough space for a hold, and the refugees brought no supplies. The vessel has a cover over the sitting compartment, which is separated into two sections by a wooden divider with one person on either side. The person in the rear compartment operated the tiller. The vessel is too cramped to allow the occupants to swap positions, and the only method of navigation aboard was a homemade compass. This vessel is unique in this study because it is the only vessel of this size. However, its materials provide a starting point for comparison with other vessels (Ricoy 1995).

There was a large interval between the first case study in 1959 and the next available case study of vessels in the 1980s. It is important to recognize that there were absolutely vessel crossings during the late 1960s and the 1970s; however, apart from the Camarioca boatlift, they were less common. This thesis was unable to locate any craft that fit into this time period.

Photographs from the Coast Guard do depict these vessels, but they are publicity images, and gathering data from such photos is highly difficult.

The next examples in the archaeological record were in the 1980s and came mostly from the Mariel boatlift. The overall trend that is evident in this period is the use of actual vessels. The boats that were found often lacked any major modifications. However, the available examples are a minute portion of the total vessels that crossed, so it is likely that those attempting to leave Cuba deployed homemade modified vessels. In the 1990s, the vessels again shifted from factory-manufactured boats to homemade vessels. In this thesis, all examples of vessels from the 1990s were homemade. The research yielded no cases of modified professionally built boats, but it would be imprudent to assume that migrants did not use professionally constructed boats during this period. Still, the available case studies and photographs imply that the migrant population chose to make vessels from scratch. The most recent era, which ranges from 2000 to the present, presented a wide variety of vessels with extensive diversity in materials and designs.

Other trends that have been observed concern the markings on vessels, which can vary dramatically. On early vessels, craft were painted primarily for stealth in order to avoid the Cuban Coast Guard. There was immense fear among refugees that the Cuban police or military would apprehend them and subsequently execute them or imprison them for life. Most vessels departed at night, so refugees painted the vessels black or grey to hopefully conceal them from cursory inspections at sea. Another method was to design and decorate them to resemble fishing vessels. Individuals who the Cuban government had granted approval to fish could most easily accomplish this approach. The method involved structurally sound vessels that carried groups of families and close friends and were captained by experienced people. No special modifications were made to hide people. Women and young children, who were aboard, concealed themselves

simply by lying prone or taking refuge in a cabin so that the vessel appeared to be crewed by a reasonable number of men. According to refugees who were interviewed, Cuba is a heavily patriarchal society. Women in fishing occupations were uncommon, especially in the 1960s and 1970s. If several women were spotted on a fishing vessel at night, Cuban authorities would consider this to be suspicious and would stop to investigate.

The painting spectrum varied on these vessels, with some having the same bright colors as fishing boats. This camouflage allowed vessels to pass through Cuban waters and had the benefit of increasing their detection level in the open ocean. The ocean between Cuba and the US has been an important shipping lane since the Spanish first colonized the Caribbean and Central America. At times, passing vessels have assisted Cuban refugees by picking them up or providing supplies and towing. There are also groups, such as *Hermanos al Rescate* (Brothers to the Rescue), which search the Strait of Florida for vessels, drop supplies for those they locate, and contact the United States Coast Guard to collect such people. Because of the nature of modern radar, the colors do not increase the risk of interdiction by the United States Coast Guard. Radar detects refugee vessels before they are visible to the naked eye, and the United States Coast Guard can track and intercept all but the smallest of craft. Vessel markings are not limited to camouflage purposes but can also serve a superstitious need. A segment of the Cuban population practices the syncretic religion of Santería (*Regla de Oché*, *La Regla de Ifá*, or *Lucumí*), which is syncretized with Catholicism and entails the worship of Catholic saints. Colors are integral to the rituals, and blue is considered a lucky color. Painting a vessel blue imparted not only a stealth benefit but also a perceived supernatural bonus (Robinson 2007). Even Cubans who do not believe in the religion are familiar with these practices. A study of the

socio-economic groups of refugees and belief in Santeria would be insightful but is beyond the scope of this thesis.



FIGURE 3 Common blue color (photograph by author)

In addition to painting vessels certain colors, there was also a trend of painting words on vessels. Three vessels that were part of the Mariel boatlift had the word “Mariel” written on them in what appears to be regular paint (i.e. applied with a brush) in multiple colors. This writing was found on the transom and on the side of the vessels. Given the size of the word, it is unlikely that it was a statement of the boats’ origins but was instead a name that had meaning because of the boatlift. A recent photograph from the fall of 2016 depicts a refugee craft that was ashore at the Marquise Key. This vessel appeared to have “Emanuel Dios con Nosotros” upon the prow (Vela 2016). Unfortunately, permission to reproduce this photograph was not received. The phrase translates to “Emanuel God is with us” and is attributed to the Bible verse Matthew 1:23. Catholicism is the dominant religion in Cuba, and this Bible passage is often read at Christmas

Masses. A reasonable hypothesis for naming the boat as such is that the refugees hoped it would act as a totem to grant safe passage. Two of the case studies have “USCG OK” painted on the side. A close inspection revealed that the writing had particle edges that commonly result from spray paint. These words are usually written in white and are highly visible. They are not the work of the migrants but rather of the United States Coast Guard. Vessels that bear this mark were inspected by the United States Coast Guard and, if not already found empty, had all of their occupants removed. This notation signaled to the public that there was no reason to contact the Coast Guard if the vessel was spotted again ([Blaine 2016](#)).

There is only one example of iconography on preserved vessels. On one case study in this thesis, there is iconography of a United States flag, which is unique to this vessel. Examining photographs of other vessels reveals a distinct lack of iconography, which is probably due to these vessels requiring stealth and being intended for one trip. There is no evidence that the iconography was applied to this case study after the vessel was on display. Since iconography appears to be unique to this single vessel, the motivation behind its use could be insightful. Unfortunately, no records of the vessel’s occupants are available, but there are two possible reasons for the iconography. First, painting the flag on the vessel may have been a good luck charm for those aboard. For many people, the United States flag symbolizes freedom and a better life; it is an image and idea that the Cuban people would have known. Second, the iconography may have been an attempt to disguise the ship from the United States Coast Guard and private boaters. Given the change in laws to require Cuban refugees to make a successful landfall, placing a United States flag on the prow of the vessel may appear to be a clever idea to the unaware. Since the vessel appears to be a normal boat at a distance, it might have resembled a particularly patriotic vessel, thereby allowing it to pass a cursory inspection by private boaters.

Although this disguise might have been inadequate for the United States Coast Guard, it was more probable that private boaters would have spotted the vessel.



FIGURE 4 United States Flag Iconography (Taken by Author)

The typical craft size has changed over the past 60 years. With a length of 2.81 meters, the earliest craft is one of the smallest. However, the smallest vessel of all was used in the early 1990s and had a length of 2.53 meters. Vessels have generally increased in size, and many vessels that arrived in the past decade were over five meters in length. This trend dissipated during the boatlift periods. During the Mariel boatlift, vessels ranged in size from just under five meters to over eight meters. The largest vessel was a fishing yacht that was used during the Mariel boatlift. The largest vessels were those that were repurposed during the boatlifts, which is probably because stealth was unnecessary at the start of the voyage. However, when stealth was needed, vessels were less than seven meters, with a majority measuring between five and six meters. There is even less variation when examining the beam of the vessels. The smallest beam was one meter, while the largest was 3.4 meters. The majority of vessels are between 1.9 meters and 2.5 meters. The heights of the vessels from the keel to the top of the freeboard were also highly similar. None exceeded two meters in height, and vessels could be quite small. The second case study was only .35 meters in height. It is difficult to judge the importance of height

since the vessels tended to vary in load and material, but the parts on one vessel could create more buoyancy, which would suggest the vessel needed less freeboard. Another vessel may have planned to have a certain amount of people aboard, and it was thus determined that more freeboard was necessary. These vessels also lack any indication of how high they floated in the water. By examining the case studies, this thesis has determined that size should not be considered when estimating the age of a CMC. Although the general theory of an increase in size alongside the progression of time seems to be valid, the number of vessels that disprove this theory in this study preclude its application in the field to estimate the age of a vessel.

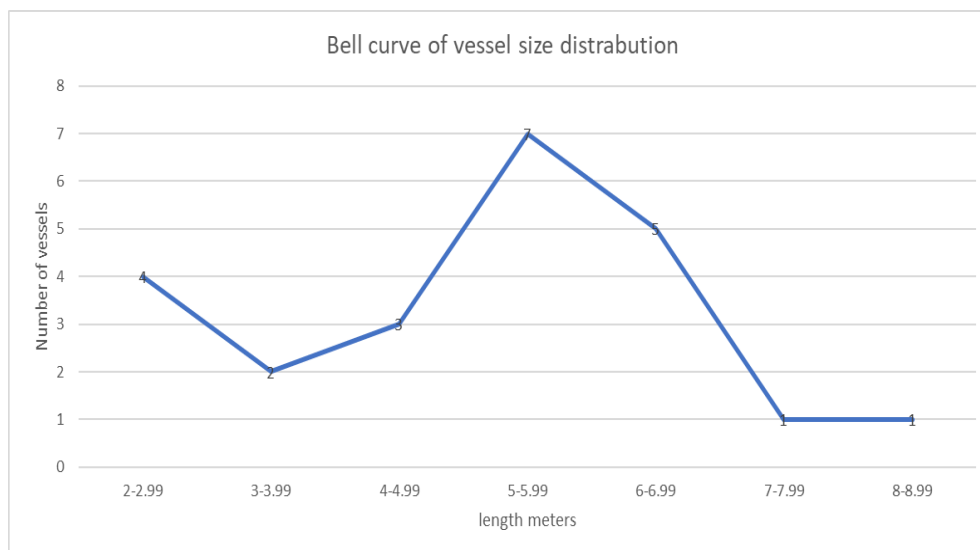


FIGURE 5 Distribution of vessels by length

As the theory chapter discusses, the availability of materials has prompted changes in the last 60 years with regard to the materials used in vessels. The first parts that are laid down for any vessel are normally the keel and the skeleton. Many vessels appear to have a hull structure of a wooden construction. The wood species is unclear but differs from pine, which is the standard building material for the construction of homes in the United States. The standard two-by-four board that is used in home construction was rarely found in the case study vessels. This type of board is not typically associated with boat construction, but since most materials for these

