A FINE WRECK IN SHALLOW WATER: INVESTIGATION INTO, AND CONSERVATION OF, A HEAVILY DISTURBED 18TH CENTURY BRITISH WEST INDIAMAN, THE SOLDIER KEY WRECK

by

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ABSTRACT

A FINE WRECK IN SHALLOW WATER: INVESTIGATION INTO, AND CONSERVATION OF, A HEAVILY DISTURBED 18TH CENTURY BRITISH WEST INDIAMAN, THE SOLDIER KEY WRECK

Allen Donald Wilson

In the summer of 2012, a team of archaeologists excavated a known shipwreck site in the submerged bottomlands in north Biscayne National Park. This site had been excavated previously by John Hall, a professor from the University of Miami, in the early 1980s. Hall never produced a report on the excavations and did not curate the artifacts recovered. The purpose of this 2012 research was to document any remaining material culture, determine the best way to preserve the site, and ultimately to use whatever remaining hull structure and portable artifacts were available to determine the nationality, previous ports of call, and potentially the name of the vessel as well as how the ship came to wreck in that location.

The excavation revealed the midships to stern portion of a British West Indiaman that dates to the early to mid 18th century. The sparse artifact assemblage suggests that the vessel was coming from Jamaica en route to England when the ship succumbed to a hurricane. However, a large number of ships wrecked in the region during the time period the Soldier Key Wreck would have sailed. Unfortunately, no name could definitively be ascribed to the ship.

CHAPTER I

INTRODUCTION

"A fine wreck in shallow water" is how W. A. Cockrell described the Soldier Key Wreck (8DA416, BISC-22) during the first professional survey of the site in September 1976 (Cockrell 1976a). Since that time, three archaeology field schools and numerous looters have visited the site. Unfortunately, divers have displaced the ballast from atop the hull, removed many portable artifacts, and left the wreck exposed to storms and shipworms (*Teredo navalis*). None of the divers produced anything more than a field-note site map and some grainy photographs. Since that time, Biscayne National Park has expanded and acquired the submerged bottomlands where the wreck is located from the State of Florida and now manages the Soldier Key Wreck. One of the goals of the National Park Service, in addition to interpretation, is to preserve resources (cultural, among others) for future generations to enjoy. For this reason, the Soldier Key Wreck was to be excavated, mapped, artifacts collected, and the ballast replaced to hopefully preserve the site. National Park Service staff can then use the site map and artifacts for interpretation and for further research, should the need arise.

Sadly, since the Soldier Key Wreck site has endured a great deal of destruction at the hands of looters, the weather, and three underwater archaeological field schools, researchers expected to find few artifacts. Therefore, the extant ship structure was vital to archaeological interpretation of the wreck. Preserving the hull by replacing the ballast removed by looters and earlier excavations, both protects the hull for future research as well as shows the public what a shipwreck looks like in its original state, prior to looting.

Background

Archaeologists with the Florida Bureau of Historic Sites and Properties (now the Bureau of Archaeological Research [BAR], which will be used for consistency) first documented the wreck in 1976 after two local fishermen took them to the site. The fishermen knew about the wreck prior to this time but did not report it until noticing that an unknown person, or persons, had dredged or used prop-wash deflectors to uncover the site. They contacted the BAR in hopes that the BAR could protect the site. The BAR conducted an initial site visit, noted the excellent preservation of the wood, retrieved some artifacts, and estimated the ship to be from the 18th century. They designated the site as "Soldier Key," after the closest land form and assigned it the Florida Master Site File number 8DA416. In 1976, this area was state land, and did not become part of Biscayne National Park until 1985 when the northern and southern boundaries expanded as part of the transition from a National Monument to a National Park beginning in 1980 (Cockrell 1976a, 1976b). The BAR conducted no further work on the site.

In 1982, Doug Biggers relocated the site while wading in the area. He contacted John Hall, an archaeology professor at the University of Miami, as well as James Sanders, the Superintendent of Biscayne National Monument. They put him in contact with George Fischer of the National Park Service's (NPS) Southeast Archeological Center (SEAC). Hall and Fischer each went out to the site with Biggers separately: Hall was interested in using the site for an archaeological field school and Fischer needed to assess the site before it became a resource in the park. Fischer named the site the "Glauber-Biggers" site after the informant and his girlfriend, unaware that the BAR had assessed the wreck previously. He assigned the site the "BISC-22" NPS site number. Shortly after his initial trip, he learned that the BAR had conducted baseline documentation (Cockrell 1982b).

In 1983, following a whole field season of work on the site that was permitted by neither the state nor the NPS, John Hall requested a permit from the state to excavate the wreck with a University of Miami field school. The state issued the permit with a number of restrictions and requirements (Cockrell 1982a, 1982b; Hall 1982, 1983b). The NPS was against allowing the permit, but as the site was not yet on federal land, their protest did not matter (Faust 1983). Excavations took place in 1983 and 1984, in the two summers prior to the site becoming federal property. Hall and his field school removed all of the ballast covering and protecting the site, but generated no documentation to the BAR or NPS and never curated any artifacts. According to John Gifford, a professor at the University of Miami as of the 2012 fieldwork, there is no record of the project at the University of Miami and Hall has since passed away. A collection of artifacts from the wreck was given to Biggers by Hall, or at least that Hall had knowledge of Biggers removing. Biggers donated this collection back to the Park Service in 2012. This collection contains the only known artifacts recovered from the Hall project. The possibility of recovering additional artifacts from the previous investigations is remote; if any are located, they, like the Biggers artifacts, will most likely have no provenience information.

Lacking diagnostic artifacts or reports about any previous excavations, the only source to contextualize this wreck is the remains of the extant wooden hull. Exposed to the elements for nearly 30 years, without the protection of the ballast, the remains of the hull are considerably more degraded than the initial pre-excavation reports suggested. While the nationality of the construction of the ship does not necessarily prove who was operating the vessel, it does help to place the vessel in its temporal context.

Methodology

The field methodology involved staged removal of sand overburden from the shipwreck remains followed by detailed site mapping via trilateration and in situ drawing, extensive photography, and sampling of the shipwreck timbers for species identification. Following the data collection, excavators replaced the sand and ballast stones over the timbers of the remaining structure of the wreck. The total known site area is approximately 25 x 10 m (82.02 x 32.81 ft.) with the long axis of the wreck oriented roughly east to west. Stone ballast was located in two piles on the north and south sides of the shipwreck; both piles were moved off the central portion of the site in the late 1970s or early 1980s, first by looters, and then again during the University of Miami archaeological field schools.

Since its disturbance approximately 30 years ago, several species of sponges and minor coral growth have colonized the ballast; no endangered species are present. At the time of the excavation, sand filled the area between the two ballast piles and the only evidence of the shipwreck's structure was a row of seven iron drift pins protruding out of the sand. The sand covering the timbers was several inches thick and, depending on the tide, is at a maximum depth of 1.22 to 1.82 m (4 to 6 ft.) of water. The area surrounding the site is a shallow .3 to .9 m (1 to 3 ft.) deep and is covered by sea grass. Though the overall extent of the site is approximately 250 m^2 (2,691 $ft.^2$), much of that is ballast that sea grass has inundated and therefore was not moved during the excavation.

Excavation

Since investigators did not yet know how much of the ship's structure remained and the site has been so heavily disturbed that minimal context remains for any artifacts present, researchers divided BISC-22 into 5 m (16.40 ft.) units for excavation and documentation; this

grid served as the site baseline for mapping and photography and was installed using brass pins and string line. Prior to any field work, researchers took photos of the entire site to document the pre-excavation conditions. Excavators utilized a 3 in. (7.62 cm) induction dredge to remove sand overburden from the shipwreck. Workers dredged systematically over the site using the 5 m (16.40 ft.) grid as provenience control. Workers then screened all dredge spoil through a .64 cm (1/4 in.) screen to ensure no archaeological materials were missed. Artifacts were not present in any significant quantity as the site had previously been excavated and had been scoured by at least one major storm. Excavators screened all sediment removed for artifact recovery. The University of West Florida's (UWF) Archaeological Conservation Lab conserved all diagnostic artifacts recovered and they were then transferred to the National Park Service's South Florida Collections Management Center to maintain the collection. Conservators maintained all materials collected in water until conservation was complete.

The shallow depth of the grass flats surrounding the site make the fragile sea grass susceptible to scarring from propellers of careless boaters. This is a constant concern for Biscayne National Park managers. Because of the sensitive environment that BISC-22 is located in, researchers completed dredging of the sand at the site in several stages. Excavators excavated the site one 5 m unit at a time and then deposited the screened dredge spoil atop the ballast piles to protect the surrounding grass. After documenting the wreck, excavators redistributed the screened spoil over the whole site equally with the dredge and then moved ballast stones from their locations on either side of the wreck to their original location above the timbers. By conducting the dredging in stages, there was no need to put any dredge spoil in the sea grass beds surrounding the site. Members of the Biscayne National Park (BISC) Damage and Recovery Program and Cultural Resources staff relocated sponges adhering to the ballast stones prior to

any dredging operations. The only hard corals present on the site are small colonies on individual ballast stones. During excavation, BISC staff moved stones with attached marine life away from the site prior to dredging operations and returned them to the site after replacing all of the ballast lacking marine organisms on the site.

Significance of Research

This project and resulting thesis are significant for two reasons. The first reason is that it is perhaps the only chance to document accurately what remains of this wreck and inventory and assess the condition of the wooden hull. Researchers have conducted only cursory surveys on the site prior to this investigation. Comparing construction features and dimensions of the hull to historical shipbuilding treatises and other shipwrecks and using associated artifacts recovered, I hoped to identify the vessel, or at least to determine the vessel type, destination, nationality, and previous port(s) of call. The second, and most important, reason this project is significant, is that the process of excavation, in addition to exposing the site for mapping, photography, and wood sampling, allows us to evenly bury the remains in the original ballast that had protected the hull prior to the looting and excavation nearly 30 years ago. Using wood samples to determine the level of degradation, the NPS will have baseline preservation data for the wreck and can use this data to manage similar wrecks in Biscayne and the rest of the National Park system. Barring disturbance, this reburial will retard the rate of physical and biological degradation of the site, allowing research in the future, if necessary, and providing educational and interpretive information about maritime cultural resources to visitors of Biscayne National Park.

CHAPTER II:

HISTORY

The Florida Keys have been a dynamic area since prehistory and, despite their small size (both in terms of land mass and resources available), played a disproportionately large role in the Caribbean basin during the colonial and early American periods. Hurricanes, Indians, shallow coral reefs, the Gulf Stream, and the introduction of European merchant and military sailors all resulted in a coastline littered with shipwrecks, and spawned the industry of "wrecking" by Europeans and Indians alike (Viele 2001:3–20). Contemporary writers and reporters recorded many of these wrecks, and salvagers and archaeologists have found a number of them, but many will remain lost forever. The remains of many of the wrecking episodes in the Keys continue to impact the area to this day through heritage tourism. The Soldier Key Wreck is one such wreck.

The Florida Keys act as a "ship trap" in Richard Gould's expanded definition of Throckmorton's term, trapping a disproportionate number of wrecks in their waters (Throckmorton 1964:51–62; Gould 2000:82–90). Several factors combine to produce this effect. The Gulf Stream provides a known northward flow of water in the Atlantic to aid in travelling back to Europe. However, it brings warm water from the tropics with it, creating ideal conditions for hurricanes. Additionally, the waters around the Keys are loaded with coral heads sitting just below the surface, miles out to sea. Finally, the Keys saw ship traffic from many nationalities, making it an ideal area for pirates, privateers, and navies alike to ambush ships.

Culture Meets Nature

Currents and winds have helped mariners make the voyage from the New World back to Europe since the first European expeditions. Navigators and sailors used the currents around Florida to their maximum advantage since Ponce de Léon's 1513 expedition (Swanson 2003:4).

The inclusion of the Gulf Stream on a map occurred as early as 1525 by Ribeiro (Peterson et al. 1996:1). Not a great deal of recording of the Gulf Stream (or "Northeast Current" as it was known prior to 1762) is known to have taken place until 1735 when Walter Haxton, a captain engaged in shipping tobacco from Maryland to England, commented on the western side of the Gulf Stream:

> It is generally known by those who trade to the northern parts of America that the current which comes out of the Gulph of Florida runs constantly along the coast of Carolina and Virginia and considerably further to the Northward, varying its course as it is obstructed by shores. Now if said current always runs nearly in the same part or space of the ocean (as from a great number of Tryals and observations which I have made in 23 voyages to Maryland, I have reason to think it does), the knowledge of its Limits Course and Strength may be very useful to those who have occasion to sail in it. (Lacouture 1995:85)

Not until 1769 did the British government conduct a study of the Gulf Stream at the request of, and undertaken by, Benjamin Franklin. Franklin's position as Postmaster General for the American colonies led him to question why the government mail vessels took up to two weeks longer to cross the Atlantic than merchant vessels. When he posed this question to his first cousin, Timothy Folger, a merchant captain out of Maryland, Folger explained that the government captains most likely did not know about the powerful (2.5-4 mph) current that flowed from west to east. Franklin had Folger chart the Gulf Stream, which he then distributed to British captains until the outbreak of the Revolutionary War (Swanson 2003:86).

While the Gulf Stream was advantageous for transporting goods back to Europe, the warm equatorial waters that the Gulf Stream brought north with it were perfect fuel for hurricanes—the destroyers of many vessels sunk near the Keys. No standard existed for recording or measuring storms in colonial times. However, the National Oceanic and Atmospheric Administration (NOAA) recorded 90 tropical storms or hurricanes between 1859 and 2010 within 65 nautical miles of modern-day Biscayne National Park, near Homestead, Florida, known in colonial times as Cape Florida. Of these, eight have been Category 5 hurricanes, nine have been Category 4 hurricanes, thirteen were Category 3 hurricanes, eight Category 2 hurricanes, and fifteen Category 1 hurricanes, with the remainder being tropical storms or depressions (National Oceanic and Atmospheric Administration 2012). Certainly any of these hurricanes, and a number of the tropical storms, historically could have sunk any vessels unfortunate enough to encounter them.

Another area where nature and culture can be at odds is in the charting and mapping of the land and waterways of a region; this is especially true in the Florida Keys. Poor charts are no doubt responsible for numerous colonial wrecks, though wrecks continue to occur in the Keys in modern times. Historic charts of the Keys are highly variable, ranging from charts that were reasonably accurate, to charts the cartographer produced without having ever been to the location. David Cutler Braddock, a privateer captain and amateur cartographer, produced one notable chart (Braddock 2007:247–265), which contains navigational and descriptive text, but the land is oddly drawn with north oriented on the bottom of the page (Braddock 1756). Another map, produced around 1765, lists Soldier Key and several other islands by name, and provides some navigational and descriptive information, though the cartographer who produced it remains anonymous (Her Majesty's State Paper Office 1765). Thomas Jefferys produced some useful

maps of the entire Caribbean, though he primarily relied on maps drawn by others and simply compiled them himself (Jefferys 1760, 1762).

Mariners familiar with the area were well acquainted with the utility of many of the maps and were the harshest critics of those that were not accurate; obviously, their lives, ships, and fortunes depended on the accuracy of the maps. Bernard Romans, a well-known British cartographer and naturalist, wrote a particularly scathing assessment of a map produced by William Gerrard de Brahm in 1775. In his assessment he wrote:

> But his placing his soundings in his draught deeper by three feet than they really are; and his advising people who intend to go through the Gulph of Florida, to take their departure at the Havannah, and steer due north, in order to make what he calls, Cape Florida, seems as if calculated on purpose to destroy ship, goods and people: happy is it for me that our present navigators know the navigation so well, and for the benefit of trade I hope his pamphlet will never serve as a guide to any man that is a novice, and chances to come this way. (Romans 1775:198)

Indians in the Keys

In addition to the numerous environmental hazards that contributed to the Keys' classification as a ship trap, several cultural hazards played an important role in the wrecking events in the Keys as well. Obviously, Indians were present prior to the arrival of the Europeans. They could be a blessing or a curse for shipwreck survivors, particularly in the 18th century, as alliances between Europeans and Indians evolved. Later, piracy proved to be a real threat for vessels in the area. Wrecking became a profitable endeavor for both Indians and people of

European ancestry as a seemingly endless supply of wrecks carrying diverse cargo occurred in the Keys.

Many different tribes occupied the Keys (Swanson 2003:4). European contact with the Indians was initially hostile. Ponce de Léon skirmished with Indians twice on his initial voyage in 1513 (Swanson 2003:3). The hostilities in the Keys came to an uneasy peace by 1680 between the Indians and the Spaniards once fisherman from Cuba, realizing how productive the waters of the Keys were, entered into an agreement with the Calusa Indians to allow the Cuban fishermen to fish the waters around Florida. The Cubans expanded their fishing activities after Yamassee and Creek slave raids displaced the Calusa between 1704 and 1711. The Creek ultimately pushed south forcing the last native Keys Indians onto Key West where they evacuated to Havana in May 1760. Following this exodus, the Creek occupied the entire Florida peninsula (Viele 1996:4; Worth 2012:4–5).