refugee craft were acquired through salvage, the lack of this particular material is noteworthy. However, an examination of vessel skeletons revealed no pieces of unmilled wood. This excluded not only driftwood but also felled lumber. Driftwood from the shore would be a poor building material because it is both rigid and fragile. Much of the wood in the vessels evidenced signs of being worked, and shoreline driftwood would not be suitable for working. Palm trees are the most common tree in Cuba but are also ill-suited for skeletal ship construction. However, there are a number of trees found in Cuba that could be utilized in ship construction. Large native trees include the Cuban Oak (*Quercus sagraeana*), Cuban Pine (*Pinus cubensis*), and the Tropical Pine (*Pinus tropicalis*), which is endangered. Research on the topic of Cuban construction yielded no discussion of the material that is used. The major topic was rather that, until recently, purchasing wood was illegal for the general public ([Ravsberg 2015](#)) ([Ravsberg 2016](#)). Many of the wood pieces on these vessels are also smaller and use simple scarfing to complete one rib. Large single pieces are not common in these constructions.



FIGURE 6 Joint in wood skeleton (photograph by author)

Wood was not the only option available to refugees. Some builders were able to use steel rebar in their vessels. Vessels that have been constructed using metal as a skeleton opted for this rebar. Steel rebar is a reinforcement material that is normally used for the construction of homes

with poured concrete or cinderblocks. On vessels that used rebar for the length of the vessel, small pieces with weld marks were common, and only a few two-meter or longer pieces were used in the construction. The quality and manufactures of the rebar were unclear; the pieces are heavily corroded, and any fine markings are obscured. This suggests that the collected material was salvaged from construction sites. In addition to straight rebar, square pieces were used along the sides of the hull with straight pieces passed through the middle. This configuration can provide a better structure for the vessel, but it increases the weight in comparison to wood. These pieces were all tied together using steel baling wire. Many industries utilize soft wire, thus resulting in high availability. Furthermore, it is inexpensive and easier to work compared to other commonly found soft metal wires, such as copper wire. Although wood and rebar constitute the dominant skeletal material, some vessels do not employ either material. During early exploration for this thesis, a craft was found on a local beach that was described as being constructed with a skeleton that is composed of metal fence posts and rails. The ribs, sternpost, keel, and gunwale were all made of these items. Unfortunately, the vessel disappeared before this study commenced. The area was briefly searched, but the vessel was not found. However, the photo of the vessel depicts these traits along with the external hull.



FIGURE 7 This particular vessel was lost before measurements could be taken
(photograph by Kathleen Mccarthy)

Certain vessels do not use a traditional boat-building skeleton in the construction. Rather, they feature a terrestrial object or objects as the core. The most obvious example of this is a vessel that has a car or truck at the core that is modified for the crossing. The bottom of the car was sealed to prevent water from flowing in, and a bow was often manufactured and attached. This study did not locate an actual vessel of this kind, but specific examples are visible in the photographs across the Internet and in the National Archives. Other vessels that lack a traditional skeleton relied on the external shape to remain rigid during the voyage. This type of craft can be shaped like a boat but does not have ribs on the inside the vessel. An example of this was an oil drum vessel, which has been destroyed. This vessel was boat-shaped, but this was not due to an internal structure. Instead, the hull was welded together, which provided the shape, and the material of steel oil drums providing the rigid structure. This type appears to be a rarer form; although it is unclear why it could be due to the difficulty of construction. Many of the vessels that use a traditional internal skeleton have multiple materials on the outside that provide

seaworthiness, as this could allow a vessel to be built with little expertise. Vessels that rely on the external structure require a more complicated construction that often necessitates welding, which requires special tools and knowledge (FIGURES 6 and 8).

The external hull material has changed over the past 60 years. Tin, wood, aluminum, steel, fiberglass, canvas, vinyl, and plastics have all been used and are represented in this study. The earliest vessel in this study had an external hull made of tin. These plates were welded together and attached to the internal wooden skeleton. During the 1960s, many other migrant vessels had wooden hulls. Photographs and interviews with migrants who arrived during this period seem to confirm a preference for wooden-hulled vessels. Wood was also a common material for vessel hulls beginning in the 1980s, including for both purpose-built migrant vessels and converted vessels. Although migrants have continuously used wooden hulls into the modern era, wood has recently become less common in favor of plastics and metals.

Boats from the 1990s have hulls of almost all types. This period yielded some of the first tarp hulls. Both canvas and polyethylene tarps were used as a hull to cover the foam. Highly similar to these vessels are those that use vinyl. This vinyl was a heavy liner material that resembles vinyl used in roof construction. The other vessel that used vinyl had yellow vinyl of undetermined origin. The tarp and vinyl forms tended to be applied to pontoon-style and rigid-hulled inflatable boats (RHIBs). It is important to note that these vessels are only styled after RHIBs since they lack the rigid bottom hull that is found on factory-produced boats. These vessels are striking because they mimic the appearance of an RHIB but lack the major structural element that defines the class. The tarps appear to be sewn together by hand, but the type of thread could not be determined; however, a visual examination of the thread revealed it to be similarly thick to twine or yarn. The thread was a tan color, but the age and conditions suggest

that the thread may have originally been a different color. A section of the thread could not be cut because the examples that incorporate sewn threads were part of displays.

Fiberglass was developed in the mid-1930s; however, it was not widely used to construct vessels until after the 1960s, and due to the embargo, fiberglass-hulled boats were not common. Fiberglass was eventually common among homemade vessels from the 2000s. These craft are unlike United States pleasure boats, as the vessels do not have a fiberglass hull but instead use the material as a patch and seam filler. This function was possible since the fiberglass is highly similar to that used to strengthen concrete in construction and concrete pouring. The fiberglass was mixed with an epoxy and then painted onto vessels. All boats with fiberglass on the hull evidence this painted application. The fiberglass was applied only to the seams and in patches on the outside of the hull. On the inside of the hull, fiberglass is also visible at the seams, the keel, and the point where the driveshaft exits the hull.

Migrants have frequently employed the method of external hull plating. Vessels that reflect this method have been in use throughout the 60 years of migration and incorporate numerous metals. Earlier vessels tended toward tin or steel; examples of those with tin hull plating are the earliest vessel in this study and those that the Miami History Museum conserves and displays. Later vessels, such as those from the 2000s, began to employ aluminum for hull plates. These metals were attached to the skeleton with machine bolts, washers, and nuts. The aluminum plates were thin and appeared to be sheet metal. There were two variations of hull shapes that used aluminum plating. Some were a typical boat shape, and others were simplified boat designs. The simplified design was pentagonal, and the ships were not rounded. The simplified designs also have flat aluminum-plated bottoms; however, steel plates are not unheard of in the construction of these vessels. They are often used to seal the bottom of cars that have

been converted into boats (FIGURE 9). Unfortunately, due to the size of such vessels, either the Coast Guard or the State of Florida has destroyed most of the converted cars. The oil drum vessel was not plated because it did not have an internal skeleton and relied on the oil drums for structure and seaworthiness.



FIGURE 8 Internal structure note added freeboard (photograph by author)

Migrants used 12.7-mm bolts. These are the equivalent of the United States half inch bolt that is commonly used in home construction. The metric designation for this bolt is m12. The bolts did vary and had either a hex head (a hexagonal-shaped head) or a carriage-bolt style. A hex head bolt requires two wrenches to attach because the bolt is circular along the shaft and spins freely when the nut is attached. In contrast, a carriage bolt requires only one wrench. A carriage bolt has a rounded head that has no area where a wrench can grip. On the shaft, the part closest to the head is square so that it can lock in place. The nut is then tightened onto the bolt in exactly the same way as a hex head bolt is tightened. The lengths of the bolts vary, but a vessel generally contains all the same size bolts throughout the construction. The bolts were made of steel, and most were highly corroded. It would be impossible to remove a bolt via wrench to examine aspects such as threads or any cut marks from when migrants shortened the bolts. All

bolts were placed with the head toward the outside. None of the examples that were found have heads on the inside of the vessels. The washers were steel and placed on the outside, therefore abutting the head. They were flat washers, which allow the bolt to have a better hold because it essentially enlarges the surface area of the head. This design also solves the problem of hole size for the bolt. Bolts, unlike screws, cannot drill holes, so migrants had to pre-drill. The washer allows migrants to have a larger margin of error for the size and angle of the hole. Migrants extensively utilized screws throughout the construction of vessels, as they can be used to fasten the skeleton together and fix the hull plates on the vessel. Small, self-tapping metal screws were used to attach the hull plates. These screws have a groove at the tip, which allows the screw to cut into sheet metal. This usage was the only instance of preferring screws to bolts. No rivets were observed on the vessels (Figure 9). Rivets are frequently found in aircraft and some structural construction. The current hypothesis is that the availability of rivets was low, and they are best applied to metal constructs. These two main reasons inform the hypothesis of this thesis that rivet use was rare. Although it is possible that later research could discover a vessel with rivets, this study found none.



FIGURE 9 External of vessel with added freeboard; the bumps are bolts covered by fiberglass (photograph by author)

Analysis of propulsion methods indicated that engines were the most common; this was not initially expected. Migrant vessels have employed three methods of direct propulsion: engines, sails, and oars.

Almost all vessels that leave Cuba use oar power at some point. Oars were often deployed at the start of the voyage to avoid attracting the Cuban authorities as the migrants attempt to launch their vessels. However, oars can also be deployed on the last push onto United States shores if the fuel were exhausted or the wind was calm. The vessels in this study do not evidence signs of oarlocks, so this was not the intended main propulsion. Migrants use oars that were generally short, single paddles that resemble canoe oars rather than kayak ones. Migrants have used paddles that were made of wood, metal, or plastic and reflect no apparent preference for material. Oars seem to be a necessary tool that migrants create with any material. Some homemade oars utilize a combination of materials. A photograph in *The Key West Citizen* depicts oars that have a shaft made from a tree branch (undetermined type) with a square piece of plastic attached to the end as a blade (O’Neal 2015). To attach the blade, a gap was formed in the branch. Then, a part that appears to be some sort of fastener was inserted through to hold the blade in place. Similarly, oars were created with shafts from metal fence posts. These oars always contained at least two pieces, so welding did not seem to be a common method for binding metal oars. There was no clear number of oars aboard the vessels; some had one, while others were found to have more than five. There were also oars that were hewn from one piece of wood. The single-piece oars that this study examines were homemade. Unfortunately, the single-hewn oar did not exhibit any signs of personalization beyond the size. The tool marks on the oars suggest that the oars were possibly carved by the intended user. The oars that were found, and specifically the variation among them in each boat, also imply that each migrant may have been

responsible for creating their own (FIGURE 10). Overall, the material and size differences convey that the multiple oars were not made by a single individual, as such a person would have created the oars based on their dimensions and specifications. It is possible that people could modify the oars while at sea. However, no evidence for this was apparent at this time. Commercially produced oars were uncommon, but some were found and appeared to be similar to oars that can be purchased at boating supply stores. All oars lacked personalization, and there were no examples of talismans or other inscriptions.



FIGURE 10 Oars from a single vessel (photograph by author)

This study expected a large number of sailing vessels in the early years of migration to the United States, but this was not actually the case. This thesis found only two examples with sails as a primary propulsion source. However, there were recent examples of craft with sailcloth. In 2014, a young man traveled from Cuba to the Marquesas Keys on a windsurfing board (Adams 2014). This is a sports craft that consists of an approximately three-meter board with a mast and sail that is connected via a free-rotating universal joint and has a displacement measured in liters. It also lacks a rudder. The board itself was made from carbon fiber. Often,

manufacturers include Kevlar interwoven with the carbon fiber for added strength. The inside of the board is normally filled with expanded polystyrene foam. It is unknown if the specific board in question is identical to that currently on display at the Coast Guard offices in Washington, D.C. The sail on the displayed craft was made from polyester film, which is reinforced Kevlar at high-stress locations. The young man traveling on the craft steered it himself. This vessel is unique in that it is powered by a sail but differs so drastically from any other vessel that it can only be categorized by the method of propulsion. Most vessels with sails relied solely on these sails for power. The masts of these vessels were formed from wood, metal, or both. Once again, the metal derived from fence posts. Fence posts are hollow but strong, and they were easy to scavenge and transport by hand. The examples of wooden masts use construction lumber. The sails were generally made from bed sheets, but Miami newspapers have reported vessels with sails of plastic sheets or tarps as well. Still, these materials were infrequent compared to bed sheets. This was most likely because bed sheets could be easily manipulated into sails by sewing them by hand to make loops that hold the sails to the mast. Case study 17 is an important example of a sail-powered vessel. It was found at the Ponce de Leon Lighthouse and had both sail and engine power available. The mast of this vessel was made from a piece of bamboo about 76 millimeters in diameter. Unfortunately, no sail material remained on the vessel. This is the only surviving example of a vessel that used this dual-propulsion method.

As stated, engines were the most common propulsion method. These engines can be split into inboard and outboard engines. The vessels in this study predominantly had an inboard engine or exhibited signs of an inboard engine rather than an outboard one. An example of outboard engines is a traditional boat engine. Outboard engines were steered with a hand tiller. In the outboard engine that was found on a vessel at the Key West Botanical Gardens, a metal pipe

was attached to the tiller, which increased the distance that a migrant could sit away from the engine. This particular vessel is case study 6, which landed in the Lower Keys during the 2000s. The engine was a Mercury boat engine. No serial number was present to determine the date of the engine's production, and it also lacked any visible power rating. Tanks located inside the vessel fueled the engine. Inboard engines were the most frequently employed of the examples in this study. Engines were diverse in origin and make. Vessels that were originally pleasure craft or fishing vessels retained their original inboard engines, while those that had engines installed after their construction used diverse engines. Lawnmower engines were the smallest power source. In this study, the vessel from 1959 employed a lawnmower engine of an unknown make. It is highly likely that the engine was from a nation other than Cuba, and considering the trade preferences that Batista had enacted, it was most likely from the United States. Furthermore, car engines have been frequently utilized. This study hypothesizes that the most commonly used engines would be diesel engines, as the embargo reduced the availability of gas engines. By contrast, the increased availability of Soviet-built vehicles, which tended to be diesel powered, rendered diesel engines more accessible for Cubans who were planning to leave the island in later years. However, this was not the result of this study; in fact, the majority of non-boat engines were gas powered, as evident from the presence of visible spark plugs on the engines. A diesel engine normally lacks these plugs and instead has a glow plug, which heats the engine in cold weather to support ignition. This thesis notes two diesel engines, one of which was not a vehicle engine. The first diesel engine in this study, which was originally from a vehicle, was an Isuzu-made engine (Figure 11 and 12), as determined from the logo on the valve cover. The logo also provided a date range for the engine since it was the first Isuzu logo, which was in use from 1949 to 1974. The second, non-vehicular engine was the power plant for a refrigerator truck. The

brand name was *Thermo King*, which a quick Google search reveals to be a refrigerator brand. The name was visible on the engine, and the size was listed on their website with an explanation of their purpose. Another engine that was prominent due to the visibility of a brand name on the engine was a modern Hyundai four-cylinder auto engine. This engine appeared to be in good condition, and the embossed manufacturer name was clearly visible. This company is the same Hyundai that is available in the United States. It is possible that the engine was sourced directly from the manufacturer, as Hyundai is a South Korean company and is therefore not subject to the United States embargo of Cuba. Most of the other engines featured obvious spark plugs but no clear manufacturer mark. One particular craft used a two-stroke tractor engine. In this case, the fuel tank was attached to the engine along with the original transmission and part of the drive train. The drive train was connected directly to the propeller.



FIGURE 11 Engine from Dry Tortugas vessel

FIGURE 12 Close up of Isuzu logo circa 1949 to 1974

The use of car, truck, and other non-marine engines necessitated special modification to the boats and engines, namely the addition of fuel tanks, exhaust ports, mounting brackets, and proper means for cooling. Each of these tasks was crucial to ensure that the engine would function.

The first issue was the decision of how to fuel the engine. Many of the vessels that were on display have had their fuel tanks removed prior to transport to minimize the risk of hazardous waste. However, this removal also led to the destruction of many vessels, which explains why so few of them were preserved or displayed. It was critical to have access to the fuel tanks mounted near the engine so that migrants could add more fuel as necessary. A few tanks on board vessels were actually professionally built boat fuel tanks. Furthermore, there was one example of a tank on a RHIB-style boat that fed the engine through gravity. The fuel tank was fashioned from a plastic tank that presented no markings that might indicate its original purpose. For ease of filling, the tank was open on the top, as this would allow a person to quickly dump fuel from gas cans or from whichever container migrants had brought aboard. Fuel lines were mounted on the bottom and routed to the engine. They were composed of rubber and featured stainless steel clasps. However, in view of the lack of degradation of these clasps, it is questionable whether they were the originals.

The engines were mounted with the brackets that were already available. Nevertheless, the boats required additional structures for attaching the mounting brackets. These brackets appear to be made of steel. The metal was magnetic and did have some rust on the brackets. The brackets were shaped like a box to take advantage of the motor mounts that the manufacturer had installed to hold the engine in the original car or truck. Since many vessels lack a traditional keel, boards were normally added along the bottom and attached with bolts, which were then covered with fiberglass and occasionally had rubber grommets to seal the holes. The boards appear to be random because their lengths were greater than expected and were laid at odd angles. The mounting board does not have to be the length observed on the vessels; rather, the boards could be the length of the engine, which would have required a smaller distance between the bolts that

attach the boards to the boats. From an examination of the boats, after many had been cleaned for display, it did not appear that other tools or supplies were attached to these mounting boards. There was a lack of hooks or other marks that would suggest any function beyond mounting the engine. Other vessels often used steel for the mounting bracket, and welds and bolts held the bracket together. On some vessels, such as the Catamaran, the mounting bracket was actually part of the main skeleton.

The porting of exhaust from the engine was also important for the covertness of vessels and the well-being of their occupants. If exhaust could exit the engine directly into the hull, where people would sit, illness from exhaust fumes was likely to occur, and carbon monoxide accumulation in the vessel could even kill migrants on board. A few vessels still had the actual pipes in place, whereas others had remnants of the exhaust port. The exhaust was piped to the outside of the hull, generally via the exhaust system of a car. This configuration utilized the end of the exhaust system, including the muffler, which helped to disguise the sound of the boat's departure and reduce the noise level aboard. The construction did not incorporate the whole exhaust system because of its excessive overall size. It was likely that the parts derived from scrap yards. Some vessels used a truck exhaust to port the exhaust directly up and out of the engine, but this was not common in the case studies for this thesis.