Numerous accounts describe encounters between shipwrecked European sailors and Indians (Dickinson 1700; Hammon 1760; Charlevoix 1866; Swanson 2003). One of the better known early accounts of a shipwrecked Spaniard is that of Hernando de Escalante Fontaneda, shipwrecked in 1549 at the age of 13 and rescued by the founder of St. Augustine, Pedro Menéndez de Avilés, in 1566. Fontaneda's account of his captivity by the Indians is not especially scathing, though he does recommend that the Spanish take the Indians from the Keys and sell them as slaves on other Caribbean islands (Swanson 2003:65–67). While Fontaneda's experience with the Indians was not terrible, this was not the case with all shipwrecked sailors in the Keys.

The experience of the English, particularly in later years, was often not as agreeable as that of the Spanish. Spain and England, among others, competed for colonial superiority in the

New World. Spanish alliances with the Indians resulted in hardships for shipwrecked English sailors in Florida. Following the intrusion of the English-allied Yamassee from Georgia and the Carolinas into north Florida in the early 18th century, word of English hostility towards Florida Indians spread. This intrusion was met with an equally hostile reaction by the Indians to the discovery of shipwrecked English sailors. In 1696, prior to this invasion, Jonathan Dickinson, a British Quaker merchant, became the victim of a shipwreck north of the Keys, near present-day Jupiter, and was taken prisoner by Indians in that region. Despite being north of the Keys and before active slave raiding by the English, Dickinson's party had to pass themselves off as Spanish in order to ensure their security as they walked to St. Augustine. The first question asked of them was whether they were "Nickaleer" (English) or "Epaina" (Spanish) (Dickinson 1700:5–10).

A 1760 report by a shipwrecked slave named Briton Hammon, working as a crew member on the Massachusetts merchant vessel *Howlet*, demonstrated the continued hostilities toward the English or their colonists. The *Howlet* was "cast away on Cape-Florida" on 15 June 1748. The captain ordered four crew members including Hammon to take a small boat to land after being stuck on the reef for two days. Approximately 60 Indians intercepted them after hoisting the English flag to ease their concerns. The bulk of the Indians went to the sloop and killed three people, including the captain. The Indians took Hammon prisoner, made him think that they were going to burn him alive, and ultimately took him to St. Augustine where he escaped on a Spanish ship after five weeks of captivity, the captain of the ship paying the Indians 10 dollars for him (Hammon 1760:3–8).

The French ship *Adour*, wrecked in the Keys in 1722, was also approached by Indians who immediately asked the crew if they were English and upon hearing they were French, and

allies of the Spanish "seemed much rejoiced at this," wrote Pierre Charlevoix, a French priest aboard the vessel. He further stated, "I know not what quarrel they have had with the English, but we all had great reason to believe that they did not love them." Additionally, he remarked that, "They say, that what keeps the savages here, are the shipwrecks, which are common enough in the channel of the Bahamas, and of which they always make their advantage" (Charlevoix 1866:349). Experiences such as Charlevoix's and Dickinson's drive home how important the Indians were in the wrecking industry, though they were also important to pirates and privateers. There is great ambiguity in defining pirates, privateers, and wreckers in the Florida Keys, often depending on the nationality of those whose ships were wrecked and also the nationality of those salvaging the ships. Indians, however, were pivotal to all of them.

The wrecking of the Spanish treasure ship *Nuestra Senora de las Maravillas* and the subsequent efforts on the part of several nations to recover her treasure best demonstrates the necessity of the Indians to Europeans in the Keys. The *Maravillas* was the *almiranta* of the 1656 Spanish treasure fleet and was lost in a January storm in 33-43 feet of water off the Bahamas. Spanish slave raids had already wiped out the native Bahamian people, making Indians from the Keys a prized commodity for recovering the sunken treasure. Spanish wreckers salvaged the wreck in 1656 and 1657 using Indians from all over the Caribbean, and almost certainly some from the Keys. Spanish, English, French, and Dutch salvagers worked on recovering additional treasure from the wreck between 1667 and 1684, using Indians from Florida almost exclusively. In fact, the Governor of Havana wrote to the King of Spain in 1681 that "A group of these English have set up a permanent camp on the isle of Grand Bahama in order to have a convenient base of operations. From here, they go to fish on the *almiranta* lost on the Mimbres" (Swanson

2003:81). While the Indians sometimes salvaged the wrecks themselves and sometimes worked as slaves to the Europeans, they certainly influenced the wrecking climate in the Keys.

Pirates and Privateers

Privateering began in the Keys as early as 1564-1565 when John Hawkins, an English privateer in search of Spanish treasure, stopped over in the Keys (Hannay 1898:83). Sir Francis Drake also sailed into the Florida Straits seeking Spanish treasure in 1586. Finding no ships and Havana too well defended, Drake traveled up the Gulf Stream to attack St. Augustine. Privateering became a much bigger business in the Keys in the following two centuries when American colonial privateers participated in commerce raiding in King William's War, the War of Spanish Succession, and the War of Jenkins' Ear (Viele 1999:59–60). Following the War of Jenkins' Ear, the French and Indian War (or Seven Years War) and the American Revolution, both relied heavily on privateering to secure naval supremacy (Borneman 2006:172–175; Lanning 2009:220–222). Unfortunately, records are scarce for prizes that wrecked trying to escape the privateers or privateer vessels that wrecked trying to capture prizes.

Piracy was sometimes an offshoot of privateering. Governments no longer granted privateers letters of marque after hostilities ended. However, the former privateers still had the skills, equipment, and need for income that they possessed as privateers—therefore one outcome was to resort to piracy. This privateer-to-pirate transition is seen after the War of Spanish Succession in 1713 when a large number of these unemployed privateers-turned-pirates set up base in the Bahamas and began terrorizing shipping in the Florida Straits. The situation grew dire enough that, in 1716, Captain Musson of Carolina was authorized to hunt them down "about Cape Florida, a station much frequented by pirates" (Swanson 2003:81).

The general nature of merchant sailors at the time was also a great impetus for turning pirate. Many sailors would desert ship for any other captain who would pay him more; so much the better if he could also do less work for more pay. With the necessary greater manning of a pirate ship of the same size compared to a merchant vessel, the work load was lightened for all. Because pirates viewed their profession as one in which all mariners were risk-sharing partners rather than wage laborers, the opportunity to make significantly more money from captured prizes was an attractive draw as well. Finally, some mariners turned pirate simply to avoid hard labor. For example, Pirate Joseph Mansfield said in 1722 that "the love of Drink and a Lazy Life" were "Stronger Motives with him than Gold" (Rediker 1989:107). The near-constant hostilities in the Caribbean, the numerous ambush locations the Keys provided, and the nature of the employment of seamen at the time provided an environment perfect for privateering and piracy.

Colonial Powers in the Caribbean

In the 18th century English, French, Dutch, Danish, Spanish, and, later, American merchants and navies visited or travelled by (and had the potential to become shipwrecked in) the Florida Keys in increasing numbers (Jefferys 1760). The Spanish treasure fleets from the New World assembled in Havana before making the trek back to Spain. This path led them directly along the Keys. Many Spanish ships perished in these waters, the most notable being the 1733 treasure fleet (Marx 1985:86–93; McKinnon 2007:86). England had numerous vessels sailing between Jamaica and the homeland as well. These vessels traveled along the Keys, often taking the "Windward Passage," a passage that would prevent them from becoming becalmed and trapped behind Cuba (Cowley 1739:10). The French and Dutch also had some influence in the Caribbean when France established a presence in the Lesser Antilles and then expanded to

the uninhabited region of Spanish Santo Domingo in the mid 1640s; the Santo Domingo settlement was recognized officially as a French colony by 1697 (Higman 1999:151). The Dutch occupied smaller colonies on St. Christopher, Nevis, Antigua, Montserrat, Anguilla, Barbuda, and Tortola. Most of these were very small, however, offering primarily a foothold in the Caribbean (Higman 1999:137).

The English presence in the Caribbean was not to the scale of the Spanish, though they were rewarded for their persistence in maintaining their colonies in the Caribbean. English concerns included not only the currents, winds, weather, and corals of the coasts, but, in the first half of the 18th century, also the Spanish *guarda costas* (Coast Guard) that intercepted their trade vessels to take them as prizes. This harassment by the Spanish was a particular concern when becalmed on the western side of Jamaica in Cuban waters. For this reason the Windward Passage, around the east side of Jamaica and against the trade winds, was preferred (Cowley 1739:10–11). The English had taken Jamaica from the Spanish in 1655, after a failed attempt to take another Spanish possession, Fort Jerónimo on San Domingo (Hannay 1898:283–290; Bryan 1992:21). Spanish attitudes to the English remained hostile following this conquest.

The hostilities between the Spanish and the English that culminated in the War of Jenkins' Ear were the result of the English exceeding the amount of trading that they were permitted to conduct under the Treaty of Utrecht with the Spanish in the New World (Chapter VI). This illegal trade resulted in the Spanish Coast Guard seizing their vessels. When it came to a head in 1739, England issued letters of marque first and then declared war, and Spain followed suit. This Spanish harassment resulted in English privateers and military occupation in the New World with a notable presence in the Keys (Bolton and Marshall 2005:361–362).

Ultimately, the War of Jenkins' Ear contributed to at least three British Naval vessels, two Spanish prizes, and untold privateering vessels and their prizes, or attempted prizes, being lost in the Keys. For example, the HMS *Looe* and a Spanish prize in tow were lost in the Keys on 4 February 1743 (Skowronek and Fischer 2009:11–12). In a similar set of circumstances, the HMS *Fowey* and her Spanish prize in tow, *St. Judea,* were lost on the reefs north of the *Looe* on 28 June 1748 (Skowronek and Fischer 2009:5–7). The HMS *Tyger* was lost in 1742, as was the Spanish galleon *Fuerte*, which foundered when it tried to capture the British sailors aboard the *Tyger* (Marx 1985:93–94). The Keys, while not directly involved in colonial warfare, suffered several losses of both military and merchant vessels as a result of European hostilities in the Caribbean.

Known Colonial Wrecks in the Upper Florida Keys

Hundreds of wrecks that date from the colonial period are known to be in the waters surrounding the Keys, although only a handful has been discovered. Records for these wrecks are highly variable based on the nationality of the vessel, the vessel's activity (and the legality of that activity), and selectivity in the historical record. Spanish records are more numerous, contain more detail, and in general offer a more complete picture of Spanish interests and experiences in the Caribbean basin. British military records became on par with Spanish records in the 18th century. Insurance records and publications such as *Lloyd's List* and *Gentleman's Magazine* regularly listed the loss of individual ships. These publications generally list activities of a vessel, not just wrecks or losses. Destinations, ports of origin, and vessels traveling with each vessel are often listed as well; however, some entire years (1742, 1743, 1745, 1746, 1754, 1756, 1759, and 1778 from *Lloyd's List*) are missing from the digital records and several more years are incomplete (*The Gentleman's Magazine* 1731; Lloyd's of London 1969:preface).

In addition to the ships wrecked during the War of Jenkins' Ear and those listed as associated with survivors of wrecking events, numerous merchant wrecks occurred in the Florida Keys. Many will never be identified due to a lack of surviving documentation, among various other reasons. An example of one such wreck is the Boca Chica Channel Wreck. The National Park Service, along with the Naval Historical Center Underwater Archaeology Branch, could only determine that vessel most likely sank between 1779 and 1790 and was probably of Spanish origin (Neyland and Voulgaris 2003:102–105). Another similar vessel known to exist, though with little additional information, is the English China Wreck. Though numerous artifacts have been recovered, researchers have yet to identify the vessel conclusively (Charles F. Lawson 2012, pers. comm.; Munro 2012).

Finally there are the well-known wrecks from the 1733 Plate Fleet that have, unfortunately, contributed greatly to the modern treasure hunting mentality of the Florida Keys. Wrecking during a hurricane, this fleet contributed an additional 13 wrecks in the Keys (Division of Historical Resources 2005). The Keys are littered with wrecks from the Dry Tortugas to Key Biscayne and many are known to have perished based on historical sources.

The 18th century was a transitional period wherein advances in cartography, increased knowledge of ocean currents, weather hazards, and knowledge of local waters should have reduced the number of ships wrecked in the Keys. The increase in colonial shipping and carryover of European hostilities, however, ensured a steady supply of wrecks for wreckers and Indians to exploit. Florida changed hands from the Spanish to the British and back to the Spanish shortly before becoming an American territory in the early 19th century. Indians allied to European powers controlled most of the land and endured their own power struggles; ultimately the presence of Europeans forced them out of their native lands or exterminated them outright.

The early 19th century saw many more changes in the Keys. After Florida became a territory of the United States in 1821, changes came rapidly (Blank 1996:23). In an effort to reduce the number of wrecks in the Keys, the United States began building lighthouses, beginning with the Cape Florida lighthouse in 1825 (Dean 1998:33). The Key West lighthouse, at the opposite end of the Keys, was built the following year (Dean 1998:49). Nine additional lighthouses were constructed throughout the Keys in the 19th century up until 1886 (Dean 1998). Despite the additional lighthouses, ships continued, and still continue, to run aground in the shallow waters and hidden reefs.

The wealth of archaeological and historical sources of wrecks in the Keys (despite the loss of a large number of these documents) bears witness to the Florida Keys' role as a ship trap. The fact that there are numerous recorded archaeological sites and active treasure hunters in the Keys today confirms this fact. The weather, Gulf Stream, and mass of European colonial shipping, and later American exploits, led to this extraordinary archaeological laboratory.

The History of the Soldier Key Wreck and Previous Investigations

One of the numerous unidentified wrecks in the Florida Keys is the Soldier Key Wreck, a wooden vessel located in the northern Keys between its namesake, Soldier Key, and Key Biscayne. Located in clear shallow water in an area with high boat traffic, the wreck has endured a number of disturbances, both cultural and natural, since its modern discovery.

Two local fishermen, Kenny Bittner and Dave Vadder, discovered the site in August of 1976. They claim to have dug small holes on it, but did not expose the site fully. They took some unknown artifacts to Dr. John Hall at the University of Miami for identification. Roughly three weeks later they visited the site and noticed that another unknown party had dug very large holes on it, likely with prop wash, which exposed the wreck down to its timbers. At this point they

contacted the State of Florida's Bureau of Historic Sites and Properties, who sent a team out to investigate the site, led by W. A. "Sonny" Cockrell on 3 September 1976.

Cockrell's team noted that the wreck consisted of an exposed keel, decking, and planking, the outer hull planking was coated with a tar and felt compound. Cockrell added that the wreck looked very similar to the *San José*, a 328-ton ship built in 1728 in New England that sank in 1733 after being purchased for use in the famed Spanish treasure fleet (Cockrell 1976b; Division of Historical Resources 2005). He recorded two fragments of black bottle glass, one of which had a round bottom base, several encrusted objects, and numerous nail casts, some of which appeared to be hollow and potentially made of copper. They collected around 20 encrusted objects, several pieces of pottery, and porcelain. The BAR team located no cannon, anchors, or other large objects. Cockrell noted that all materials he saw on the vessel appeared to be from the 18th century and described the site as "a fine wreck in shallow water, hopefully being protected by Florida Marine Patrol and Rangers at Cape Florida Light" (Cockrell 1976a).

Bittner and Vadder were adamant that they had not disclosed the location to anyone and that the unknown party must have found the site by chance, or likely by using remote sensing (magnetometer). Cockrell noted a spoil pile to one side of the wreck, indicating that the looters had used an induction dredge to expose the site (Cockrell 1976b). Cockrell (1976a) assigned the site the State Master Site File number 8DA416, recommended the site be studied further, and noted that the site would require additional protection and patrols from the Florida Marine Patrol.

Information concerning the vessel spread rapidly through local circles. Before the end of the year in 1976, Carl Frederick, with the Archaeological Society of the Museum of Science in Miami, sought information about the wreck from the BAR. Cockrell (1976c) responded that their primary concern was the preservation of the site. In order to maintain this protection, Cockrell

reacted proactively, requesting assistance from the Florida Marine Patrol in both Miami and Marathon (Cockrell 1977a, 1977b) as well as seeking assistance directly from the Director of the Division of Law Enforcement, Department of Natural Resources (Cockrell 1977c).

Cockrell's efforts appear to not have been an overreaction: by the end of 1977, Ross Morrell, Acting Director, Division of Archives, History, and Records Management (now the Division of Historical Resources), received a five-page letter from Robert McKay (1977) requesting permission to excavate the Soldier Key Wreck in cooperation with the Archaeological Society of the Museum of Science, Miami. McKay also criticized the State's involvement in all aspects of site preservation, efforts to limit treasure hunting, and the State's aversion to including finds from treasure hunters in their museums. McKay included two articles from treasure hunting journals in a misguided effort to sway the State.