The final aspect was the cooling of the engine. An overheated engine had the potential to seize and stop shortly after starting the journey. The craft used water-cooled car and truck engines. In a car or truck, the radiator at the front provides this function and is filled with water to cool the engine. The radiator is attached to a tank that has a mixture of water and chemical coolant. However, the problem for migrants was that this coolant tank and hosing were generally not included with a scavenged engine, which prompted one of the most interesting innovations

noted in this study. This innovation was a trait observed in vessels from the 1990s until the modern era. Migrants were seemingly inspired by the cooling systems of purpose-built boats, and they used the ocean as the reservoir. The water then needed to be pumped from the ocean to the radiator. To accomplish this, migrants ran a pipe from the underside of the hull to the radiator. The part of the system under the vessel employed a structure that appeared to be galvanized steel plumbing piping, while rubber hoses carried the water in the passenger compartment. The intake placement and style varied among vessels, with no particular trend becoming apparent. The cooling system, however, was not complete with these changes; water still needed to be pumped to the radiator. To accomplish this, the open end of the pipe was pointed at the propeller, and the pipe was placed between the propeller and the rudder. This could differ, though, and in some cases, the pipe was slightly off center to the propeller. This configuration created a ram ventilation system. Water would be driven into the pipe, and the vacuum that resulted from water leaving the engine would pull the water through the system, thereby cooling the engine. Variants that were found had no protruding pipe and seemingly relied more heavily on the vacuum created by the engine to draw in the water. This cooling method was not limited to modified boats or even rigid-hulled boats. Examples exist of both homemade vessels and craft that used tarps as the hull material. This was perhaps the most intriguing feature of these vessels, and further examination of this device is needed to determine if certain materials or styles predominate.



FIGURE 13 Tarp raft; ram cooling pipe is circled (photograph by author)



FIGURE 14 Ram cooling pipe (photograph by author)

Migrants also received outside propulsion assistance, both intentionally and unintentionally. As an example of external assistance, one migrant from the 1960s reported that a

cargo ship picked up their boat and then returned it to the water near Miami, at which point they made it to shore by their own power. Other boats have gained assistance and occasional hindrance from the Gulf Stream. The Gulf Stream pushes migrant craft east and north along the coast of Florida. The average speed of the current is 1.8 meters per second or 3.6 knots, and it often moves migrants who were aiming for Key West toward the Middle and Upper Keys or sometimes Miami. The Gulf Stream also has the ability to move a vessel even further north. The vessels that the current impacts the most were those that rely on wind propulsion or were equipped with an underpowered engine. For instance, a CMC washed ashore on Oak Island, North Carolina after Hurricane Matthew made landfall in 2016. Articles about the vessel reported that it was heavily sun-damaged, and there was no sign of the fate of the passengers. It was theorized that migrants who come to shore during the last wave have received aid from smugglers in the form of a tow ship. These vessels would tow the Cuban Migrant Craft to the immediate edge of United States territorial waters and then cut the migrants loose. From that point, migrants were responsible for the remaining distance. An improvement in the health of migrants supports this theory, as they have arrived in a less sunburnt and malnourished state. The Coast Guard, who have made these observations, has not noted any other major changes. Furthermore, other migrants who have come ashore at the same time as groups that were believed to have used a towboat have had the same degradation to their health as previous refugees. It was not impossible to judge the reliability of smugglers, and migrants in other parts of the world have reported abandonment after payment. While most external propulsion methods were based solely on luck, migrants can engage in planning to utilize smugglers and the Gulf Stream. However, both were still highly variable. Migrants can use these external methods, but

direct propulsion methods have proven to be successful. While researching this topic, there was no mention of any vessel that relied solely on ocean currents to cross the Florida Straits.

Steering depended on the original purpose and the propulsion of the vessel. Craft that used outboard motors that were similar to those found on pleasure boats in the United States direct the boat through the thrust of the engine. The example in this study indicates that the outboard engine was steered by hand, which required someone to sit at the rear of the vessel and use the tiller to apply power and direct the vessel. A common trend was to have a hand tiller. Tillers and rudders were generally constructed from a combination of steel plumbing pipe and a piece of sheet metal that was welded to the pipe. Rudders were generally small and under half a meter, while tillers were made from steel pipe with a 25-mm diameter. The rudders and tillers were typically attached to the transom via brackets. The bracket system consisted of two to three brackets with the tiller passed through, and bolts secured the brackets to the transom. Rudders were all magnetic and heavily rusted, and they appeared to be made from steel scraps. The shape of the rudders was square, which did not seem to be intentional but was rather likely to result from the original purpose of the sheet metal. Some pieces were smooth, with the exception of pitting and bubbling due to rust, while others were diamond plate steel. The diamond plate steel was present on two examples. An examination of all rudders revealed no apparent evolutionary trend. Although there was a tin rudder, there were too few changes beyond that to indicate a trend. A single wooden rudder was noted on the sail-powered vessel, but it resembled the steel rudders in its dimensions and overall style.

Rudders were generally positioned to enable a single person to operate the rudder from the rear. They were commonly positioned near the engine so that the person could also operate the engine by adding fuel or shifting gears (required for the tractor engine). Two vessels had

some sort of seat for the person operating the rudder. One was a plastic lawn chair, while the other was a constructed wooden chair (Figure 18). It was likely that most of the vessels had some sort of seat for the rudder operator. For example, the Catamaran was steered by two rudders on each pontoon. The actual rudders were missing from the vessel, but the brackets that held the rudders were still in place and were the same style as those on the single-rudder examples. These brackets suggest that the Catamaran used metal rudders with steel pipes as the tillers. No seats, marks, or brackets were observed at the rear of the pontoons. It was probable that people sitting at the rear of the vessel operated each rudder independently. The Catamaran was the singular example of a homemade craft that required more than one person to operate the rudder. For migrant craft that were originally boats, the rudder was often unmodified. Metals were commonly used, but some older fishing boats that were homebuilt most likely had wooden rudders. On these vessels, a steering wheel determined the direction. Unfortunately, most of these craft no longer have rudders attached, although markings and brackets were evident on the transoms.



FIGURE 15 Steel plate rudder (photograph by author)



FIGURE 16 Steel plate rudder (photograph by author)

With so many non-conventional materials and a tendency to overload vessels, migrants have had to add parts to the vessels to increase the buoyancy. These additions have included containers that were filled with air and materials that were less dense than water, which allows the vessels to float even when overloaded.

Migrants have used a variety of containers filled with air, but the most common were truck tire inner tubes, which were easily obtained through scavenging. The inner tubes can be either left intact or cut and re-sewn into long tubes to support a RHIB-style vessel. A definite trend in vessels was a shift from a simple doughnut shape to a tubular one. Visible patches on the exposed inner tubes suggest that repairs were made before installation on the vessels. Furthermore, an air compressor tool for refloating inner tubes was found on the inner tube vessel that was located at the Ponce de Leon Inlet Lighthouse. While no patches were found aboard, it was likely that migrants would have brought patches for emergency repairs. Most inner tubes were not inflated when on display. However, the tubular vessel at the Ponce de Leon Lighthouse Inlet Museum was partially inflated.

Rigid containers filled with air were frequently incorporated into the actual structure of vessels. These containers were sometimes covered by tarps or plating, although such coverings were not necessary. The rigid containers derived from a variety of sources. An easily identifiable container was the 200-liter (55-gallon) steel drum. When empty, these drums can theoretically support just under 150 kilograms. The average human weighs around 80 kilograms, which makes empty oil drums a suitable candidate to add buoyancy. Despite their name, oil drums are not limited to the petroleum industry; often, these barrels carry water, syrup, and chemicals. Empty barrels can be purchased on the open market within a price range of 70 to 120 USD. Migrants have utilized oil drums since the earliest vessels were deployed. Because of their size and design, they were easy to place in line, and since they were made of steel, it was possible to weld the drum directly to the skeleton. These drums were designed to stack on top of one another but not to lock together, although they do stick together due to friction. Only one vessel that was inspected employed oil drums for extra flotation. Photographs from local newspapers and the Coast Guard clearly depict oil drums, and modified cars and trucks, in particular, seem to have frequently used these drums. They come in a large palette of colors. The availability of case studies was insufficient to determine a trend; however, it can be theorized that the colors, if painted across all surfaces of the vessel, were most likely the choice of the migrants and were not a signal of the original contents of the drum. It is important to note that these drums can also be made from plastic. This version provides more buoyancy because the air inside does not have to support heavy steel. None of the vessels or photographs that were examined featured such barrels, but it is possible that migrants have employed them. Other popular rigid containers were plastic liquid containers. This category encompasses a wide variety of containers ranging from one-liter soft drink bottles to much larger containers. Unlike with oil drums, it was more

difficult to formulate the buoyancy that these containers provide because they were often not uniform in a single vessel. A few traits were noticeable. The containers were always kept inside the skeleton or the hull structure of the vessel, and they were always used with some other buoyant device or material. On some vessels, these containers have an opening that was accessible to the migrants aboard, which suggests that some may serve a dual purpose.

However, a majority of the containers on these vessels were inaccessible. This buoyancy method was not limited to only small vessels. The use of such rigid containers was evident on the second-smallest vessel (case study 2) as well as on one of average size (case study 19). Since it appears that these containers were used in conjunction with other buoyancy aids, it can be surmised that the buoyancy gains alone were inadequate to support the vessels. This was especially true for the smaller liter bottles in the outer tarp layer of one vessel (case study 2). Rigid containers could also be found inside the hold of the vessel; in this location, the containers were probably used for carrying water or fuel rather than for increasing buoyancy.