McKay's connection with the Archaeological Society of the Museum of Science, Miami, was questionable and the Society did not authorize him to use their name in an effort to excavate the Soldier Key Wreck. Irving R. Eyster, President of the Archaeological Society of the Museum of Science, Miami, upon becoming aware that McKay had used the Society's name in an attempt to sway the State, wrote letters to Bruce Smathers, the Secretary of State (Eyster 1978a), and to Senator Robert Williams, Executive Director, Division of Archives, History, and Records Management (Eyster 1978b) disavowing McKay's affiliation with the Society and affirming that McKay's desires to excavate the wreck were not the same as the Society's. Robert McKay was already well-known to Cockrell and, in a letter to Morrell, Cockrell noted numerous disagreements between himself and McKay in the past and, in particular reference to the letter McKay wrote to Morrell, "I can only say that I think any reasonable person reading his letter to

you of December 10, 1977 can do nothing but conclude the man (McKay) is a fool" (Cockrell 1978).

The Soldier Key Wreck does not appear again in the State's files until 15 April 1982, when Cockrell mentions in a tape transcription that another individual, Doug Biggers, had requested information on the wreck (Cockrell 1982a). A telephone log from the BAR Underwater Archaeological Research Section from the same day as the tape transcription lists a call from Biggers about the wreck and also mentions that George Fischer, of the National Park Service, had been on the wreck (Underwater Archaeological Research Section, Bureau of Archaeological Research 1982). At this point, ownership and stewardship of the wreck becomes somewhat confusing, with the site ultimately bearing the brunt.

In a tape transcription dated 15 days later (30 April 1982) Cockrell records the results of his conversation with George Fischer. Biggers apparently referred Fischer to the site and had first been on the site earlier in the month. Cockrell remarked that his initial investigation yielded early-18th-century-type bottle bases and stoneware of the same period. Fischer also noted that the wreck had no space between the frames, which he said was typical of British architecture of this period, and that the site looked very similar to the *San José* (Cockrell 1982b).

Fischer also mentioned that responsibility for the site was questionable. According to Cockrell (1982b), Fischer "suggested that the superintendant of Biscayne could keep track of it if it was in Federal management, but that the problem between turning this over to the Feds is that the State has delayed it because the upland associated areas haven't yet been incorporated into this area." George Fischer also noted that some charts listed the area around the wreck site as already under National Park Service jurisdiction, but that the extension had not yet formally taken place (Cockrell 1982b).

The issue with the stewardship of the site and submerged bottomlands stems from the expansion of the Park from a National Monument. Originally a National Monument when it was established in 1968, the Monument was expanded in 1974, and yet again to its current size when it was converted into a National Park in 1980 (National Park Service 1980). However, even though Congress had authorized expansion of Park boundaries and acquisition of the land, submerged and terrestrial, the State of Florida did not cede the land that the site sits on to the Park Service until 1985 (Miller 2005). Consequently, neither the State nor the Park Service knew for sure who was in charge of the site, though the State ultimately seems to have taken the lead. All of the activity at the wreck site took place in that brief, five-year window during which the area's ownership was questionable, and during the time the BAR had their hands full with the legal battle with Mel Fisher over the *Nuestra Señora de Atocha* (US 1982), while the Park Service was engaged in a legal battle over the HMS *Fowey* (US 1985).

Excavation

On 18 June 1982, John Hall, Department of Anthropology, University of Miami, contacted Cockrell about obtaining an antiquities permit to excavate the Soldier Key Wreck site for the purpose of conducting an archaeological field school. Hall claimed "weekenders" were constantly disturbing the site (which they almost certainly were) and that the best course of action would be to allow him to excavate the site. Cockrell (1982c) stated that the state did not want to destroy the site for teaching purposes alone, but that if looters were destroying the site anyway, then he would be interested in giving Hall an antiquities permit as long as he met certain criteria.

Had Hall followed the criteria set forth by Cockrell, the site would have yielded significantly more information. While Hall wanted to simply extract the artifacts from the site,

Cockrell insisted that he would also have to attend to the hull structure. Both the artifacts and structure were to be preserved and the site report published; if Hall guaranteed that these criteria were met, Cockrell would have no qualms with issuing the permit. Cockrell (1982c) noted that "He (Hall) would be delighted to do this," though that appears to have not been the case. Still favoring preservation of the site over excavation, Cockrell expressed concern over the transfer of land from the State to Biscayne National Monument and the need for increased Marine Patrol protection until that transfer could be completed (Cockrell 1982c).

On 2 July 1982, a team from the BAR along with Hall and Biggers made a second site visit to see if any further degradation of the site had occurred since their initial visit, as well as to discuss with Hall his plans for the site. Hall had evidently already had his Marine Archaeology class map the site and the ship's structure. The BAR team ascertained that Biggers had located the site, and in the interest of protecting the site contacted Dr. Hall. Biggers and Hall, with Hall being the principal investigator, were interested in conducting a field school on the site. Prior to any work taking place, however, Biggers's attorney advised him to file an admiralty claim to protect the site, though in a subsequent conversation the BAR team learned that Biggers had drawn up the admiralty claim papers but had not filed them (Clayton and Dunbar 1982).

The mapping noted by the BAR team was conducted by a field school that Hall already had underway. Without any permitting from the BAR or Park Service, and without notifying either agency, Hall took it upon himself to work on the Soldier Key Wreck site and to conduct a field school (Hall 1982). This undertaking did not sit well with the State or the Park Service. Larry Murphy, Chief of the Submerged Cultural Resources Unit (SCRU) of the National Park Service, contacted Cockrell about a Park Service archaeologist, Ron Ice, who had recently returned from a trip to the Keys and brought back with him a brochure advertising Hall's field

school. Cockrell noted that he specifically told Hall that he needed an antiquities permit, which he did not currently possess (Cockrell 1982d).

Hall confessed to undertaking this illegal work with the abstract he submitted to present at the Florida Academy of Sciences annual conference on 8 April 1983:

> Preliminary Investigation of Glauber Biggers BISC-UW 22
> Site, a mid-Eighteenth Century Shipwreck in Biscayne Bay. JOHN E.
> HALL, Department of Anthropology, University of Miami, Coral Gables
> 33124.
>
> Following the accidental discovery in April, 1982, of a portion (c. 15 meters) of a larger hull, burned to the water line and submerged in shallow (2 meters at high tide) water near Soldier Key in Biscayne Bay, an underwater survey was undertaken to determine the approximate date, nationality, and possible historical significance of the vessel. Unusually well preserved ship's timbers, conglomerate containing various iron materials, nails, glass, slate, ballast stones of three types, and bricks were analyzed and tentatively dated (Hall 1983a).

Following the 1982 field season, Hall contacted the BAR, in an attempt to secure an antiquities permit. Hall said that he was pulling out of his deal with Doug Biggers (though the terms of the "deal" were unspecified) (Dunbar 1982). BAR archaeologist James Dunbar (1982) noted that Hall mentioned that John Gifford, a student of George Bass at Texas A&M, was joining the anthropology department at the University of Miami, and that both he and Gifford were interested in getting a permit and continuing to excavate the site the following summer. Gifford, however, was not a student of George Bass at Texas A&M. Hall also wanted to show the BAR the site (possibly to show that the site was still being impacted by vandals) and, of

particular importance, he wanted to "cover it over until they can get a permit. Too many vandals" (Dunbar 1982). Why Hall mentioned that Gifford was a student of Bass, or if there was just some error in communication between Dunbar and Hall, remains a mystery.

The National Park Service was also keeping tabs on what was happening to the wreck. In addition to sharing with the BAR the information about Hall's presentation at the Florida Academy of Sciences annual meeting (Fischer 1983), a memorandum dated 14 April 1983 to the Superintendant of Biscayne National Park from Richard Faust, Chief of the Southeast Archeological Center (SEAC), about Hall's activities again mentions that he did not have a permit for research. Faust also remarks that Hall used the National Park Service designation, BISC-UW-22, in reference to the wreck and therefore must have obtained his information from Doug Biggers. He also states that his understanding is that the NPS does not yet control the bottomlands in this area, and therefore there is no reason for the Park Service to take action against Hall. He does, however, recommend writing a letter to the University of Miami and having them consult with the Park Service before doing any additional work on the site (Faust 1983).

Despite Hall's previous illegal activities, he submitted a formal request for a research permit to L. Ross Morrell, Director of the Florida Division of Archives, History, and Records Management, on 26 April 1983. Hall's request states that the purpose of the research is to allow Hall and his students to map the site and remove "small items from the bilge area, after their locations in situ are recorded." As part of his field school, Hall would require each student to write a research paper on some aspect of the shipwreck (ship construction, biological analysis, historical background, etc.) and that those papers would form the basis for Hall's own

publication on the wreck; selected papers would be eligible for presentation at the Florida Academy of Science annual meeting in April 1984.

Hall pleaded his case by saying that the wreck was in very real danger of being destroyed by vandals or weather, though it was especially susceptible to vandalism. He also pointed out the strong "scouring action and tide rip" that he seemed to suggest could further erode the site. Hall noted specifically that he did not desire to bring any wood up, as there was a possibility of getting funding in the future to bring up significant portions of the hull structure for a museum display. Perhaps the most appreciable section of the permit application is Hall's discussion about covering the site: Hall states that after consulting with unspecified experts in shallow water biology and ecology from the Rosenstiel School of Marine and Atmospheric Science (RSMAS), University of Miami, recovering the site "would not be desirable, as the original anaerobic condition surrounding some of the wreck material could not be duplicated, and deterioration would proceed at an accelerated rate." The request was signed by both Hall and Peter O. Muller, Chairman, Department of Anthropology, University of Miami (Hall 1983b).

L. Ross Morrell (1983) responded to Peter O. Mueller directly about Hall's request to excavate the Soldier Key site. In his response, Morrell specified 21 conditions that Hall, and the University, would have to meet in order to get the State's approval to excavate the site (Appendix A). If the Department of Anthropology agreed to the conditions specified by the State, and sent Morrell written confirmation that they agreed to the terms, then the State would allow Hall and the Department of Anthropology to proceed with their work on the wreck. Hall apparently undertook the project, but the 1983 field season was not long enough to complete the tasks he wanted to accomplish or those mandated by the State. Hall asked for, and was granted, an extension to continue work into the 1984 field season (Morrell 1983).

The Aftermath

Hall never produced a report on the site to either the State or the Park Service. Sometime between the end of his fieldwork in 1984 and the inquiry from James Adams in 1998 (described below), Hall passed away. Whether or not he conserved the artifacts remains a mystery; he never turned them over to the State or Park Service. Subsequent attempts by earlier cultural resource managers, and later by Charles Lawson, to retrieve any information about the excavation from the University of Miami have generally been dismissed, including a 1998 letter from Otis B. Brown, Dean, RSMAS, University of Miami, to James Adams, Cultural Resource Manager, Biscayne National Park, that specifically denied that RSMAS had anything to do with the excavations and that to his knowledge there were no issues between the school and the State (Brown 1998). All Hall ever produced, as best this research can determine, were some sketches of the site on notebook paper, likely the mapping the BAR was referring to that Hall conducted in 1982, prior to obtaining an antiquities permit.

Despite Hall's mention of Gifford's involvement with the excavation, Gifford did not work directly on the site and did not approve of the work that Hall performed. Gifford (1998) stated that Hall "undertook this project with insufficient methodological knowledge of how to excavate a shipwreck, and failed to seek advice and consulting from more knowledgeable persons, including myself." Gifford noted that artifacts Hall obtained from the 1983 excavation did make it into Hall's lab, but that there is no record of what happened to them after that. He stressed, however, that these were his personal beliefs and not those of RSMAS or the University of Miami. Gifford has attempted to track down the artifacts and any additional knowledge about the project, to no avail (Charles Lawson 2012, pers. comm.).

Once the State officially transferring the submerged bottomlands in the area surrounding the Soldier Key Wreck to the NPS, they added the site to their inventory. As a Park Service archaeological site, the Soldier Key Wreck was subject to site assessments by National Park Service cultural resource personnel. As part of these assessments, long-time Biscayne National Park volunteer Terry Helmers sketched the site in 1988. This sketch is the last visual record of the site prior to Hurricane Andrew in 1992.

Prior to the work that he directed in 2012, Charles Lawson contacted Doug Biggers, still an avid sport diver in the area, about the wreck. Biggers provided Lawson with not only photographs of some of the work done in the 1980s, but even some artifacts he said came from the site. Lawson accepted the artifacts and photographs. There is no evidence in the photographs that Hall was involved with the site during the time any of the photographs were taken.

While Hall appears to be the chief culprit in the disturbance of the site and the removal of diagnostic artifacts, he is not alone to blame. Efforts to retrieve the artifacts collected on the surface by the BAR have turned up nothing. The BAR provided what written documentation they possessed, including artifact inventory records of the artifacts they retrieved, but no actual artifacts. The SEAC artifacts from George Fischer's initial collection have been located, but are minimal. Sadly, despite three years of fieldwork by Hall and visits from archaeologists from both the BAR and Park Service, the only maps drawn of the site are not-to-scale sketches, and the only artifacts recovered are from a private citizen working with Hall and a few sherds from SEAC. The few artifacts from Hall's work have no provenience and may or may not actually be from this particular wreck. Hall left the wreck itself completely exposed to the elements.

Because of the abuse this site has received, this site is, unfortunately, a prime candidate for implementing proven in situ conservation methods and documenting the damage the site has

suffered from weather events, divers and snorkelers, and general degradation after being uncovered for 30 years. Both of my research goals, the conservation of the site as well as researching the time period of operation, size, purpose, and what type of vessel the Soldier Key Wreck is, assist in meeting the National Parks Service's management and inventory obligations for their cultural resources. Ultimately, this excavation will hopefully give Biscayne National Park the data necessary to manage the site properly, as well as provide some interpretive data, if only to Park personnel and researchers.

CHAPTER III

METHODOLOGY

Prior to any fieldwork, the crew conducted an extensive literature review of the area in an effort to find potential identities for the wreck. The team looked over what little Hall had produced as well as the documents obtained from the NPS and the BAR. Still, the crew had very little information about what was present during the initial excavation, and had no way to know exactly what was left of the site. There was very little expectation of finding any significant quantity of artifacts. The crew, however, excavated the site with the same care that an undisturbed wreck would receive, albeit with significantly different methods. The exact methods used on this excavation and subsequent reburial efforts are detailed in this chapter.

Crew

The crew on this project consisted of the Park Archeologist, Charles Lawson, and two Archeological Technicians working at Biscayne National Park over the summer as members of the Biscayne National Park cultural resource team. Members of the National Park Service's Submerged Resources Center (SRC) joined the Biscayne team for a month. The director of the African Slave Wrecks Project, and Associate Professor of Anthropology at George Washington University, Stephen Lubkemann, brought along several students/members of his group, and a three-member dive team from the NPS Southeastern Archeological Center (SEAC) also joined the crew specifically for the excavation.

Project Logistics

Due to the location of the site in the far northern expanse of the Park, Charles Lawson secured the Baldwin, Sessions, and Shaw House from the Stiltsville Trust to house the crew. Stiltsville is a series of houses built on the water on stilts, hence the name. The "neighborhood"

is located on the northernmost extent of the Park. The large number of crew, the threat of summer storms quickly arising, as well as the expense of fuel and safety of the crew made this location preferable to traveling to the site from the Convoy Point headquarters every day, a trip that would take between 45 minutes to two hours each way depending on the boat used. The Stiltsville location was only about a 10 minute boat ride to the site each day (Figure 1).

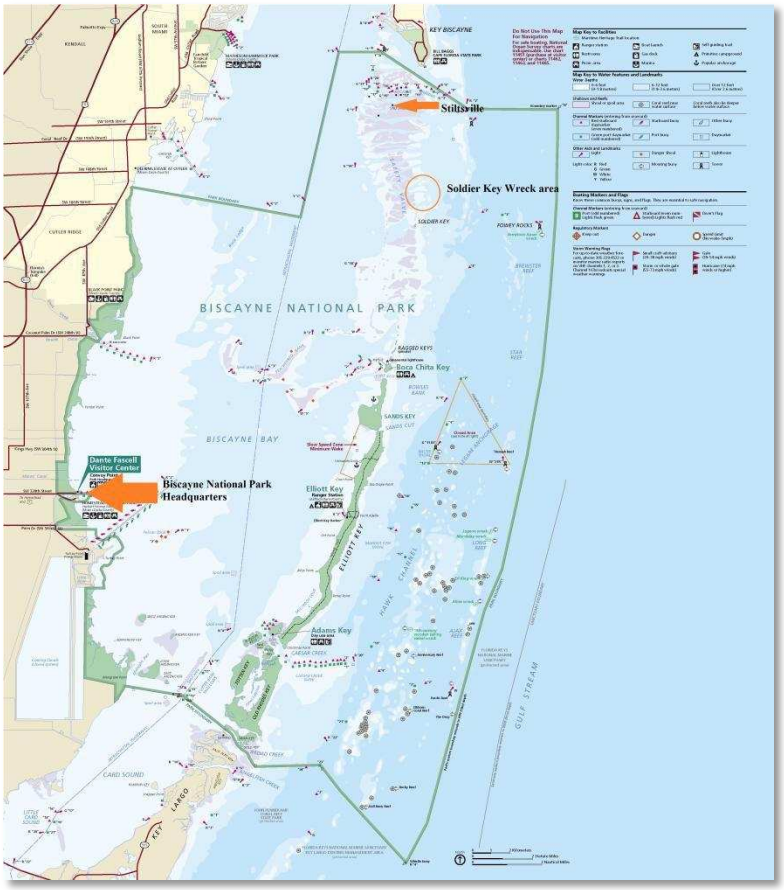


FIGURE 1. Park headquarters, Stiltsville, and the general location of the Soldier Key Wreck (Courtesy of the National Park Service, 2009.)