Migrants have also increased the buoyancy of their vessels by adding foam to the structure or by building the main structure out of foam. Two distinct forms of foam were observed: an expanding foam and a closed-cell extruded polystyrene foam that resembles Styrofoam®. However, it was not possible to determine the manufacturer of the foams in the case studies.

Expanding foam was deployed in multiple unique ways, such as in tubes to provide structure to the vessel. The foam was sprayed or poured into the tarp tubes and would not require a skeleton for support. Two methods of foam installation were detected during the examination of the vessel. The first and most common was spraying the foam into the tarp containers and stitching the end shut once they were filled. This method was most easily accomplished on

vessels that lacked a rigid skeleton. These hulls could be filled in sections and stitched closed, which allowed migrants to build the vessel as they collected the spray foam. The second method entails the use of plastic tubing to deliver the foam to the ends of the hull. This approach could be deployed on vessels with an external hull made from tarps. However, it was additionally evident in a vessel that had a rigid skeleton made of rebar. Expanding foam could also be deployed directly to the hold of the vessel and appeared to be highly similar to the foam that was in tubes along the hull of the vessels. Application of the foam appeared haphazard. The foam itself seemed to be poured expanding foam. In case study 20, the foam was non-uniform. It presented with hills and valleys that appeared to have been dumped into the hold. This approach did not appear to be an emergency procedure because no personal effects or trash items (e.g. shoes, bottles, and plastic bags) were trapped in the foam. There were no cut marks to suggest the removal of items by the curators, the individuals who found the vessel, or visitors to the exhibit. This foam was not limited to the structure of vessels and can be found in external pontoons, which were unique to a certain type of vessel, namely purpose-built boats that were modified for the voyage across the Florida Straits. The pontoons were filled with expanding foam and were strapped to the side, while the outside of the pontoons was made from different materials. The pontoon ends were not sealed, which exposed the foam inside.

Plastic piping was the most common material for pontoons, although the pontoon in case study 8 was made from a corrugated plastic pipe. Case study 7 had a pontoon made from an object that appeared to be a fire hose from its diameter and the woven internal structure visible in the cross-section. The strapping was composed of aluminum sheets. The straps were wrapped around the pontoons and then fastened to the upper parts of the freeboard with bolts and screws.

These pontoons ran the length of the vessels. Further testing would be needed to determine if the additional buoyancy that the pontoons added was effective.

Closed-cell extruded polystyrene foam (CCEPF) is a foam often used in shipping containers and coolers. It is generally white and available in many sizes. Moreover, it is malleable and can be carved to a desired size or shape. This foam was often observed on the rigid skeleton of homemade vessels but was not found in modified boats or in conjunction with expanding foam. The blocks could be inserted into the gaps between ribs and against the hull. Like expanding foam, the CCEPF was typically covered by an external material. In the pentagonal vessel, the CCEPF constituted the interior of the vessel along with a wooden skeleton, while the outside was plated in aluminum. Case study 2 was similar to this vessel (mentioned previously in the section about rigid containers) in that it also was wrapped in a tarp and had an iron skeleton. The largest example of CCEPF was in Case Study 16, the Catamaran. The pontoons of this vessel were constructed of CCEPF with iron straps around the outside, which were then connected to the seating area. The CCEPF-tarp pontoons were then painted with a paint that appears to be acrylic (in view of the paint's current cracking and peeling). The CCEPF at the bow of the pontoons was shaped and capped with wood to help the vessel cut through the water. Although CCEPF poses many benefits, it was not ubiquitous to these craft, and other means of adding buoyancy were also present. As the case studies demonstrate, CCEPF was not used at a higher rate than other materials at this time.



FIGURE 17 Foam vessel with aluminum on the bow (photograph by author)

Notably, this study found no navigational aids. The only vessel with any sort of navigational aid was case study 12, which held a single pair of binoculars that were missing a lens. Although it was highly unlikely that the people who left on this voyage did so without any navigational aids, none was recovered. It was likely that migrants would have taken expensive electronic aids with them and left behind broken and valueless items; however, electronic devices were probably used only rarely. Although global positioning devices (GPS) can enter Cuba, the cost through either the government or the black market would generally be prohibitive to the overwhelmingly poor population. The government controls the devices and appears to require a license for ownership, which would hamper anyone who was intent on leaving the nation if the government was aware of dissidents possessing such a device. Furthermore, migrants did not need a GPS to successfully reach United States shores. By simply using the North Star and other celestial markers, migrants would have been able to direct themselves to the

United States. Once within about three miles, any lights on the shore would be visible and could serve as a guide. The screw-pile lighthouses that dot the coastline of the Florida Keys are visible at approximately 22.5 km (14 miles). In 2016, the American Shoal Lighthouse had 24 migrants land on its site. It was easier for migrants to obtain paper maps and navigation charts; however, they have not been found on any of the case study vessels. A possible reason for this absence was that the wind and weather of southern Florida would likely have blown away or disintegrated any loose or unprotected materials.

Migrants do have many aids available. Compasses were most likely the easiest to obtain and could be scavenged off many boats. On vessels that were fishing yachts before transitioning to migrant vessels, a preinstalled compass was likely to be attached to the dashboard. These elements may have been removed when put on display, or by souvenir hunters after the boats were abandoned. Migrants may have utilized pocket or field compasses since there does not seem to be any law in Cuba controlling their availability. However, their small size makes the detection of such devices on a vessel difficult, even if the compasses were left behind.

These vessels had very few amenities. None of the homemade vessels had any sort of bathroom facility on board. Vessels also lacked any form of privacy, as dividers were nonexistent, and almost all occupants could see every part aboard. Furthermore, the vessels lacked evidence of bedding materials beyond bed sheets on certain sail vessels. Pillows and blankets were most likely left in Cuba because they would take up space and not benefit the group. People did bring spare clothes, which they could use as cushions while underway. This study expected this phenomenon and would have specially noted any example. The only structures built into a vessel might be a small pole that would hold up a tarp to protect a few people from the elements. In some cases, sitting areas were noted. Some were built into the

vessels and were diverse in design and material. Others were actual chairs that were nailed or bolted onto the vessel, and still, others were similar to seats in canoes. These crosspieces may have also acted as thwarts. Seats that were actual chairs were usually plastic, such as lawn chairs, or stadium-style seats. The stadium-style seats were positioned for passengers and oriented toward the bow. The lawn chair was positioned on the stern next to the engine to allow one person to simultaneously work the engine and tiller. The homemade chair was exactly like the lawn chair in positioning. Working the tiller and minding the engine was the most labor-intensive job aboard these vessels, and being able to sit would increase the amount of time that one person could operate the tiller before exhaustion set in. It was probable that the constructor of the vessel was also its main operator, and they would have sought to ease the strain in any way possible. In this situation, the simple addition of a chair proved useful.



FIGURE 18 RHIB-styled vessel; note the handmade seat to operate a tiller (photograph by Richard McCusker)

With such limited prior research on these vessels, this analysis has had to make a number of assumptions based on material culture evidence. These vessels reflect ingenuity in the midst of the changing availability of materials and design ideas. Earlier vessels from the late 1950s to the 1980s were made from wood and tin, while those from the last 16 years tended toward aluminum and plastics. The design of the vessels mimicked well-known successful production models. A key piece of invention found on these vessels was the use of ram ventilation and the physics of a siphon. Though many vessels have water intakes, this design and method seem to be tied directly to CMCs through the specific use of a semi-modified terrestrial vehicle engine.

The next step in the research of these vessels is to examine each decade individually. There are many possible variations that were missed due to the scale of this research, which focused on sample case studies. However, it is important for such research to begin immediately. The number of available case studies dwindles every year, and with changes in the legal status of these migrants, the number of vessels is likely to diminish to only a few vessels a year of the most desperate of people.

Chapter 6 Demographics:

Any time there is an extensive migration of people, it is necessary to examine the demographics of those people. Such an analysis of the population can highlight an underlying reason or cause for the migration. In war-torn regions, women and children often dominate migration. When the cause of migration is economic, there tends to be a higher percentage of male migrants. Examples of many of these situations are visible around the world. Mexico is a striking example of economic migration. Migrants sometimes bring their families, but it is common to instead send money back to Mexico ([Connor et al 2013](#)) ([Aizenmen 2017](#)).

Demographically, 70% of Syrian refugees are women and children ([UNCHR 2017](#)). Cuba differs from many countries that experience a large migration of their population. Cuba was a stable country with a functioning economy. Cuban migration was unique because the Cuban people received preference in the United States compared to people fleeing other oppressive political regimes. Generally, people escaping from oppressive regimes must prove that they were directly targeted in order to be declared a political refugee. Achieving refugee status in the United States can be a complicated process that requires interviews and referral for refugee status by an international entity, such as the United Nations Refugee Agency, or if possible, the United States embassy in the area ([USCIS 2017](#)). This process can take months or even years, which can slow the migration of refugees to the United States ([US State Department 2017](#)).

Throughout the 60-plus years of migration from Cuba, there have been numerous waves of migration, and Cubans of all socio-economic levels have made the crossing. Because of the status of United States and Cuban relations, it was theorized that a few trends were evident. First, the distribution of men and women would be similar, with men having perhaps a slightly larger percentage. This theory was based on Cuba's patriarchal-dominated society. It was also likely

that family groups would have crossed together because the chance of returning to Cuba was low, and people may have felt that those left behind would face retribution since leaving Cuba without permission was a criminal act until 2013 ([Gupta 2012](#)). Economically, sending money back to their families has been difficult in the past, a few banks operate in both the United States and Cuba as a result of the United States embargo. The amount of money that Cubans could send to their the families was limited ([Lovitt 2015](#)). It was also important to note that Cubans do have other options besides trying to cross the Florida Straits. For example, they could cross through Mexico and Canada and receive the same refugee status. Cuban could also make a crossing to Puerto Rico via the Dominican Republic ([Dominican Republic News 2007](#)). Because of these options, it was difficult to determine an accurate number of only those who have arrived via boat across the Florida Straits. Since the Department of Homeland Security combines all data on Cuban migrants into one source, it was essentially impossible to only examine the part of the population that arrived in the United States by boat. This thesis hypothesizes that the population demographics will remain approximately equal, with perhaps a slight majority in the number of men who make the crossing.

Cuban migration has been inconsistent. Every year, there were some Cubans who successfully arrive in the United States. However, there were also periods in which thousands of people make the crossing. The period between 2015 and 2017 witnessed the last large wave, with more than 20,000 more arriving than in the previous year ([Krogstad 2016](#)). Other such events were the boatlifts and, in 1994, when the “Wet Foot Dry Foot policy” started. The greatest single wave was during the Mariel boatlift, which allowed over 125,000 Cubans to immigrate to the United States. The individuals comprising these waves come from every socioeconomic and racial background. The Cuban government previously curtailed departure from the island by

requiring an exit permit that was prohibitively expensive ([Canada 2010](#)). This requirement most likely led to more people attempting to cross the Florida Straits, as people could not board a plane to another nation without the permit. People who left in the 1960s and 1970s were those who were not prospering under the communist government. Often, those who had been brought in for questioning and subsequently released decided that they needed to leave the island. These people would have been more educated or middle-class Cubans who were able to afford a boat or already owned a vessel. The fact that a majority of CMCs at this time were professionally built boats offers support for this conclusion.

A useful tool for understanding a population is an age-sex pyramid. An age-sex pyramid is a graph that compares age and gender for a whole population. Such a graph can determine if a population is growing, shrinking, or stagnating. An age-sex pyramid can assume a few shapes. For a growing population, the shape is a pyramid, whereas a shrinking population has an inverted pyramid. A stagnating population, then, is shaped like a column that tapers off as age increases. However, these shapes were not expected in an age-sex pyramid that examines a migrant population. In a migrant population, the shape is a diamond due to the majority of migrants being in young or middle-aged adult brackets and usually being without young children or the elderly. The pyramid graph for Cuba in Figure (19) is different from this as well. The majority of the population was still in the 20 to 59 age group, but there was a substantial senior population of people over 60. Other migrant age-sex pyramids that the Migration Policy Institute has created exhibit a diamond shape with a low elderly population, while the Cuban immigrant population has a much larger elderly population. Moreover, there was a higher number of older Cuban women, which is generally a normal trend for many populations in which women live longer than men and is common in many developed nations. It was unlikely that older women were

making the crossing now to inflate the numbers of the older population. Rather, the substantial older population was due to those who came to the United States during, or shortly after, the Cuban Revolution. Those who arrived as young adults during the Mariel boatlift are now around 53 to 60 years old and represent the largest single line on the pyramid. One other data point to note was the female percentage of the population for the 20 to 24 age group, as this was the first point where the female population exceeds the male population. Women comprise 56% of the immigrant population for this age group. The 25 to 29 population was majority male, as was the 15 to 19 bracket. The female population does not regain the majority until the 60 to 64 group, at which point it remains the majority. A larger percentage of women in the older demographic is normal for developed nations. In a population where there is still a significant chance of death during childbirth, the older male population can be larger. In a developed nation, women generally have longer lifespans than men. In the United States, women typically live to be five years older on average than men (81 versus 76) (life expectancy in Cuba was the same as in the United States, according to the WHO) ([WHO 2017](#)). Thus, a sizable female population was expected and was most likely not due to a migration of senior Cuban women to the United States. The anomaly where women represent a larger percentage of the population in the pyramid at the 20 to 24 group, which suggests that there was a shift in the population that was migrating. Since migrants in a population were generally in the 20 to 30 age group, the 20 to 24 group were likely to be new arrivals and not from earlier migrant waves. When the age group populations for 20 to 30 years were combined, women account for 51% of migrants ([Migration 2016](#)). This figure supports data that demonstrate a recent change in the population of migrants. There were now more women who made the journey; however, the reason for this was unclear. Although Cuba still appears to be a male-dominated society, actions by the Cuban government have

encouraged women to take part in the workforce and for parents to evenly share the workload at home (Harris 1995).

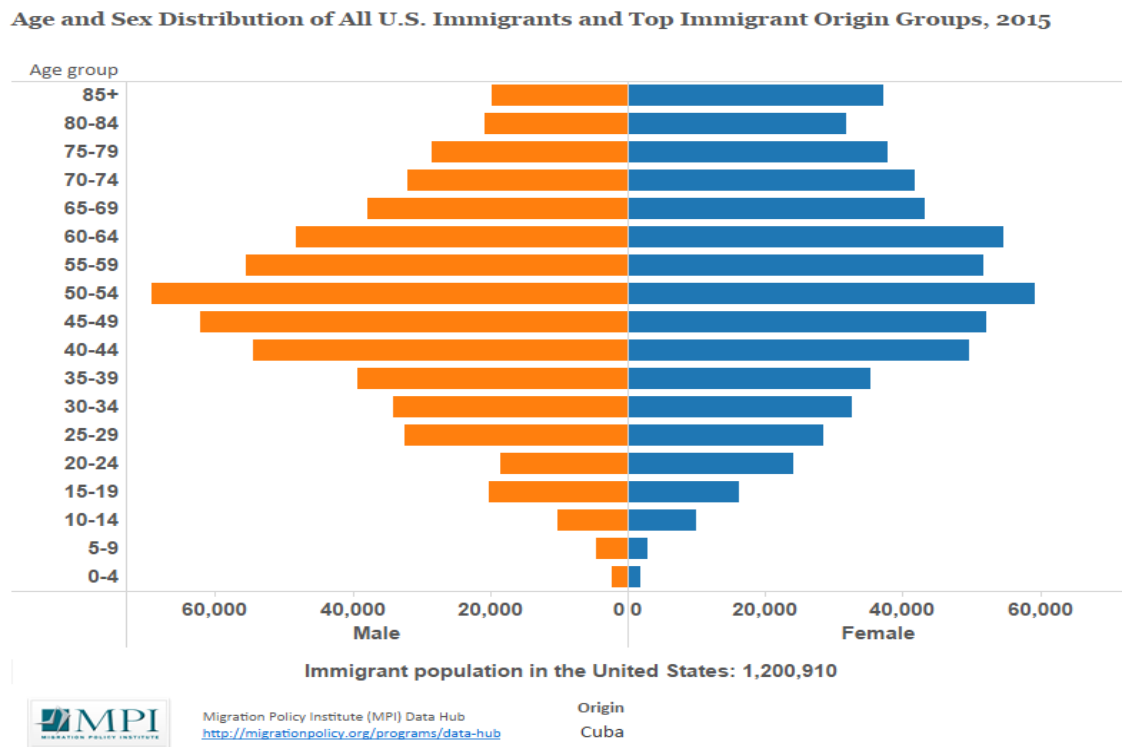


Figure (19) Age-sex pyramid of Cuban immigrants from 2015 (Courtesy of the Migration Policy Institute) (Migration 2016).

The 40 to 50 age bracket represents a large portion of migrants who arrived in the migration wave prompted by the introduction of the “wet foot, dry foot” policy in 1994. Evidently, the male population constitutes 53% of the population. This figure was likely due to young men leaving Cuba for better opportunities in the United States. With changes to laws at the time, it would have seemed to Cubans that the preferential status they held could end. With this in mind, young men who may have had extended family in the United States might have left Cuba to use the favorable laws and to secure a life in the United States (Migration 2016).

The demographics indicate that the initial theory was partially correct. Men and women do migrate to the United States in similar numbers, with men usually accounting for a slightly

larger portion. Single young men might leave for the opportunity to start a new life in the United States. Since returning to Cuba from the United States had been impossible until recently (this is still debatable), the greater number of males might also be explained by the collective departure of family groups. It was highly probable that the Cuban government would have investigated remaining family members and possibly punished those left behind. Therefore, Cuban migrants could not utilize the method of working in the United States and returning to their country of origin, which Latin American migrants did. Although economic opportunity may have motivated some people, the sum of difficulties led them to become refugees who (until only recently) could have faced persecution if they returned to Cuba. The theory that men would constitute a slightly larger portion of the total population throughout the time of these craft has been proven untrue. Although men were more likely to migrate in the past, it appears that more Cuban women were arriving in the United States in recent years.

Demographic data gathered from the United States Department of Homeland Security, which was responsible for the United States Coast Guard and Border Patrol, contain more recent information about Cuban migrants. The data indicate a trend. The most recent years evidence a larger percentage of women arriving in the United States. In 2008, 3,140 of the 5,505 total new arrivals (57%) were women. In 2014, the Department of Homeland Security reported that there were 6,178 new Cuban arrivals. Of these, 3,790 were women, and 2,388 were men. Thus, 61% of new arrivals were women. This was the last data set before the December 17, 2014 announcement that the United States was warming relations with Cuba. Compared to 2013, in which only 3,265 of the 5,482 new arrivals were women (59%), 2014 witnessed a 12% increase in total arrivals, with the proportion of women also rising by 2%. The last decade of immigration

has been predominantly female; however, the age-sex pyramid shows that this was a recent shift, as the chart reflects a higher percentage of men in the population up to the age of 60.