Despite the shallow nature of the site, the crew used scuba gear daily. Because the crew did not schedule regular trips back to the headquarters, where the air compressor was located, and to avoid depriving other departments at the Park of necessary scuba tanks as well as the logistical issues associated with transporting numerous scuba tanks, the SRC allowed the team to

use their portable, gasoline-powered air compressor designed for filling tanks in remote locations for the duration of the project.

The infrequent trips back to the Convoy Point headquarters also meant that the team had to bring sufficient supplies to draft the site plan and enough copies of the necessary paperwork to adequately document the wreck. Pin flags, mylar sheets to draw and record measurements, and drafting supplies were all key to the project. Potable water for bathing and drinking and fuel to run the generators necessary to power the house also had to be transported to the site and replenished roughly every three days.

Remote Sensing and Visual Survey

Prior to excavation, the Biscayne National Park cultural resource team secured the assistance of Humberto Guarin of Bert Instruments, Inc. to perform a sub-bottom sonar survey of the site. Because of the extensive sea grass coverage, the team did not expect to uncover the remains of the hull entirely. Consequently, a sub-bottom survey could potentially reveal the true extents of the site and locate debris associated with the wreck of which archaeologists were not previously aware.

Guarin used a proprietary sub-bottom sensor for the project and warned the team that the equipment was heavily affected by the presence of sea grass—exactly the area the crew needed to survey. Because of the shallow nature of the site and the heavy sensor, or "fish," required to survey the area, the boat that Guarin used could not access all areas that the crew wanted to survey. Because of the limitations from the equipment, the search pattern was rather inconsistent.

Humberto Guarin never produced a report on the survey to the Park and repeated attempts to contact him have been unsuccessful. The website listed for his business, bertinst.com,

is no longer operational at this writing. The survey likely produced little to no additional data and for that reason Guarin discarded it.

The Biscayne National Park team also performed a snorkeler/pedestrian survey of the grass flats around the site prior to any excavation in an effort to locate additional hull structure and to identify any possible cannons or anchors that individuals may have missed in the past or that may now be uncovered. This survey located a very small ballast scatter in the shallow flats 41.51 m (136.19 ft.) to the west of the baseline "0" datum location. The crew found no other materials associated with the wreck during the survey.

The shallow water also prevented a towed magnetometer or side scan sonar survey of the site. However, divers used a hand-held metal detector (a JW Fischer Pulse 8X Professional Underwater Metal Detector) during the excavation in an effort to locate any metal items buried under the sea grass. The only buried metal located during the survey was a hit along the keel immediately to the west of the site, consistent with a drift pin that the team could not uncover because of the sea grass. The pin was associated with a floor that was partially exposed to the north. There were no hits to the north, south, or east of the exposed portion of the site.

Ecological Concerns

Because of the Park Service's mission to preserve all aspects of National Parks for the future, the Park Archeologist consulted biologists prior to any fieldwork. After a site tour the biologists determined that no endangered species were present, though NPS personnel should relocate the corals and sponges that adhered to the ballast stones before the team displaced the ballast. The natural resource team at Biscayne National Park carried out that work in June 2012. In addition to the corals and sponges, the archaeological team had to be careful of the lobsters

and brittle stars that make their home in the ballast, as well as the occasional Bahama Starfish in the surrounding grass flats.

The most pressing biological concern was ensuring that the excavation disturbed the sea grass surrounding the site as little as possible. Aside from avoiding the grass when moving ballast, care had to be taken in operating and anchoring the boats daily, and researchers tried to avoid impacting sea grass while accessing the site in full scuba gear with heavy tools and equipment. The larger Boston Whaler boats used to transport the crew anchored in slightly deeper water to the east and the crew swam or waded to the site from there. The Carolina Skiff, on the other hand, had to anchor close enough to the site to permit the dredge induction hose length to reach the wreck to facilitate dredging. Because of the planned length of the project, Park volunteer Terry Helmers, along with Archeological Technicians from the Park, placed two large anchors on the south side of the excavation area, one each to the east and west of the site, so that the skiff would not have to deploy its own anchors every day, further damaging the sea grass. By placing two anchors, the crew could anchor the skiff from the bow and the stern and it could then remain stationary regardless of the tidal flow.

Laying Out the Site

A survey of the site showed seven iron drift pins protruding from the sand, running roughly southeast to northwest, and ballast piles on both the north and south sides of the drift pins and the surrounding sand basin (Figure 2). Grass flats covered the surrounding area and were not disturbed. Archaeologists did not disturb ballast displaced by earlier events that sea grass had colonized, either. Consequently, the grass and the extent of preservation of the hull determined the excavation boundaries.

Archaeologists laid out a single baseline over the site roughly parallel to the exposed drift pins. Copper pins provided by the NPS anchored the baseline at each end and served as the datums for geo-referencing the site. The baseline was elevated roughly .5 m (1.64ft.) above the site. The baseline consisted of a nylon string stretched taught with a fiberglass metric tape reel zip-tied to the nylon line to reference the locations of artifacts and features, delineate the excavation units, and serve as known points from which the team could trilaterate the site. At every two meters the crew placed a line "cookie," a circular piece of plastic that attached to the line via tension often used by technical divers, which they would then use as a known reference point in taking measurements. The overall length of the baseline was 20 m (65.62 ft.). The 0 meter end of the baseline and datum was to the western end (toward land) and the 20 meter end and datum was to the east (seaward).

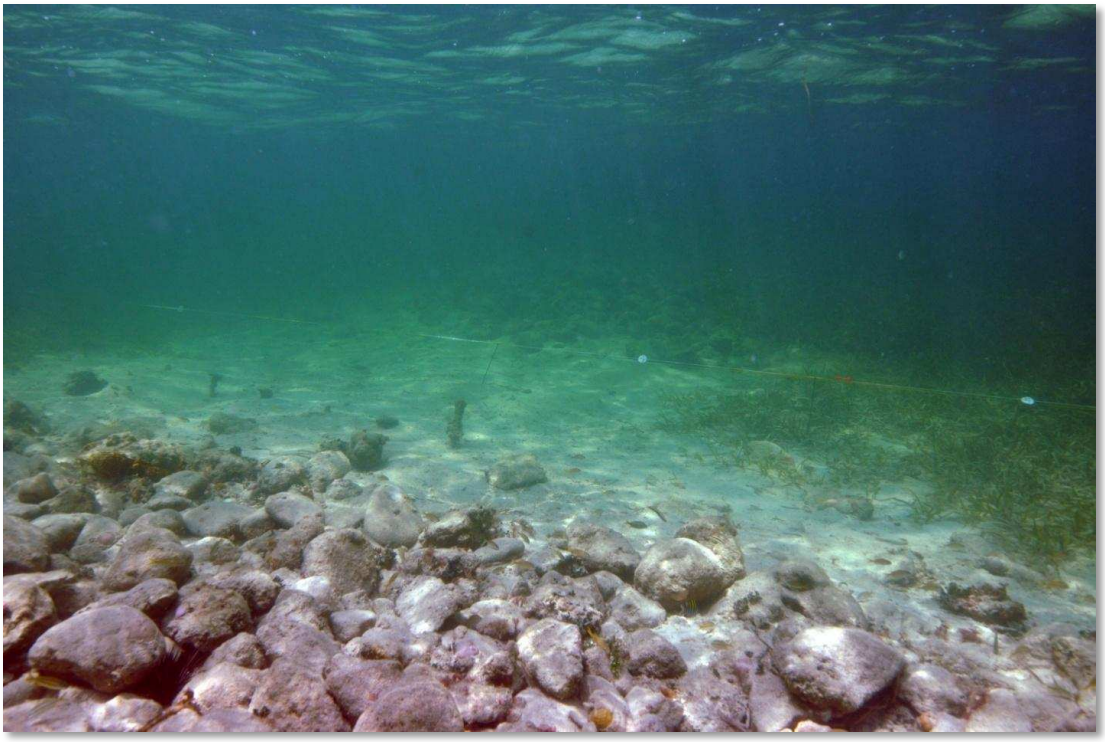


FIGURE 2. The site showing the exposed drift pins, the baseline, shallow depth, and the ballast piles. (Courtesy of the National Park Service, 2012.)

At every 5 meters along the baseline, as well as at each end, the team laid a line perpendicular to the baseline to delineate the excavation units. As a result, the site had five bright yellow nylon lines running perpendicular to the baseline at the 0, 5, 10, 15, and 20 meter marks. The team anchored these lines at each end with large steel nails that they removed after excavation was complete. These lines were elevated above the site at levels determined by their anchoring points. In an effort to disturb the site as little as possible, the team chose to anchor the lines in the grass at each end, where they were less likely to contact any hull structure of the site and would only minimally affect the grass. The team removed these lines after they completed excavation of each area to facilitate easier and more accurate trilateration measurements. The divers took great care to not disturb the baseline at any point.

Excavation

Dredging the site began on the westernmost (0 meter) end and continued in 5 meter excavation units. Since few artifacts likely remained in situ due to past disturbance by divers and weather, larger units allowed more rapid recording and photography of the hull, while minimizing the amount of time timbers were exposed. Because the site lacked provenience due to extensive disturbance and the researchers had no idea what remained on the site, they made no specification about from which side (north or south) of the baseline the dredge spoil and resulting artifacts came, though the bulk of the structure remained on the north side of the site.

Dredging was accomplished using a Keene Engineering 3 in. (7.62 cm) water induction dredge powered by a Honda 6.5 horsepower pump. Mesh nylon bags collected the dredge spoil from the site while allowing the sand, silt, and small shell and coral fragments to flow through and remain on site. This collected sand was important as the team intended to use the sand removed from the site to assist in the reburial of the wreck. The pump remained on the Carolina

Skiff anchored to the south of the site and the exhaust end of the pump was located on the south ballast pile to keep the sand pile from killing the surrounding grass, and so that the ballast would trap as much sand as possible and prevent the tidal flow from removing it from the site entirely.

As the bags filled up, the crew moved them to the Carolina Skiff where crewmembers not actively engaged in dredging, mapping, or dive safety procedures sorted through them for artifacts. If the crew member dredging encountered in situ artifacts or features, the crew member would stop dredging and the artifact or feature was piece plotted, photographed, and collected before dredging continued.

Artifact Recovery and Cataloging

The crew on the skiff carefully sorted through the shell and coral that collected in the dredge bag looking for artifacts (Figure 3). The workers on the skiff screened the dredge spoil through ¼ in. (.635 cm) screen. However, allspice seeds and other small artifacts could still fit through the screen, so workers manually sifted through the spoil after screening to look for any artifacts that may have slipped through the screen. As the crew encountered artifacts, they recorded them in a field specimen (F.S.) catalog. The team collected the shell and coral, as well as any sand that happened to remain in the dredge bag in a large Rubbermaid container on the skiff to be redeposited back on the site, again in an effort to use as much material from the site in the reburial process.

Team members grouped artifacts for processing in the field based on their provenience (artifacts collected from the 0-5 meter unit were assigned the bulk designation of Field Specimen 1 regardless of composition, those from the 5-10 meter unit were assigned Field Specimen 2, etc.). Recovered artifacts were separated further in the lab following the field work based on their material (ferrous items from the 0-5 meter unit were designated field specimen 1.01, etc.).

The team stored all artifacts in five-gallon buckets with sea water until they could transport the material back to the Convoy Point headquarters lab.

Following conservation and processing at the University of West Florida Archaeology Conservation Lab, the South Florida Collection Management Center, which oversees and houses the archaeological collections from Biscayne National Park as well as Big Cypress National Preserve, De Soto National Memorial, Dry Tortugas National Park, and Everglades National Park, assigned artifact numbers and curated the artifacts.

FIGURE 3. Researchers sorting through dredge spoil for artifacts. (Courtesy of the National Park Service, 2012.)

Sampling

Archaeologists took samples from the ceiling planking, hull planking, keel, a floor, and the sacrificial hull planking for wood species identification. They also collected a sample of the tar and hair used between the sacrificial hull sheathing and the outer hull sheathing, as well as a collection of the various stones used as ballast on the vessel. The collection listed these samples in the same field sample format as the artifacts, with the exception that those requiring further testing (the wood samples and the tar and hair sample) were designated as destructive samples and were not expected to be returned to the Park Service.

Of the three features the crew found, two were collected as samples. Feature 1 (Figure 4) was an ash lens and Feature 3 (Figure 5) was a burned conglomerate in the bilge. Both features appeared to be untouched by Hall. Divers removed bulk samples from the features, trying to collect as much as possible. Crew members assigned the samples field specimen numbers and kept the samples submerged until they could analyze the substances in the lab.

FIGURE 4. Feature 1, ash lens. (Courtesy of the National Park Service, 2012.)

FIGURE 5. Feature 3, burned conglomerate. (Courtesy of the National Park Service, 2012.)

Because Feature 1 was primarily ash, with some visible allspice mixed in as well, researchers decided the best way to extract artifacts from the feature was to utilize a float tank to separate any lighter organic matter (such as the allspice seeds) from the heavier sand, shell, coral, and rock also in the bilge. Lauren Walls, flotation specialist at the University of West Florida, separated the sample using a 189.27 L (50 gallon), one-way flow, flotation tank. Mesh screen of 1.8mm (0.070 in.) lined the heavy fraction basket, and 0.5mm (0.0196 in.) geological sieve caught the light fraction. An agitator fixture agitated the sample from above and below, using a hose split from the main water supply. Following separation of the heavy and light fraction, workers screened both samples for artifacts. Workers cataloged the artifacts yielded from the

float sample in the field sample catalog along with the others. Lab workers saved the light fraction as an artifact in the event any future testing is desired by the Park Service.

Mapping

The crew mapped the site using tilateration: using the line "cookies" placed on the baseline, the crew took two measurements, one each from two separate "cookies" to numbered pin flags placed at areas researchers deemed key to the site, including the edge of the hull, ends of individual timbers, fasteners, and any other diagnostic areas (Figure 6). The pin flags remained on the site until the crew completed all of the mapping. Then, using those known distances, the crew created a scale drawing of the site.

FIGURE 6. Baseline, "cookies," and pin flags used in trilateration. (Courtesy of the National Park Service, 2012.)

The crew laid out the 1:10 scale drawing on a table at the Baldwin, Sessions, and Shaw House on a large piece of mylar. They first laid out the baseline to scale, put a scale on the bottom of the site plan and then, using compasses, plotted in the points they had triangulated earlier in the day. The crew repeated this process every night to check for errors before the next day until they had mapped in all of the points accurately.

Once the crew mapped in all of the points, divers created scale drawings of each unit of the site. They transferred those scale drawings to the 1:10 scale mylar site plan at night. In addition to completing the site plan, the scale drawings served as a check on the trilateration measurements. The crew resolved any discrepancies the following day.

Photography

In addition to the Nikon D90 12.3 megapixel SLR camera in an Aquatica housing used by all of the team members for candid working shots as well as diagnostic shots of the hull or artifacts, the crew was fortunate to have a dedicated photographer. Susanna Pershern, an underwater photographer with the National Park Service's Submerged Resources Center (SRC), had no archaeological responsibilities on the project other than to shoot photographs and video of the excavation and to process the photos and video. She took all of her still photographs and video with a Nikon D3S 12.1 megapixel SLR camera in an Aquatica waterproof housing with Ikelite strobes providing the flash.

Charles Lawson and Biscayne Archaeological Technicians photographed the site prior to any disturbance or excavation. The plan initially was to take a series of photographs of the site - before excavation, once the extant hull had been exposed, and finally after the team reburied the hull in the protective ballast stones and sand - which would be used to form a series of photo mosaics. However, the shallow depth of the site, even at high tide, prohibited the team taking the

number of photos needed to make accurate before and after photo mosaics. Fortunately, after much work, two photo mosaics of the exposed site were ultimately constructed: one by Charles Lawson and one by Susanna Pershern. Archeologist Andres Alberto checked the accuracy of the photo mosaics against the scale site plan the crew created with favorable results (Figure 7 and Figure 8).