Obtaining demographic data for Cuban migration before 1990 has proven difficult. The Department of Homeland Security does not have such data easily accessible. This department was created in 2002 in response to the September 11th terrorist attacks, and it assumed the responsibilities of the Department of Immigration, Border Patrol, and the Coast Guard. Each branch would have maintained its own records of Cuban migration depending on how the migrants entered the United States. The Department of Homeland Security was able to provide a fair amount of documentation about Cuban migration, but data was still missing. Thus, consultation with other sources was necessary. Before the Cuban Revolution, migration from Cuba was limited. After the revolution, people began to migrate to the United States in substantial numbers. The first data point that was available from other sources was from 1980, at which point there were 608,000 Cuban immigrants recorded in the United States. This figure increased to 737,000 in 1990 (an increase of 129,000). The Mariel boatlift dominated migration during the 1980s, after which migration was low. In 2000, the Cuban immigrant population reached 873,000 (an increase of 139,000). By 2010, the population of foreign-born Cubans rose by 232,000 to a total of 1,105,000. In 2015, the first year after the announcement of warming relations, 43,159 Cubans entered the United States. This was close to double the figure in 2014 (24,278). In 2016, the migration rate continued to increase, with 56,406 Cubans arriving in the United States. Nevertheless, 2016 marked the end of the wave, with 2017 witnessing lower rates of migration from Cuba and the passage of multiple months without a migrant craft landing (Torres 2017). Although these recent numbers were high, it should be noted that this was not the highest point of migration. Instead, the highest single period of migration was the Mariel boatlift.

It was also apparent that migration has been highly variable, with thousands arriving in certain months and other months receiving no successful migrants.

By consulting other sources, it was possible to indicate where Cuban migrants live after arriving in the United States. Cuban migrants reside throughout the United States, but the majority of the population was gathered in a few areas. In 2013, the foreign-born Cuban population was most highly concentrated in Southern Florida, with almost 700,000 people living in the Miami area. The second-highest concentration of Cuban migrants was in the New York metropolitan area, with 68,000 people on record. These data were collated by the Migration Policy Institute and incorporate data from the United States Census Bureau ([Batalova and Zong 2015](#)).

Another interesting consideration was the identity of the Cubans who have arrived in the United States. According to data from the Pew Research Foundation, they derive from all parts of Cuban society. Once they arrive in the United States, Cubans enter the United States workforce in a number of roles. Cuban migrants were involved in the production and transportation of raw materials at a higher rate than other migrants and native-born Americans. Furthermore, although native-born Americans fill a larger percentage of sales and office occupations compared to Cuban migrants, Cuban migrants were more likely than other immigrant populations to work in this sector. All other immigrant groups comprise a larger portion of the service and natural resource industries. Cuban migrants were less likely than native-born and other foreign-born individuals to engage in a management, business, science, or art field. However, a quarter (the largest percentage of the population) work in these fields ([Pew Research Center 2006](#)).

In terms of education, the population of foreign-born Cubans generally has at least a high school diploma. Before 1980, 48% had a high school degree. This decreased to 47% in the 1980 to 1990 population; however, after 1990, the percentage rose to 49% of the population. About 22% of the population before 1980 and 26% of the population after 1990 had a college degree, with the exception of those who arrived between 1980 and 1990. During this period only, 13% had a college degree, and 25% of the population had a ninth-grade education or less. This lack of a high school education was higher than normal as well. Before 1980, only 18% of the population had a ninth-grade education or less, and for people arriving after 1990, 11% had the same level of education. The married population represents the dominant marital status among the foreign-born Cuban population. Specifically, 61% of people who arrived before 1980 were married. This figure decreased to 55% of the population for those who arrived between 1980 and 1990 as well as those that arrived after 1990. The Cuban population has generally been married or had been married; those who have never been married constitute a small part of the population. Before 1980, only 8% of the population was single and had never married. This figure increased to 21% for 1980 to 1990 arrivals, and it rose further to 23% in the population that arrived after 1990. The income of foreign-born Cubans has fluctuated over the past decades. Cubans who arrived before 1980 earned 38,000 USD a year on average. This was the wealthiest portion of the foreign-born Cuban population. Cubans who arrived between 1980 and 1990 earned 8,000 USD less compared to those who arrived before 1980. This group also earned less than those who arrived after 1990. Cubans who arrived after 1990 earned 33,000 USD a year. This difference could be related to the education level of migrants; however, more data were needed to determine if there was a correlation.

From the examination of demographic data and its comparison to the archaeological data, this thesis concludes that the demographics were not a selecting factor in the design of CMCs. There was not enough evidence to suggest that modern vessels have any particular feature that functions differently due to the use of the vessels by a changing population, such as one with more women and children. Homemade vessels did appear to increase in freeboard size, but this was more likely due to an increase in the number of occupants in the vessels; there was more weight between people and supplies, so the vessels would sit lower in the water. Recent vessels have had more materials added that might make the journey more comfortable, but these could be intended for any person aboard. It was much more likely that key selective factors, such as the available materials and boat-building knowledge, were responsible for the design of the vessels. A possible demographic shift in the Cuban population could account for the increase in women departing the island, but evidence to support such a theory was not available for this thesis. Moreover, it was possible that the methods of migration do not have similar demographic trends. With multiple points of entry, it could be that groups that choose sea routes were male-dominated, while those opting to cross through Mexico or Canada contain more women. However, since the data was not separated, it was not possible to establish an informed theory on the matter.

Chapter 7 Conclusion:

Cuban Migrant Craft are part of an import family of vessels, Migrant Craft. These ships tell the story of desperate people trying to improve their lives. Mentions of this ship type can be found throughout history and new designs will be seen in the future. Every group that makes use of Migrant Craft creates its own distinct variations to meet their unique challenges. It is in these vessels that the creativity of people can be seen. It is the responsibility of archaeologists and historians to record these vessels so that future generations will be able to have a greater understanding different migrant groups.

Understanding trends among CMCs was a daunting task in view of the uniqueness of the craft and the dwindling number of intact vessels. However, it is important to note that this study has focused on vessels that successfully completed the voyage, and there were unknown numbers of other vessels that failed during the crossing and sank. No vessels in this study were sunk at sea. It is possible that the Florida Straits are littered with vessels that are too small for detection. A search for these vessels would provide an interesting foil to successful vessels, but such a study would likely be too costly to complete. This thesis has effectively detected trends that can inform future studies of the vessels. These trends refer to the style of vessels and the materials that comprise them. Future studies must commence within the next five years; otherwise, it is likely that the elements will cause the loss of most of the remaining craft and, in turn, an important and unique period in maritime history.

There were certain aspects on or part of the vessels that do not seem to change or fit into a trend. The types of bolts that were used across vessels seemed to be whichever was available at the time. Often, a single vessel had multiple types of bolts and fasteners. Also, there was no trend in the means of propulsion, and specifically no transition from sail to combustion engines as

expected. This was likely because engines were readily available in a multitude of forms and could be scavenged from around the island. Sail power was used in every decade, but the number of sail-powered vessels was lower than anticipated.

There were some trends regarding the size of vessels, although they do not appear to be linear. The data indicate that smaller vessels tended to be from earlier decades, while larger vessels were used more recently. The largest vessel in this study was dated to the Mariel boatlift, which was the midpoint of the use of these vessels. Migrants have employed larger vessels, but the United States Coast Guard has sunk them. Still, there were successful vessels that exceeded 8.4 meters. The exact numbers of these larger vessels were not known to this study since such information could not be located. A complete study of the Coast Guard records may be necessary to ascertain the largest vessel. The Coast Guard states that it was able to interdict close to 80% of all migrants ([Goodhue 2016](#)). The “wet foot, dry foot” policy would dictate that migrants must be sent back to Cuba or to a third country, and their voyage would be considered a failure. Since the United States Coast Guard destroys vessels that it determines to be too large, these larger vessels were missing from the archaeological record. Interestingly, there was no written directive determining the definition of “too large,” but it appears that vessels made from cars and trucks fall into this “too large” category. No example of a vessel using a land vehicle as a frame was available for this study; however, this type of craft was a unique part of the history of these vessels that were viewable only through photographs.

There was also a trend in types of vessel. The type refers to whether the vessel was a homemade craft or a professionally built boat. During the Camarioca and Mariel boatlift periods, professionally built boats were more common, as people did not need stealth to leave Cuba. Professionally built boats were also more pervasive during the earlier decades, probably due to

the availability of the vessels combined with the poor indictment abilities of the early Cuban revolutionary government. This changed as the Cuban government gained support and technology from the Soviet Union. The changing style of vessels was also a noted trend. Early homemade vessels resembled simple, traditional single-hull boats, whereas vessels from the past 20 years have mimicked popular small vessels, such as RHIB vessels. Cuban migrant craft seem to share the shape of RHIBs but lack the rigid hull that defines a RHIB vessel. Additionally, CMCs that have arrived over the past decade have evidenced additional hull modification. Cubans have added freeboard to possibly allow the vessels to carry more people and to reduce the risk of swamping. External homemade pontoons were added after the increase in freeboard, perhaps to enhance the stability of the vessels and provide further buoyancy.

Other important aspects of CMCs that were unique are the ram ventilation cooling system, multiple types of foam for floatation, and plastic containers for flotation. The ram ventilation cooling system has been on many vessels from 1990 until the present. Unlike professionally made vessels with purpose-built boat engines that use pumps to draw water in to cool the engine, CMCs utilized plumbing pipes with a propeller and a vacuum effect to force water into the engine. The use of foam was not unique, as many modern craft use foams for added buoyancy. It usually occurs on vessels that were less than seven meters and entails a marine-grade spray foam that can be found between the first and second hull and which provides the vessel with much greater buoyancy properties if water swamps the vessel. The CMCs in this study appear to use construction spray foam that can withstand short-term exposure to water. The purpose of the foam in CMCs was the same as in professionally constructed vessels. However, the ingenuity of the Cuban people has not been limited only to mimicking professional shipbuilders with available materials but also extended to using the materials to make unique

designs. This ingenuity was demonstrated by the use of extruded polystyrene foam as a hull structure. Two vessels noted in this thesis employed the foam in this way: the Catamaran-style vessels and the pentagonal vessel. Both covered the outside of the foam with paint, and the bows had some form of shielding. This type of foam was not utilized in professional ship construction, and polystyrene foam must be shaped to fit into CMCs. This foam was widely available throughout the world, and it was likely that extruded polystyrene foam could be found on many homemade vessels that have not been studied. However, no other examples were found. The use of empty drink containers was also a unique way to add flotation to vessels.

There were some difficulties at the onset of this study. For instance, CMCs were difficult to locate. Both museums and the local populace had moved interesting vessels from where they had come ashore and had cleaned them for display. The author was alerted to two vessels that had been left on the beach, but they had vanished by the time the research began (within approximately one month). The location of the vessels was unknown. Many vessels were destroyed after landing, as the government considers them to be hazardous waste. If a vessel has no obviously interesting element or no locals take the vessel, then the State of Florida contracts a company to remove and destroy the vessel. For years, the vessels have been neglected by a majority of archaeologists, and as a result, many CMCs were now destroyed and unavailable for study. The removal of vessels disconnects those vessels from the people, linking people to vessels was highly difficult. Thus, locating and consulting anyone who was on a particular vessel in order to understand their journey was next to impossible. It also caused difficulty in determining if a vessel was a CMC, as the current owner might not be aware of the vessel's origin. Challenges also arose in attempting to contact migrants; when approached, many declined interviews. Therefore, too few interviews were conducted to provide a significant data set.

The demographic data, while clarifying general population trends, does not appear to have any correlation to the design of the craft. The design of vessels was more likely determined by those who had built them and not by the number of people who were leaving Cuba overall. There were also issues with interpreting data from United States government agencies, as all points of entry were combined, which obscures which migrants arrived by boat and if they were different from those who entered via a land route. An in-depth anthropological study is likely needed to determine if there were major differences between people who left Cuba by CMC and those who chose, or had the ability, to use a land or air route.

There are several studies that should be completed within the next decade. First, there should be an in-depth examination of the engine types and the unique modifications made to them beyond those identified by this study. It was within the realm of possibility that migrants could have altered certain parts of the engines and that this was not apparent in the inspections completed during this study. Moreover, it would be useful to record the origins and movement of the engines if possible. Most engines have a traceable serial number on some part of them. This data could reveal how modern US-made engines have arrived in Cuba and through which countries they passed. Another recommended study is an examination of the wood that was used in construction. This study did not have the resources to identify the wood types. There were a number of possible species that could have been utilized and identifying these by appearance alone was not possible. Wood samples could be collected and analyzed to determine which species were preferred and if the wood was non-native to Cuba, where it could have originated. Furthermore, there is an anthropological study that should be completed. There was evidence that some Cubans arrived in the US via transportation by smugglers. These vessels were reused, so identifying such cases was limited. This phenomenon would create another subset of the

Cuban-American population since their voyage would be extremely different from the voyage of those who built their own vessels or crossed through Mexico or Canada. In addition, another study could investigate the personal effects left on the vessels, although difficulty could arise in determining which objects were part of the vessels and which were flotsam that washed ashore in the same area. Any such study would need to utilize photography, such as the photographs presented in this study.

It is the opinion of this author that more resources must be deployed for both the study of vessels as well as their preservation. The size of these vessels makes them prime candidates for indoor display, especially in Florida, where many Cuban-Americans live. However, because of the ephemeral nature of the vessels, outdoor storage often causes rapid deterioration. This decay is compounded by the display of vessels in such a way that allows the public to touch or even walk on them. This poses a danger not only to the craft but also to the public, as sharp parts could cut interested patrons. If such funds cannot be dedicated to the preservation of the vessels, then it will become necessary for maritime heritage preservationists to intervene and record as much as possible. It is the hope of the author that this thesis can provide those future studies with a baseline upon which to build an understanding of this important maritime immigrant legacy.

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Appendix 1: Ship Proforma

No.:

Location Landfall (MM/YYYY):

Year of sailing (MM/YYYY):

Interdicted and Where and by what agency: Y/N

Length overall:

Beam overall:

Depth of Hold:

Draft (if possible):

No. people who were aboard:

A) Adults

B) Children

C) Teens

D) Older than 65

E) Ethnicity

Propulsion method:

Core structure (Boat, Car, building materials):

Totems or symbols placed on or in vessel:

Storage of belongings:

Description of exterior:

Seating arrangement:

Description of interior:

Robustness of watercraft upon arrival:

Repairs and modifications:

Navigational aids:

Current location of the vessel:

Comments:

Appendix 2: Case Studies

Case Study #	Length (m)	Width (m)	Landing point	Date	Material	Propulsion method
1	3.9	1.4	Lower Keys	1994	Canvas and plastic bottles	Sail
2	8.4	3.4	Lower Keys	1980	wood	inboard engine
3	5.57	2.5	Lower Keys	2005	Canvas tarps, rebar, Foam insulation	inboard engine
4	6.2	1.93	Lower Keys	1980	wood	inboard engine
5	5.25	2.2	Lower Keys	2006	RHIB Yellow tarp galvanized steel barrel rings	Outboard
6	6.08	2.17	Lower Keys	2015	Aluminum covered in Fiberglass	Outboard
7	5.35	2.2	Lower Keys	2014	Aluminum covered in Fiberglass	Car Engine
8	5.34	2.3	Lower Keys	2014	Aluminum covered in Fiberglass	Car Engine
9	5.42	1.94	Lower Keys	2005	Aluminum covered in Fiberglass	inboard engine
10	4.5	2.3	Lower Keys	2011	Tarp and Spray Rubber liner hand sewn	Car Engine
11	6.55	2.01	Lower Keys	2012	Aluminum covered in Fiberglass	Diesel engine
12	4.85	2.07	Big Pine Key	2016	Wood skeleton aluminum covered rigid foam	Car Engine
13	6.05	2.5	Big Pine Key	2016	tarp filled with foam	Car Engine
14	7.2	1.5	Lower Keys	1980	wood	inboard engine
15	4.9	3	Wilbur-by-the-Sea	2016	Foam Catamaran metal cross pieces with netting in between	Bracket for inboard
16	6.75	2.3	Ponce de Leon Inlet Lighthouse	2015	Tarp with inflatable tubes	diesel tractor engine
17	5.1	1.8	Ormond-by-the-Sea	2013	Rebar Skeleton canvas covering plastic containers internal structure	Car engine plus bamboo mast
18	2.53	1.4	Volusia County beach	1989	Heavy duty canvas rebar and rigid foam	Metal mast

19	2.95	1.1	Ponce de Leon Inlet Lighthouse	1994	wood and tire inner tubes	wood mast
20	3.5	2.43	Miami-Dade County	1994	wood rigid foam inner tubes Tin plating on bow canvas on sides	Bamboo mast
21	2.4	3.04	Miami-Dade County	1994	55-gallon drums plywood	truck engine
22	5.6	2.03	Dry Tortugas	2014	Aluminum covered in Fiberglass	Car engine
23	2.8	0.88	Key West	1959	tin sheets	lawn mower engine

Appendix 3: Platt Amendment

I.-That the government of Cuba shall never enter into any treaty or other compact with any foreign power or powers which will impair or tend to impair the independence of Cuba, nor in any manner authorize or permit any foreign power or powers to obtain by colonization or for military or naval purposes or otherwise, lodgement in or control over any portion of said island."

"II. That said government shall not assume or contract any public debt, to pay the interest upon which, and to make reasonable sinking fund provision for the ultimate discharge of which, the ordinary revenues of the island, after defraying the current expenses of government shall be inadequate."

"III. That the government of Cuba consents that the United States may exercise the right to intervene for the preservation of Cuban independence, the maintenance of a government adequate for the protection of life, property, and individual liberty, and for discharging the obligations with respect to Cuba imposed by the treaty of Paris on the United States, now to be assumed and undertaken by the government of Cuba."

"IV. That all Acts of the United States in Cuba during its military occupancy thereof are ratified and validated, and all lawful rights acquired thereunder shall be maintained and protected."

"V. That the government of Cuba will execute, and as far as necessary extend, the plans already devised or other plans to be mutually agreed upon, for the sanitation of the cities of the island, to the end that a recurrence of epidemic and infectious diseases may be prevented, thereby assuring protection to the people and commerce of Cuba, as well as to the commerce of the southern ports of the United States and the people residing therein."

"VI. That the Isle of Pines shall be omitted from the proposed constitutional boundaries of Cuba, the title thereto being left to future adjustment by treaty."

"VII. That to enable the United States to maintain the independence of Cuba, and to protect the people thereof, as well as for its own defense, the government of Cuba will sell or lease to the United States lands necessary for coaling or naval stations at certain specified points to be agreed upon with the President of the United States."

"VIII. That by way of further assurance the government of Cuba will embody the foregoing provisions in a permanent treaty with the United States." (Platt 1903)