FIGURE 7. Photomosaic of the site after excavation. (Courtesy of the National Park Service, 2012.)

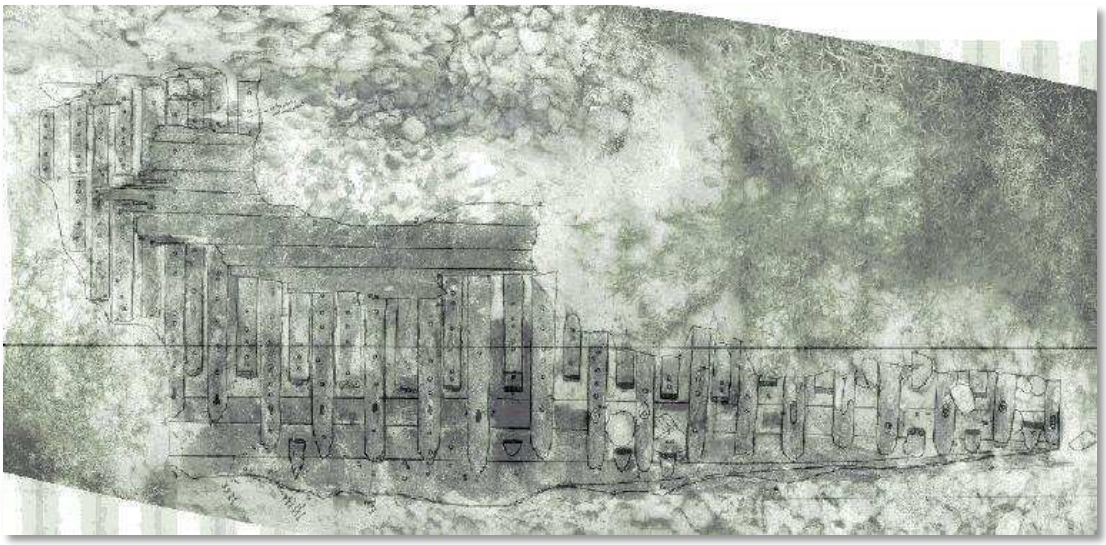


FIGURE 8. Overlay of the site plan drawn at Stiltsville over the photomosaic from the SRC. (Courtesy of the National Park Service, 2012.)

Throughout the field work, the team took candid photographs of all aspects of the excavation; the layout, dredging, mapping, searching for artifacts on the skiff, and the reburial were all photographed. The crew took additional photographs of diagnostic ship construction elements encountered during excavation, in situ artifacts, and features. Team members took these photographs with a photo scale and north arrow.

Recovery

After fully documenting what remained of the site not covered by sea grass, the crew reburied the wreckage with the ballast stones and sand from the site. Divers removed all evidence of the excavation (pins, pin flags, string, and anything else that may have inadvertently been deposited on the site by the crew) with the exception of the two copper pins that anchored the baseline at each end. Divers left them to serve as datums for any future work and to georeference the site. Since reburial, stabilization, and conservation of the site were the main goals of the project, Chapter VII covers, in detail, the reburial process.

Conclusion of Fieldwork

With such a large crew of skilled workers, the shallow depth of the site, the large excavation units, the excellent visibility, the close proximity to the site, and having the ballast already removed from the hull, the crew easily accomplished the fieldwork portion of the project within the two-week time frame allotted. Following the egress from the Baldwin, Sessions, and Shaw House, the Biscayne team cataloged and desalinated the artifacts, digitized field notes and drawings, and performed maintenance on all of the equipment. The other teams continued other projects in other Parks. The results of the field work, the artifacts discovered, and analysis of the hull are discussed in the following chapter.

CHAPTER IV

RESULTS

The extensive (though brief) fieldwork performed yielded a great deal of data both during excavation as well as in the lab. Despite previous work conducted by Hall and others on the site, and the condition in which they left the site, a substantial portion of the hull and more artifacts than the team expected remained on the site. Sadly, due to provenience issues created by previous work and numerous storm events during which the site was uncovered, researchers can answer few questions about the vessel's crew anthropologically. Still, despite these issues, research on all aspects of the material recovered and recorded has yielded a surprising amount of data that can contextualize the vessel's previous port of call, likely destination, and purpose. Historical records supplement the sparse material record to give a good idea of how vessels of this time period and purpose operated, how the crew lived, the difficulties faced by the captain and crew, and what was happening in the area and in Europe at the time that influenced these factors.

Ship Remains

As the primary purpose of this project was the conservation of the site, excavators were unable to expose any of the exterior of the hull during the project for fear that the exposed outer hull would create scour areas. This lack of data from the exterior of the hull is unfortunate as many dimensions and construction features, such as fastener patterns on the sacrificial sheathing, the true dimensions of the keel, and the articulation of the garboard strakes with the keel, remain unknown. However, researchers did take extensive measurements and notes on construction features of the interior of the hull (Figure 9). Some construction features listed in the few field notes from Hall's work that the 2012 crew did not observe are considered as well.

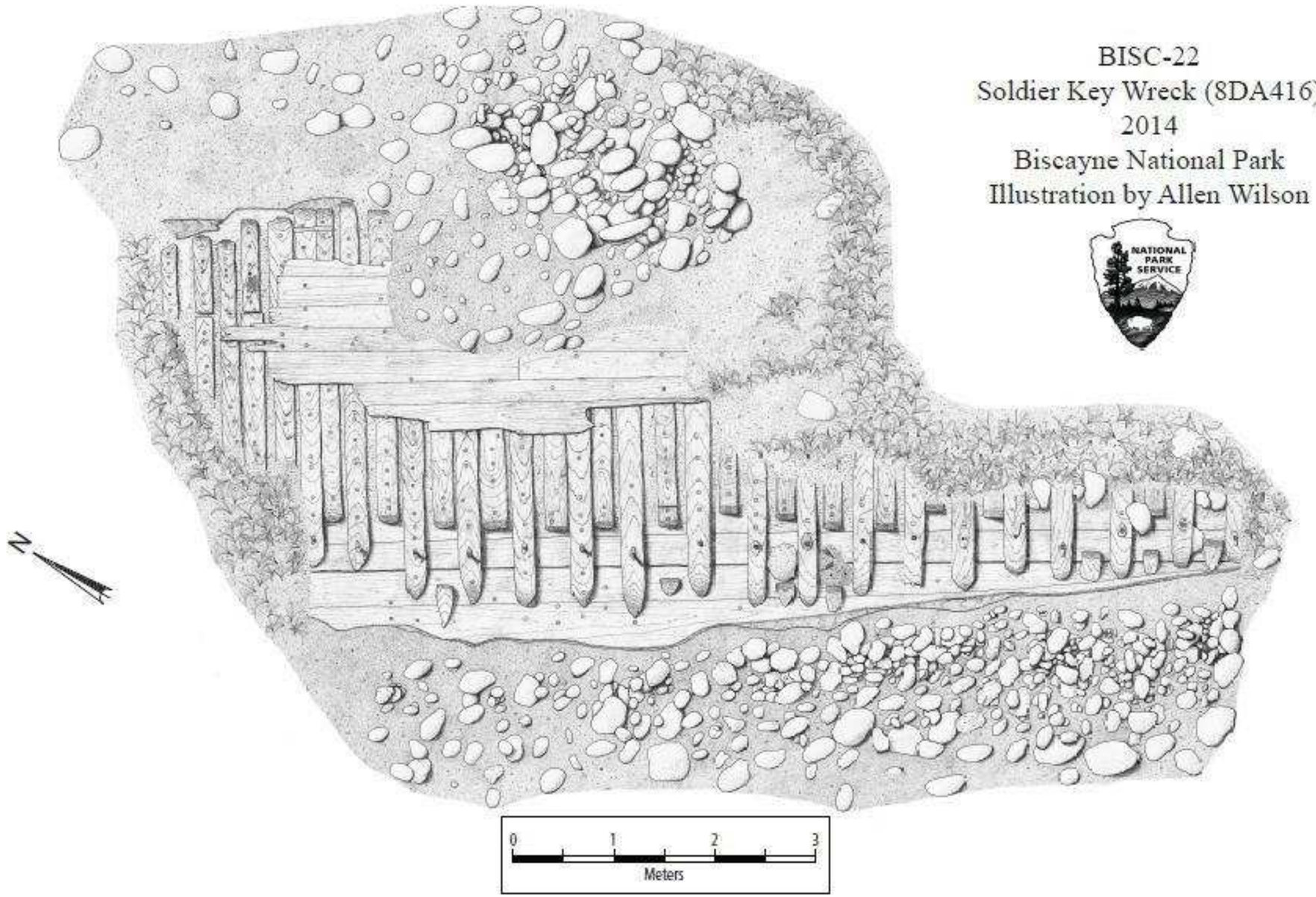


FIGURE 9. Soldier Key Wreck site plan as seen in 2012. (Illustration by author, 2014.)

During excavation, researchers exposed 13m (42.65 ft.) of articulated hull remains. On the southern end of the site, divers exposed an 11m (36.09 ft.) long keel made of a single piece of white oak (*Quercus alba*) (Amy Mitchell-Cook 2012, elec. comm.) with no visible scarfs, along with the remains of the port side of the vessel. The sided dimension of the keel tapered slightly from 31 cm (12.20 in.) on the western (bow) end to 29 cm (11.42 in.) on the eastern (stern) end. Unable to expose any more of the keel, the molded dimension is unknown. Hall's notes, however, include a small drawing (Figure 10) that suggests the keel is composed of two timbers of equal size, 10 x 10 in. (25.4 x 25.4 cm) laminated on top of one another. This arrangement would be unusual and would give the vessel a full 20 inch (50.8 cm) thick keel. While a thinner keel "shoe" was common to protect the keel from groundings, this combination of timbers to form the molded dimension of the keel is uncommon. This lamination could not be verified by the 2012 fieldwork. We also found no section of keel that is as narrow as Hall's notes indicate (10 in. [25.4 cm]).

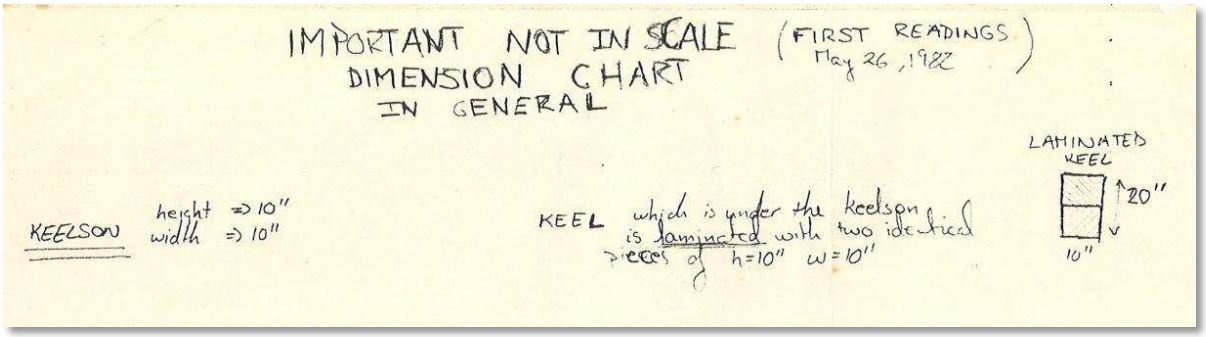


FIGURE 10. Hall's notes and sketch regarding the possible laminated keel. (Courtesy of the National Park Service, 2012.)

The northern end of the site consists of the rear starboard side of the vessel with 19 first futtocks attached. Attached to the keel, divers found 20 floor timbers. Divers were able to expose where 18 of the floors were affixed to the keel with large iron drift pins, though the keelson is now missing. Researchers numbered the floors and futtocks sequentially as they were found,

starting on the westernmost extent (0-5 m unit). Since sampling every floor and futtock would have been far too destructive, divers took a single sample of floor number 7, which Dr. Amy Mitchell-Cook (2012, pers. comm.) identified as white oak. The color and texture of all of the floors and futtocks were similar and all appear to be from the same type of wood. With the widespread use of white oak in the rest of the vessel (excepting the sheathing), the shipwright likely fashioned all the floors and futtocks from white oak as well.

The floors are articulated at the keel with space measuring from 31-34 cm (12.20-13.39 in.) with the average being 32 cm (12.60 in.). At the point of attachment to the keel a shallow (4 cm [1.57 in.]) notch was cut out to accept the keel as it sits proud of the garboard strakes. On either side of the shallow notch is a triangular cut out that, when the floor is placed over the keel, forms a triangular limber hole on either side of the keel (Figure 11). The scantlings for the floors and futtocks were sometimes indeterminate, as sea grass or excess sand obscured the dimensions. Researchers did, however, measure all scantlings they could access. The sided dimensions of the floors vary from 17.2 cm (6.77 in.) to 22.9 cm (9.02 in.) with the average being 19.77 cm (7.78 in.). Consequently, the average room and space for the floors is 51.77 cm (20.38 in.). The molded dimensions are much more variable as the true original dimension was often eroded away, particularly right above the keel, which was the most consistently accessible location from which to measure the timbers. Still, the molded measurements vary from 28.3 cm (11.14 in.) to 42 cm (16.54 in) with the average of those measureable being 35.09 cm (13.81 in.).

FIGURE 11. Detail of the floor timber limber holes. (Courtesy of the National Park Service, 2012.)

The first futtocks on the starboard (northern) side of the vessel were reasonably well preserved down into the bilge of the vessel. On the port (southern) side of the vessel, seven very badly eroded nubs of wood existed as proof of the port futtocks. The measurable futtocks' sided measurements varied from 17 cm (6.69 in.) to 20.4 cm (8.03 in.) with the average being 18.69 cm (7.35 in.). While most of the futtocks were reasonably well preserved, some suffered erosion similar to the floors and due to that erosion the molded dimensions vary from 17.5 cm (6.89 in.) to 38 cm (14.96 in.) with the average being 26.88 cm (10.58 in.). All of the first futtocks, at their proximal, terminal end in the bilge, were cut at an angle to accommodate top "fillets"—wedge-shaped timbers that would bring the futtocks level with the floors where they met the ceiling planking or limber boards. The use of fillets was a way for the shipwright to economize: he could

use smaller compass timbers and build the dimensions up using the fillets (VanHorn 2004:92,102,106,184,185). Only a few small, badly eroded pieces of wood that once comprised the fillets are still present. Photos exist, however, from Biggers that show a fillet that was loose, or more likely, forcibly removed from the Soldier Key Wreck (Figure 12). This particular construction feature is worth mentioning as the fillets on the Soldier Key Wreck did not appear to have saved much wood at all (they are only around .5 m [19.68 in.] long, and at their thickest end are around 10 cm [3.93 in.]). They may have just become a standard construction feature of whichever shipyard built the vessel. The use of fillets occurs almost exclusively on British shipwrecks (VanHorn 2004:188).

FIGURE 12. Fillet from 1980s from the Soldier Key Wreck. (Courtesy of the National Park Service, 2012.)

The spacing for the futtocks was inconsistent with only a single definitive mold frame evident (floor number 3 and futtock number 4). Divers uncovered a single transverse wooden fastener that attaches these two timbers (Figure 13). While the proximity of the futtocks and floors varied, and no other transverse fasteners were observed, floor number 8 and futtock number 8 also appear to be paired. This arrangement suggests that every fifth pair of timbers represents a mold frame. Interestingly, in the definitive mold frame, the frame is attached aft of the floor. In the pairing of floor and futtock number 8, the futtock was attached forward of the floor. This construction feature often marked the midships of a vessel and has been seen in ship construction from the earliest ships of Spanish exploration in 1559 (Smith et al. 1999:32–34) to the 1814 wreck of the *Nancy* (Sabick 2004:93).

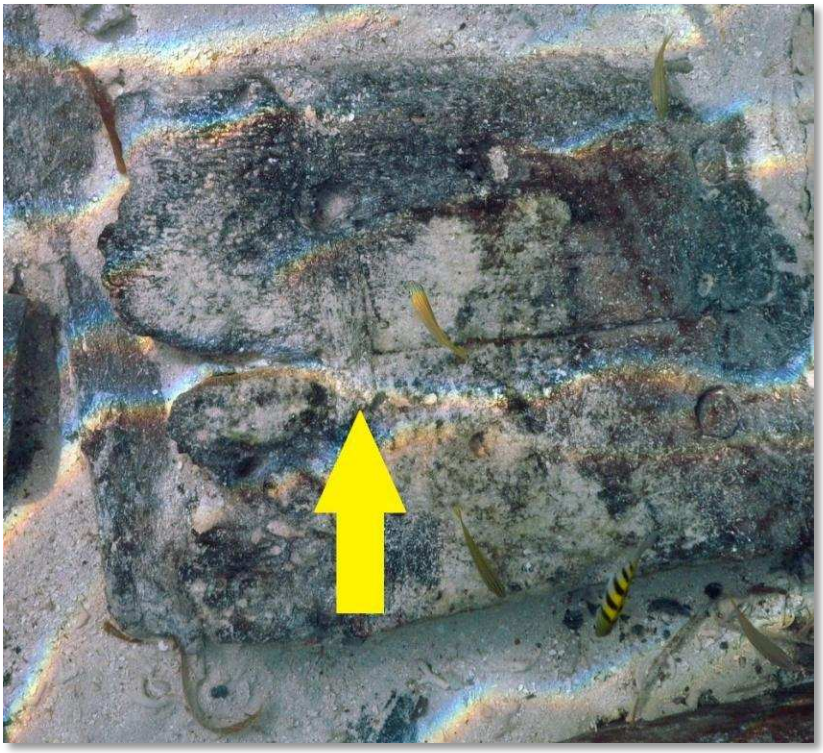


FIGURE 13. Mold frame (floor number 3 and futtock number 4) transverse attachment. (Courtesy of the National Park Service, 2012.)

The 2012 fieldwork exposed portions of ceiling planking that ranged from 35 to 40 cm (13.78-15.94 in.) wide. The shipwright appears to have used the exact same planking for both the outer hull planking and the ceiling planking as they are all 4.4 cm (1.73 in.) thick and also constructed of white oak (Amy Mitchell-Cook 2012, pers. comm.). The 2012 project exposed the remains of sacrificial sheathing constructed of a resinous soft wood, likely red pine (*Pinus resinosa*) or scots pine (*Pinus sylvestris*) (Amy Mitchell-Cook 2012, pers. comm.). Because the crew could not expose the outside of the hull, the width of the sacrificial sheathing is unknown. The thickness of the sheathing planks was 2 cm (.79 in.). A thin layer of tar and animal hair was placed between the sacrificial sheathing and the outer hull sheathing.

Aside from iron drift pins that attached the floors to the keel, all of the extant components of the vessel were fastened entirely with 3.18 cm (1.25 in.) diameter octagonal wooden treenails. Many, like the rest of the exposed wood, were badly eroded. Several treenails collected from the site, however, exhibit pegged ends (Figure 14). Whether all of the treenails were pegged is unclear (many treenails are missing and the tight pegs in the end grain of wood are difficult to discern underwater), or perhaps only one side, interior or exterior, was pegged. Pegged ends were not always necessary and show a greater degree of care and a greater investment of time in the construction of the vessel (McCarthy 2005:68).

FIGURE 14. BISC 621. A pegged treenail recovered from the Soldier Key Wreck. (Courtesy of the National Park Service, 2012.)

Researchers noted three unusual construction characteristics during the 2012 fieldwork. The number 2 second futtock still had visible saw marks on the proximal end where the first futtock terminated (Figure 15). Two other interesting construction features occur right next to one another; whether the characteristics are related and whether or not they serve any purpose is unknown. On the proximal end of first futtock number 10 is a shallow saw kerf cross-cutting the timber approximately 20 cm (7.87 in.) from the terminal end of the futtock. At the terminal end, in the bilge, a very thin treenail protrudes at a right angle through the garboard strake (Figure 16). The saw kerf was likely the result of the shipwright changing his mind on the final length of that particular futtock. The purpose of the treenail is unknown, though it may have been to plug a hole from a knot or some other hole in the garboard strake. The possibility also exists that the

treenail, the kerf, or the combination of the two, marked or secured something related to the construction of the vessel or the rigging.

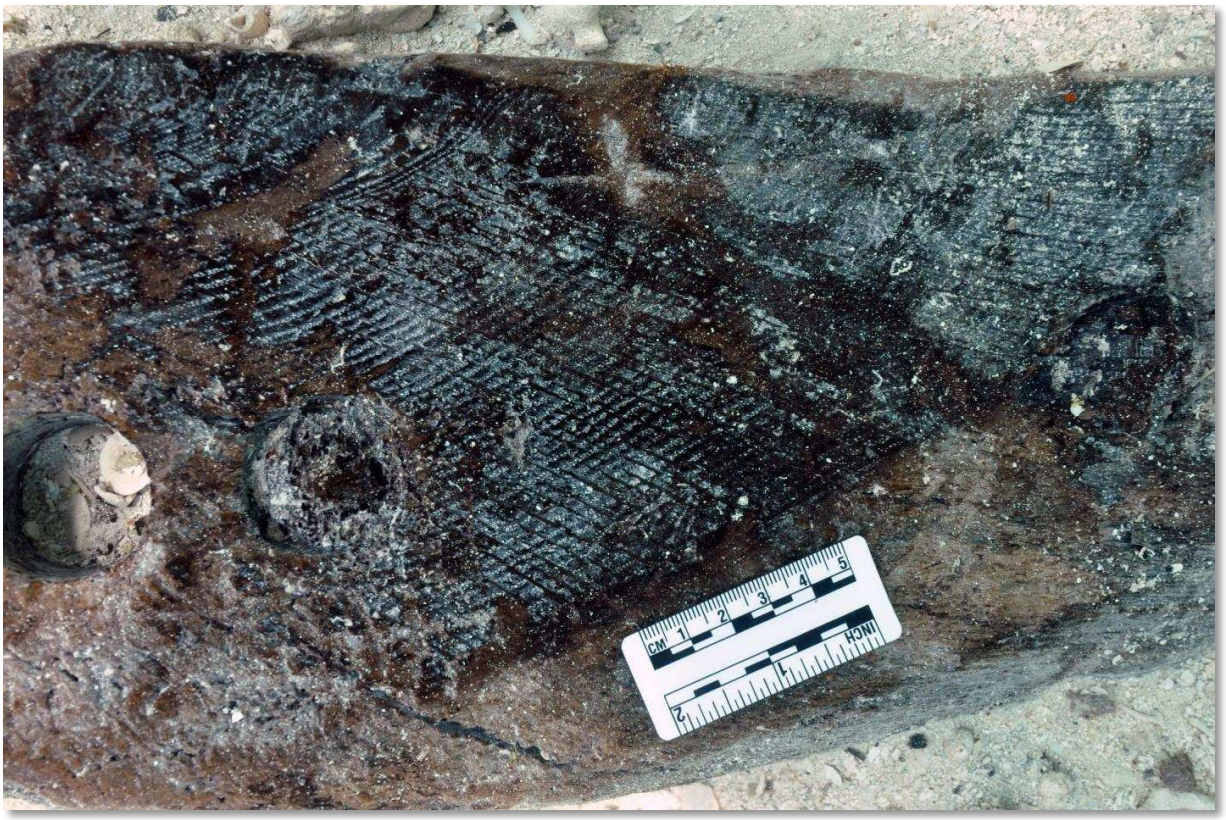


FIGURE 15. Saw marks on the proximal end of second futtock number two. (Courtesy of the National Park Service, 2012.)

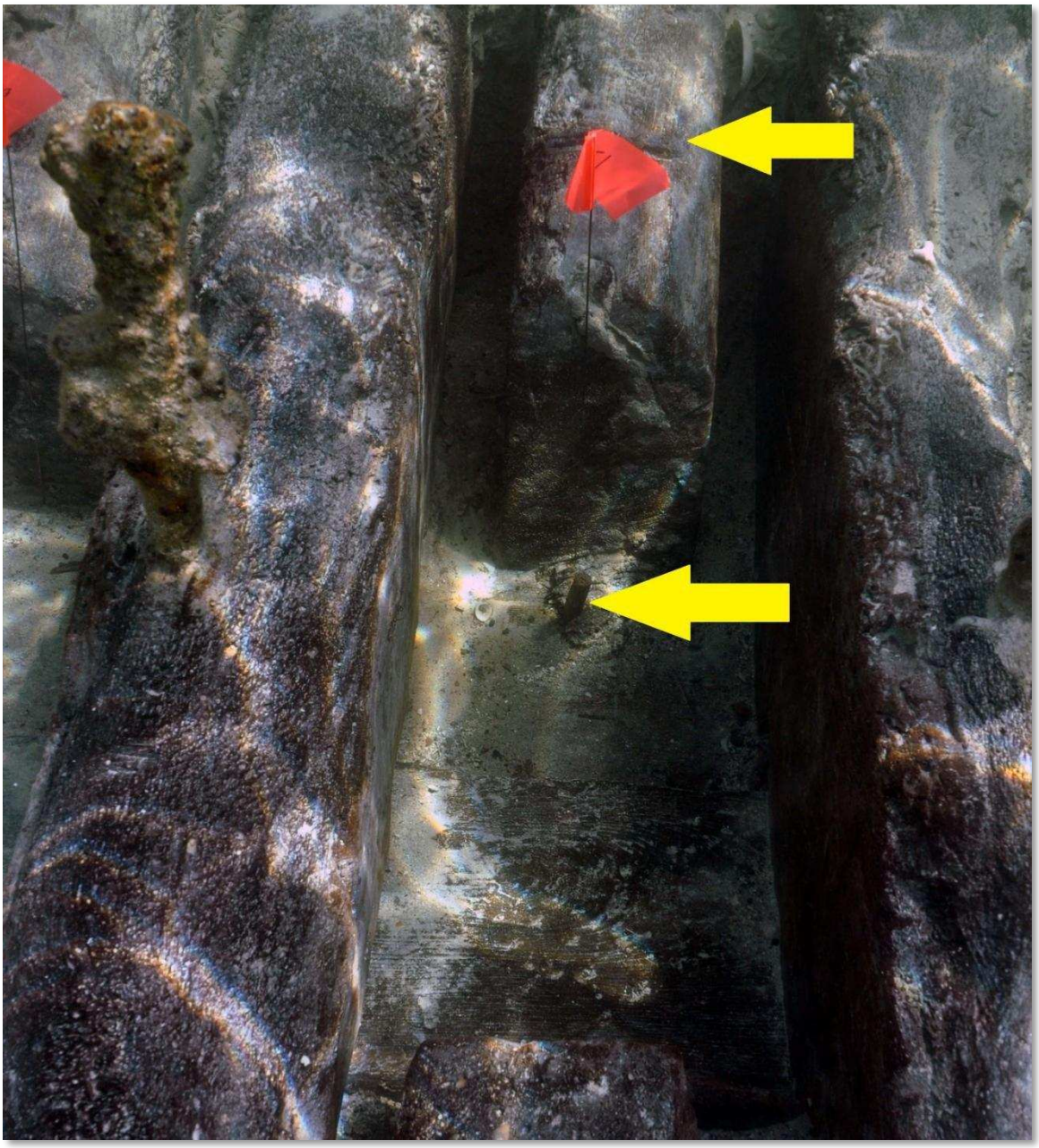


FIGURE 16. Detail of the saw kerf on floor number 10 and the small treenail in the starboard (north) garboard strake. (Courtesy of the National Park Service, 2012.)

While efforts were made to locate the stern in 2012, the area where the stern should have been produced no positive returns during the metal detector survey. A probe survey of the area was inconclusive due to the large amount of ballast. The area was too heavily vegetated to attempt to expose. However, earlier photographs from sport divers in the 1980s, who may or may

not have been involved in the looting of the vessel, clearly show the stern of the vessel in what appears to be various levels of articulation. The stern appears to be built heavily, lacked cant frames in its construction, and may have had at least one gudgeon in place when photographed (Figure 17). Comparing photographs from Biggers and those given to park volunteer Terry Helmers by an unknown source after he presented a talk to sport divers about the resources in the Park, researchers can track the aforementioned disarticulation of the stern section. In the photos recovered from Biggers, the stern is intact and articulated with the rest of the wreck (Figure 18). In the subsequent donated photographs, the stern is listing hard to port, the opposite side to which the rest of the vessel is listing (Figure 19). Whether this damage was anthropogenic, related to storm events, or more likely the result of both, is unknown, as is what happened to the stern.

FIGURE 17. Soldier Key Wreck stern with probable gudgeon. (Courtesy of the National Park Service, 2012.)

FIGURE 18. Photograph from the Biggers collection showing the articulated stern. (Courtesy of the National Park Service, 2012.)

FIGURE 19. Soldier Key Wreck stern listing to port. (Courtesy of the National Park Service, 2012.)

Mast Step and Keelson

While not present during the 2012 excavation, Biggers' photos and notes provide evidence of a large saddle mast step (Figures 20 and 21) and a significant length of keelson, though the keelson did not run the length of the vessel, having eroded or been broken off aft of the mast step but prior to the stern. There was no indication of where the mast step had been during the 2012 fieldwork; fortunately, however, photographs and the little bit of information from Hall's work provide an idea of where the keelson extended and, consequently, where the mast step was located.

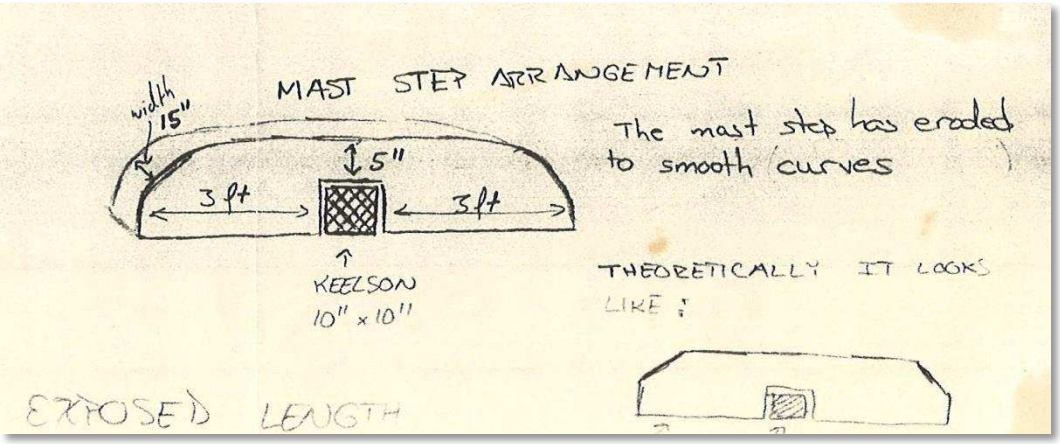


FIGURE 20. Hall's 1980s drawing and notes on the mast step. (Courtesy of the National Park Service, 2012.)

FIGURE 21. 1980s photograph of the mast step from the Soldier Key Wreck. (Courtesy of the National Park Service, 2012.)

During the 2012 excavation, excavators encountered a large piece of ballast wedged between floors number 11 and number 12. Divers left this stone in place in the hull as it was

heavy, wedged in rather tightly, and removing it likely would have damaged the wreck. The aft floor that framed the large ballast stone, floor number 12, had another unique feature. Around the drift pin that would have attached the keelson to the keel and secured the floors between the two timbers, was a dead coral colony. While some other drift pins and floors had small living corals affixed to them, this was the only drift pin/floor that possessed this particular trait (Figure 22). Auspiciously, some of the photographs donated to the Park Service by the anonymous diver show all three of these features, the coral colony, the large ballast stone, and the terminal end of the keelson, in a single photograph. Consequently, researchers can determine where the keel that used to be present extended, and therefore can deduce where the mast step was located (Figure 23).

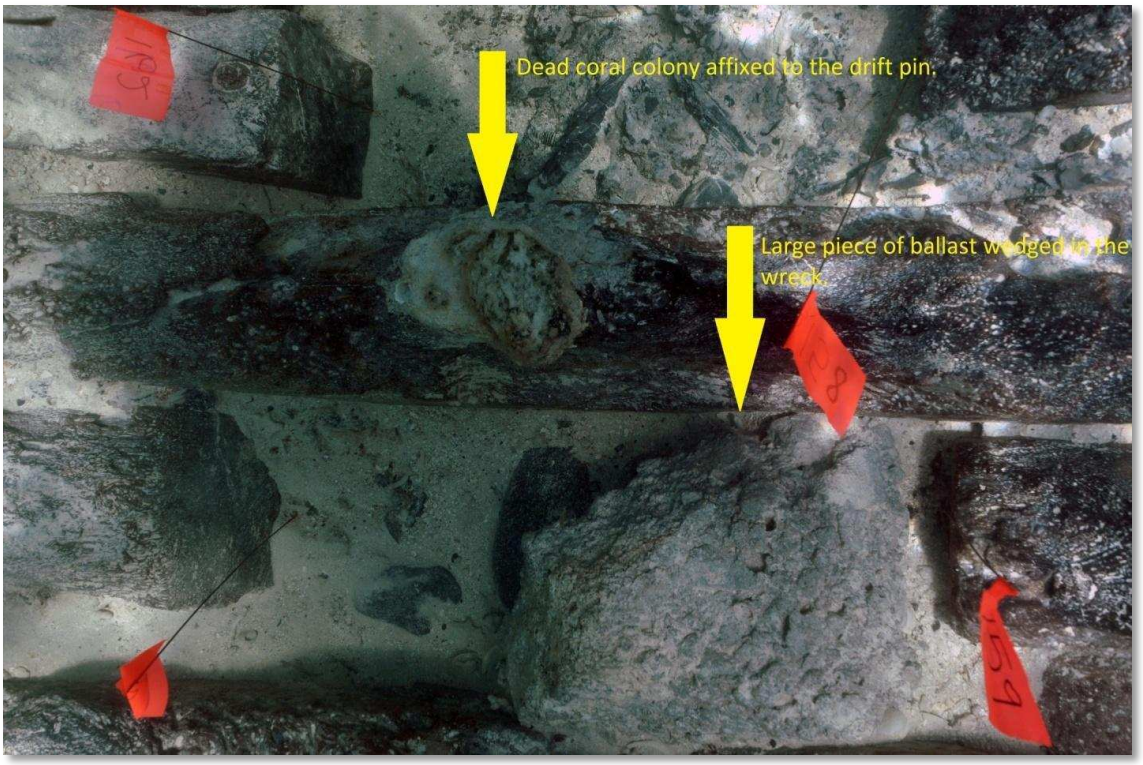


FIGURE 22. Photograph taken during the 2012 excavation showing the coral colony and large piece of ballast wedged between the floors of the wreck. (Courtesy of the National Park Service, 2012.)

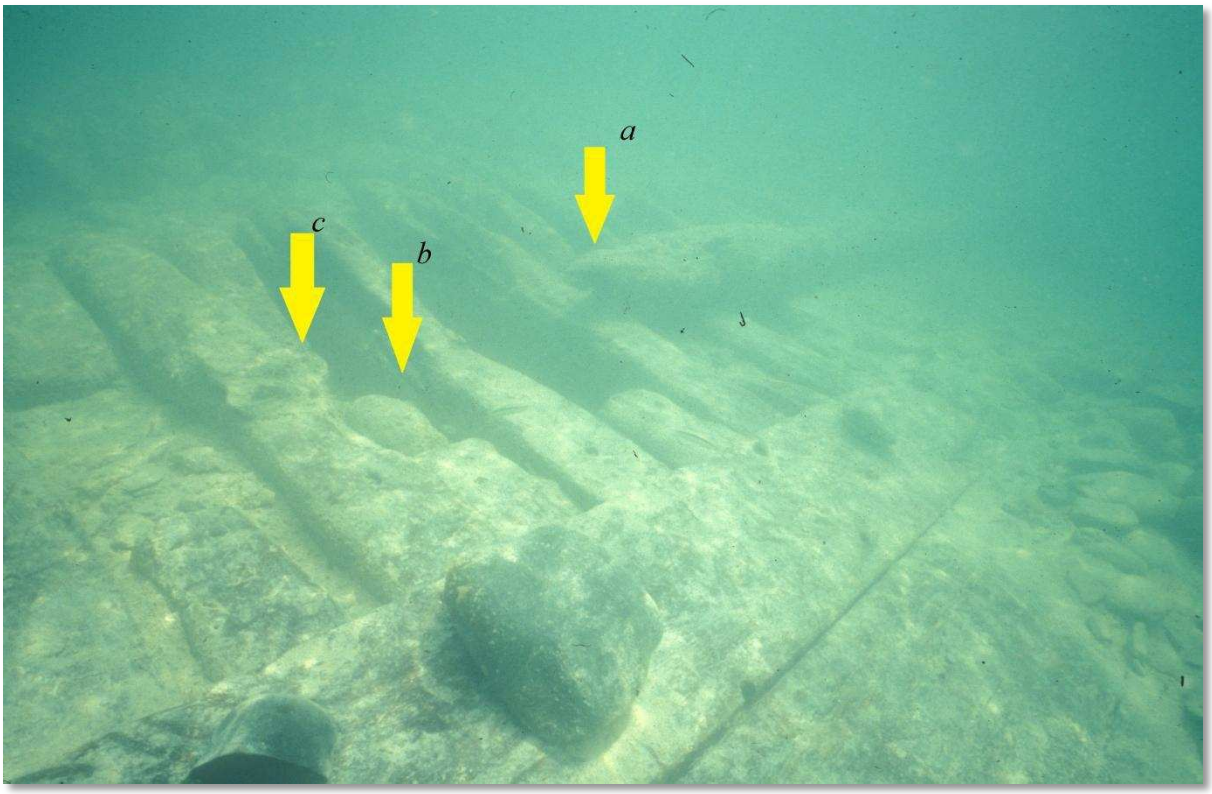


FIGURE 23. Photograph from the 1980s showing the terminal end of the extant keelson (*a*), the large wedged ballast (*b*), and the coral colony around the drift pin (*c*). (Courtesy of the National Park Service, 2012.)

The drift pins present during the 2012 excavation further support the location of the keelson in the 1980s corresponding to the location suggested by the photographs. During the 2012 excavation, divers found drift pins in each of the seven floors forward (west) of the proposed 1980s terminus of the keelson. Likely pins still through the keelson and fastening the keelson, floors, and keel together would be less susceptible to damage. The drift pins on all of the floors aft of the terminal end of the proposed location of the keelson are badly eroded to the top of the floors.

Hall's and Biggers' measurements put the mast step at 38.1 cm (15 in.) fore to aft as well as 38.1 cm (15 in.) tall and with an athwartships span of 208.3 cm (6 ft. 10 in.). A rough estimate

of the length of the keelson aft of the mast step in the 1980s (at least 3 m [9.84 ft.]) puts the location of the mast step at generally the westernmost extent of the exposed keel during the 2012 excavation. Given the size of the mast step and its approximate location within the vessel, it almost certainly stepped the main mast. With the mast step approximately in the middle of the vessel, the location also supports the rough estimate of the size of the vessel. With 11 m (36.09 ft.) of exposed keel, the missing stern, and the mast step's location to the western end of the site, the length between the perpendiculars was likely around 24.38 m (80 ft.), corresponding to the approximate size of the similar Ronson ship (VanHorn 2004:72).

Pump

Pumps are a necessity aboard any ship; they are particularly vital for a wooden sailing vessel conducting transatlantic voyages. Sailors expected some degree of water to enter the vessel and taking one's turn on the pumps was a regular part of the watch (Oertling 1996:3–9). The situation could become dire if caulking became displaced or the vessel sustained damage from grounding, foul weather, or warfare. Fortunately for archaeologists, these specimens are frequently well preserved—their necessary location, deep in the bilge, almost assures that the lowest portions of the pump will be covered in sediment and remain intact.

The Soldier Key Wreck is no exception and evidence of a pump was discovered in the early investigations. Documentation from the 1980s work on the site mentions a pump aft of the mast step on the port side of the vessel (Figure 24) and in Biggers' donated photographs is an artifact that may be the pump well (Figure 25). Because excavators found no evidence of the pump well during the 2012 excavation, all information researchers can glean from the pump comes from the isometric drawings and photographs from Biggers. The actual artifact from the Biggers collection was not returned to the National Park Service.

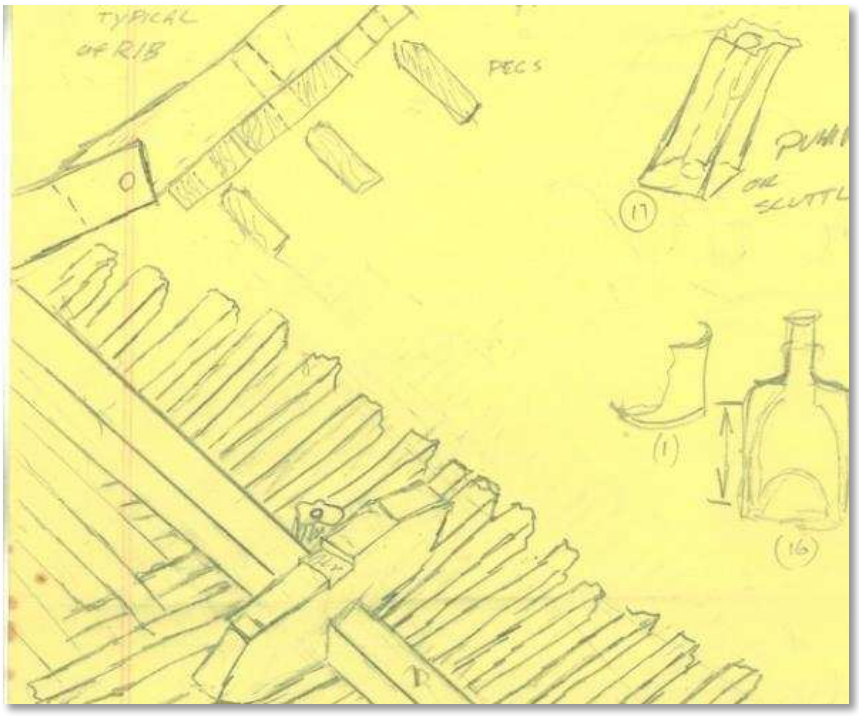


FIGURE 24. Isometric drawing from the Biggers collection showing the pump in place. (Courtesy of the National Park Service, 2012.)

FIGURE 25. Photograph of possible pump taken by Doug Biggers in the 1980s. (Courtesy of the National Park Service, 2012.)

Two types of pumps were in use in the 18th century, the time the Soldier Key Wreck sailed: the common or suction pump, and the chain pump (Oertling 1996:22–24,56–58). The common or suction pump is, unsurprisingly, operated by using the suction of a single piston-like valve to lift a column of water out of the bilge (Oertling 1996:23). The chain pump, on the other hand, functioned by using a number of valves affixed to a chain that would go down one wooden tube, collect water, and return up another tube. Chain pumps were more efficient, though they were also more complicated (Oertling 1996:56).

The type of pump alluded to by Biggers' and Hall's work is most likely a suction pump. Because they required fewer personnel to operate, suction pumps were preferred by merchant vessel operators. Naval vessels, having no shortage of able hands onboard, tended to be fitted with chain pumps (Oertling 1996:41,62). While there is no indication that the Soldier Key Wreck ever was a naval ship, the pump offers further proof that the vessel was built as a merchantman rather than as a naval vessel.

Rigging

The rigging components, as with all of the artifacts, are few and lack provenience. The majority of rigging components recovered is in the lot of artifacts that Doug Biggers returned to the Park. In this lot, Biggers returned two iron hooks, one with a swivel eye (BISC 660) (Figure 26) and one with a fixed eye (BISC 661) (Figure 27). BISC 660, the swivel hook, also had a hole in the tip of the hook, likely to aid in "mousing"—lashing around a hook to hold a load fast (Biddlecombe 1990:21).

FIGURE 26. BISC 661. Fixed-eye hook. (Courtesy of the National Park Service, 2012.)

FIGURE 27. BISC 660. Swivel eye hook with mousing hole. (Courtesy of the National Park Service, 2012.)

Biggers also returned what was at one time an articulated, though badly corroded, chain plate, deadeye, and the iron strop surrounding the deadeye (BISC 657, BISC 659, and BISC 658 respectively). Photos taken by Biggers in the 1980s show the complete articulated chain plate/deadeye assembly.

Following conservation, the chain plate resembles, in form, those described by Blaise Ollivier in his 1737 treatise on British, French, and Dutch naval vessels:

> The chains in our (French) ships are formed of a deadeye-strap, two links and a preventer-plate; and in the English ships, both large and small, there is only an iron strap in place of the two links, like that designated by the letter A in Fig. 75 (Olivier's original volume). The upper end of this strap is folded over and passes through an eye formed in the deadeye-strap. The lower end is fastened to the ship's side with an iron chain-bolt. Only the English three deck ships have preventer-plates. All their other ships have none at all. This practice allows for a great saving in iron and in labour, and the sides of the vessel are less weighed down. (Ollivier and Roberts 1992:106)

While archaeologists have not recovered any artifacts from the BAR or Hall's excavations (aside from the artifacts from Biggers), artifact notes taken by the state during their initial 1976 assessment list some rigging components. A sheave was recovered and recorded as "100 grams and about 75% complete" (Murphy and English 1976), as well as another possible sheave listed as "charred wooden poss. pulley roller w/grooved outer edge curved frag of whole circular roller 6 cm length 2 cm width 1 ¾ cm thick" (Smith 1976a). Also listed among the artifacts recovered was a "horseshoe shaped EO (encrusted object) light sand encrustation—

prob. ships rigging 21oz. 15cm length 10 cm across" (Smith 1976b), and a "slingshot shaped encrusted object 36 oz. 15cm tip to tip 26cm length light sand coral shell encrust" (Smith 1976c). Several generic "fasteners" are listed, though they were likely related to the construction of the upper works of the ship. One fastener, however, is recorded as a "thin encrusted poss. forged standing rigging fastener 14 oz. 22 ½ cm length and 8 cm max width" (Smith 1976d). Like the generic fasteners the BAR recorded, several pieces of iron strapping that the BAR recovered and recorded may or may not be from the rigging.

The only artifact researchers recovered during the 2012 fieldwork that may be a rigging component is likely a comb cleat. The artifact BISC 648 (Figure 28) is a single piece of carved wood measuring 14.51 x 2.04 x 2.87 cm (5.71 x .80 x 1.12 in.) with two protrusions and a cutout between them. Researchers discovered it wedged in the north limber hole of floor number 9. Identification of this artifact as a comb cleat seems to match up most favorably as a British naval encyclopedia defines a comb cleat as "…made of ash, or elm board, have one or more hollow cavities gouged in the middle, and the backs rounded to resemble a cock's comb" (Steel 2011:159), as well as the description listed in *The Art of Rigging* as "semi-circular and hollowed out in the middle, to confine a rope to one place" (Biddlecombe 1990:8). The *Encyclopedia of Nautical Knowledge* (McEwen and Lewis 1953:98) describes them as: "Comb cleat: in sailing vessels, a piece of hard wood secured fore-and-aft in lower rigging and through which a series of holes is bored to properly lead and place the various clewlines, buntlines, leechlines, or other running gear…" The small size, however, severely limits the holding power of such a cleat, leaving the possibility of the artifact being a shroud cleat (a cleat fastened to lines in the rigging on which to temporarily fasten other lines). If it is a shroud cleat, it is a fairly rudimentary one as

it lacks a groove on the underside where it would articulate with the shroud, and grooves where it would be lashed to the shroud (Lees 1979:168).

The only other real possibility is that it is a handle of some kind. The artifact lacked any evidence of attachment points and showed no obvious wear. A small piece of iron was, however, protruding from one side of the artifact slightly off center. Radiography of the artifact showed that the iron was not part of a fastener, did not protrude to the other side of the artifact, and was likely embedded during the wrecking event or during the time the artifact spent in the bilge. It may have been a new, unused shroud cleat that would be finished when required and grooved to the particular shroud where it was needed, though the most likely explanation is that the artifact is a comb cleat, albeit a small one. Such a comb cleat may have been used on the ship's boat, rather than the larger vessel.

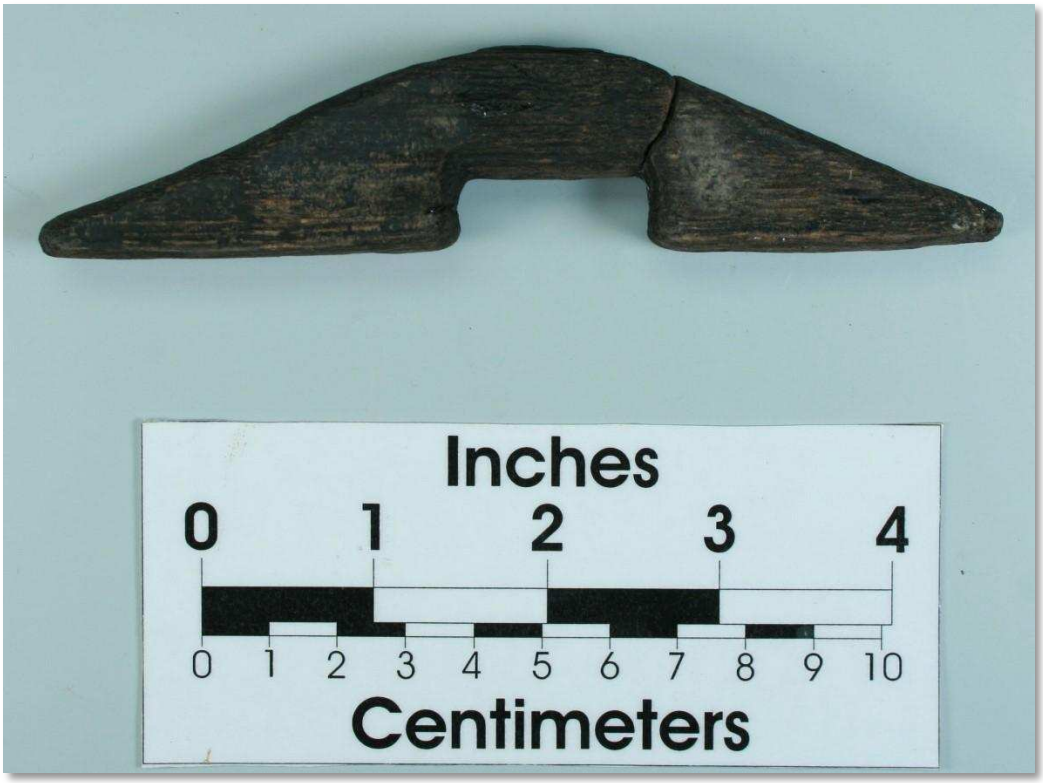


FIGURE 28. BISC 648. Probable comb cleat. (Courtesy of the National Park Service, 2012.)

Fasteners

Wooden treenails were the only fasteners visible in the interior of the extant hull with the exception of the iron drift pins that fastened the keelson, floors, and keel together. However, concreted iron fasteners were recovered during the 2012 excavation. Wooden treenails were preferable below the waterline, but iron fasteners were used in construction of the upper decks and iron sheathing tacks were used to attach the sacrificial sheathing to the hull. Radiography of the concretions revealed that the original iron has long since deteriorated (Figure 29). Along with the x-rays, resin casts made from the hollow concretions revealed that several fastener types and sizes were present, among them a sheathing tack (BISC 595) and several rosehead nails that exhibit spoon tips (BISC 593 and BISC 626).

FIGURE 29. X-ray of several concreted fasteners from the Soldier Key Wreck showing the diversity of fastener types used. (Image by author, 2013.)

Carbonized Wood

Researchers collected a total of 150 fragments of carbonized (charred) wood from throughout the wreck weighing a total of 204.8 g (Table 1). The bulk of the charred fragments came from the 5-10 m unit as it contained both Features 1 and 3, both intact deposits of burned material in the bilge. With the amount of carbonized wood recovered from the vessel and the distribution within the site, the charred wood is likely from contemporary salvage of the vessel to recover cargo below deck and iron fasteners from the vessel itself following the wrecking event.

TABLE 1

DISTRIBUTION OF CARBONIZED WOOD ON THE SOLDIER KEY WRECK

Artifact Number	Unit	Quantity	Weight
BISC 583	0-5 m	29	32.8 g
BISC 604	5-10 m	21	47.6 g
BISC 634	10-15 m	36	62.2 g
BISC 642	Feature 1 (5-10 m)	18	1.7 g
BISC 644	Feature 3 (5-10 m)	46	60.5 g

Brick

Divers recovered a total of 64 low-fired brick fragments weighing a total of 1,317 g from the dredge spoil (Table 2) as well as one nearly-intact brick. The highest concentration of brick fragments came from the 5-10 m unit with only small traces coming from the 0-5 m and 10-15 m units. The single nearly-intact brick (BISC 636) was surface collected from the southern ballast pile in the 10-15 m unit. This single brick weighs 1,510 g—more than the rest of the brick fragments combined. Given the relatively small quantity of brick recovered and the probability that brick would not have been extremely desirable to looters, the brick is most likely associated with the ship's hearth rather than cargo. The brick may just have ended up being used as ballast, however.

TABLE 2

BRICK DISTRIBUTION ON THE SOLDIER KEY WRECK

Artifact Number	Unit	Quantity	Weight
BISC 582	0-5 m	6	150.5 g
BISC 601	5-10 m	47	1,060.0 g
BISC 632	10-15 m	11	106.5 g
BISC 636	10-15 m	1	1,510.0 g

Ballast

The ballast assemblage for the Soldier Key Wreck from the 2012 fieldwork consisted of a variety of sizes and shapes of conglomerate, volcanic tuff, marble/travertine, micrite, and olivine. Hall's and Biggers' previous work on the site revealed ballast consisting of river rock mica, granite, quarry marble, coral, and possibly ore (Biggers and Hall 1982). While the 2012 fieldwork moved a great deal of ballast from the piles on either side of the hull, an unknown but very large number of ballast stones remained buried outside of the vessel and were often covered over by sea grass. The crew, therefore, was incapable of excavating them. Consequently, quite a few different types of stone may be present that neither field crew encountered and that may account for the two crews not finding or recording the same types of ballast.

Artifacts Related to Shipboard Life

Aside from the main hull structure and artifacts associated with the construction and sailing of the vessel, the majority of artifacts are associated with the sailors onboard the vessel. Most artifacts recovered during the 2012 excavation that could be attributed to the sailors involved victualing, including ceramic and glass containers and animal bones—some with evidence of butchering.

The ceramic vessel artifact assemblage collected in 2012 consisted of a single slipware rim sherd weighing 1.0 g, seven sherds of glazed red earthenware (GRE) weighing 13.8 g, six

sherds of manganese mottled ware weighing 51.7 g, a single sherd of untyped glazed coarse earthenware weighing 1.5 g, and a single rim sherd of untyped refined earthenware that weighs 2.1 g. It is worth noting that the single untyped refined earthenware rim sherd may also be manganese mottled ware. At least six different pastes/fabrics have been identified as being used in the manufacture of manganese mottled ware and the sherd is so small that the telltale manganese or iron streaking is not evident, but may be present (Jefferson Patterson Park and Museum: State Museum of Archaeology 2002). In addition to the glazed ceramic types, excavators recovered eight sherds of Spanish storage jar weighing a total of 336.1 g. One of the sherds (BISC 618), however, was concreted to a large iron fastener. Because this wreck produced so few artifacts, the concretion was x-rayed, and then left attached to the sherd as a possible display piece. Consequently, the storage jar sherds are overrepresented in weight by the concreted fastener. Still, they are, by far, the largest category of ceramics by weight (Table 3).

TABLE 3

CERAMIC DISTRIBUTION ON THE SOLDIER KEY WRECK

Artifact Number	F.S. Number	Unit	Ceramic Type	Date of Manufacture	Part of Vessel	Number of Sherds	Weight
BISC 587	1-05	0-5 m	slipware	1675-1770	Rim	1	1.0 g
BISC 591	1-09	0-5 m	storage jar	1500-1800	Body	1	5.0 g
BISC 605	2-08	5-10 m	storage jar	1500-1800	Body	3	54.6 g
BISC 609	2-12	5-10 m	glazed red earthenware	1550-1800	Body	3	8.1 g
BISC 610	2-13	5-10 m	manganese mottled ware	1675-1780	Body	3	1.8 g
BISC 611	2-14	5-10 m	lead glazed coarse earthenware	1490-1900	Body	1	1.5 g
BISC 616	2-19	5-10 m	storage jar	1500-1800	Body	1	17.9 g
BISC 617	2-20	5-10 m	storage jar	1500-1800	Rim	1	20.1 g
BISC 618	2-21	5-10 m	storage jar	1500-1800	Body	1	223.0 g
BISC 619	2-22	5-10 m	glazed refined earthenware		Rim	1	2.1 g

Artifact Number	F.S. Number	Unit	Ceramic Type	Date of Manufacture	Part of Vessel	Number of Sherds	Weight
BISC 620	2-23	5-10 m	manganese mottled ware	1675-1780	Body w/ handle attach-ment	1	4.6 g
BISC 628	3-6	10-15 m	storage jar	1500-1800	Body	1	15.5 g
BISC 631	3-9	10-15 m	glazed red earthenware	1550-1800	Body	4	5.7 g
BISC 647	7-1	5-10 m	manganese mottled ware	1675-1780	Base	1	38.3 g
BISC 650	8-2	5-10 m	manganese mottled ware	1675-1780	Rim	1	7.0 g

In addition to the ceramic vessel assemblage, excavators recovered a single pipe stem (BISC 624) from the Soldier Key Wreck. This pipe stem measured 2.35 cm (.93 in.) long with an outside diameter of .52 cm (.20 in.). The hole in the stem measured, using Binford's pipe stem dating technique, between 4/64 and 5/64 in. (.16 and .20 cm). The 4/64" drill bit was loose, while the 5/64" drill bit could not completely penetrate the pipe stem. This single pipe stem fragment, while admittedly not enough to date a site, using Binford's dating technique, dates from roughly 1710-1800. Using Binford's formula, $y = 1931.85 – 38.26x$, where y is the date one wishes to calculate and x is the bore diameter in sixty-fourths of an inch, with the bore diameter factored at 4.5 for this pipe stem, the date comes out as 1759.68 (Binford 1961:19–21).

The dredge spoil provided several shards of glass. Unfortunately, many of the shards suffer from deformation and degradation of the shards to the point that their former form is unrecognizable. A single shard (BISC 615) still retains an applied string finish, the only diagnostic feature observed on any of the glass shards.

The damage the glass suffered includes not only breakage from use and from the wrecking event, but also impressive amounts of heat damage (spalling and melting), likely from

contemporary salvage operations (Figure 30), as well as devitrification from age and exposure to the marine environment (Hamilton 2010:20). The glass the researchers recovered varies in color, though much of that variability may also be from deterioration and heat damage. Green bottle glass and clear glass shards are present, though the bulk of the collection is an unnatural light blue color, often mottled with other iridescent colors, which appear to be heavily damaged green bottle glass. Likely all of this "blue" glass is badly degraded green bottle glass, a result of both the salvage fire and subsequent deposition in a marine environment. The color change is probably due to the inclusion of minerals in the molten glass during the salvage of the vessel, but the exact mechanism for the color and clarity change is not understood at this time.

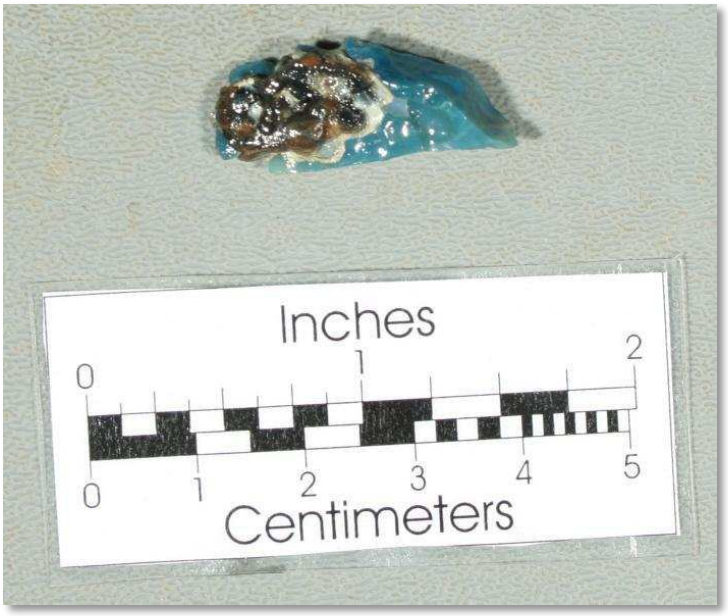


FIGURE 30. BISC 589. Representative blue opaque glass that likely was green bottle glass. (Photo by author, 2013.)

Faunal Remains

Divers recovered numerous bones from large mammals, as well as a bone from a vermin on the vessel, at least one bone thought to be intrusive, and one (possibly two) worked bone tool/knife scales (the external slab on each side of fixed and folding knives that are typically

made of wood, bone, or antler for aesthetic purposes and to provide grip). The majority of the bones came from the dredge spoil, but at least one (BISC 649) was located in situ in the bilge, in the starboard (north) limber hole of floor number 9, and its location was piece-plotted. Because the faunal assemblage includes numerous different bones from what were, at the time of collection, unknown species and anatomical location of animals, researchers analyzed the faunal assemblage slightly differently. Lab workers grouped all bones that may be related to victualing together into artifact numbers by provenience. Following conservation of all of the bones, researchers consulted with a faunal specialist. Cathy Parker, faunal specialist at the University of West Florida, analyzed each bone and identified as accurately as possible the species, anatomical location, butchering marks, and environmental changes (charring/cooking) of the bones. Researchers did not collect any remains from marine animals that the crew of the vessel may or may not have utilized as food. Because each bone has a fairly diverse set of attributes, researchers analyzed the entire faunal collection, listing all attributes of each bone including provenience.

Divers recovered no bones from the 0-5 m or 15-20 m units. They recovered the majority of the food bones (BISC 627) and possible tool/knife handle (BISC 638), in the 10-15 m unit. The crew recovered bone from the 5-10 m unit (BISC 598), though not in the quantity and variety of the 10-15 m unit bones. All of the bones from the 5-10 m unit that Parker could identify to species came from domestic cattle (Table 4). The one definite tool/knife/flatware handle scale from the site (BISC 603) also came from the 5-10 m unit. Several of the bones exhibit calcination, providing further evidence of contemporary salvagers using fire to access the vessel.

TABLE 4

DISTRIBUTION OF BONE ON THE SOLDIER KEY WRECK

Artifact	Unit	Quantity	Weight	Species Present	Body Part	Anthropogenic Effects
BISC 598	5-10 m	8	97.1 g	Indeterminate Large Mammal, Cow (*Bos taurus*)	Lumbar vertebra, rib, cortical bone, epiphysis, long bone fragments	Vertical fractures from exposure to high heat on cow rib. Cow lumbar vertebra butchered- no saw marks, likely cleaved or hacked.
BISC 627	10-15 m	10	28.1 g	Pig (*Sus scrofa*), cow (*Bos taurus*), Cormorant (*Phalacrocorax*), Indeterminate rat (*Rattus sp.*), Indeterminate bird (*aves*), Indeterminate large mammal	Pig phalynx, cow thoracic vertebra, indeterminate bird shaft fragments, indeterminate rat right proximal femur, cormorant left tibiotarsus, indeterminate large mammal fragments	Cow thoracic vertebra butchered- no saw marks, likely cleaved or hacked.
BISC 638	10-15 m	1	1.7 g	Indeterminate large mammal	Indeterminate.	Possibly worked
BISC 643	5-10 m	1	82.0 g	Cow (*Bos taurus*), or Horse (*Equus ferus caballus*)	Fragment of long (leg) bone.	Butchered when raw (spirally-fractured), likely to access marrow.
BISC 649	5-10 m	1	11.2 g	Indeterminate large mammal, possibly cow (*Bos taurus*).	Radius.	Butchered when raw (spirally-fractured), likely to access marrow.

Parker identified most of the large mammal bones as belonging to domestic cattle (*Bos taurus*) with a single swine (*Sus scrofa domesticus*) bone as well, though some of the fragments

lack diagnostic features to clearly identify species, and as a result they may also be bones from a domestic horse (*Equus ferus caballus*). This bone being from a horse seems unlikely as the bone in question (BISC 643) was broken open while raw, likely to access the marrow. She identified a single bone as the right proximal end of a rat (*Rattus*) femur, though she could not ascertain the exact species. No other vermin remains were recovered. A single cormorant (*Phalacrocoracidae*) bone (from BISC 627) was also among the bones recovered in the 10-15 m unit, though this is thought to be invasive to the site—likely deposited while the site was uncovered. Cormorants are a common marine bird in the area around the site.

Despite most of the bone fragments having lost their provenience, much can still be ascertained from them. Several bones show clear evidence of butchering (vertebra cleaved in half) and, interestingly, some of the bones show evidence of breakage prior to cooking, likely to access the marrow inside. One rib exhibits fracturing consistent with exposure to extremely high temperatures—much higher than cooking temperatures, likely from salvage. The butchering marks were likely the result of butchering on land and salting or brining the meat for the extended journey across the sea. The broken-open uncooked bone, however, is more likely the result of consuming fresh meat. The nature of West Indies trade at the time was not conducive to keeping livestock aboard, certainly not large cattle and hogs. Likely, sailors consumed any fresh meat in port or within a few days of leaving port.

Cargo of the Vessel

The only commodity found in an appreciable amount to be considered cargo intended for market was allspice (*Pimenta dioica*). Researchers recovered a total of 694 full or partial seeds of allspice totaling 16.4 g. The crew recovered allspice from every unit of the excavation with extant hull exposed (0-5 m, 5-10 m, and 10-15 m), as well as from the float sample from Feature

1 and those mechanically sorted from Feature 3 (Table 5). Additionally, researchers did not collect any of the allspice from Feature 2, an intact lens of allspice seeds, deciding instead to preserve that feature in situ.

TABLE 5

ALLSPICE DISTRIBUTION ON THE SOLDIER KEY WRECK

Artifact Number	Unit	Quantity	Weight
BISC 581	0-5 m	59	1.6 g
BISC 614	5-10 m	240	6.5 g
BISC 630	10-15 m	300	7.0 g
BISC 641	Feature 1 (5-10 m)	84	.7 g
BISC 645	Feature 3 (5-10 m)	11	.6 g

While the only discernible cargo on the Soldier Key Wreck was allspice, a pair of other artifacts may be related to the cargo as well. Researchers recovered two fragments of textile (BISC 639 [Feature 1, 5-10 m unit] and BISC 613 [5-10 m unit]) from the site that, while extremely small, lab analysis has determined are made of vegetable fiber, likely jute fiber, known as burlap once woven into fabric, or possibly hemp. Bags were one of two methods of transporting allspice, the other being in hogsheads (casks or wooden barrels) (Browne and Ehret 1756:14,248). Burlap and hemp, of course, were not limited to transporting allspice and may have been used for any number of purposes.

Invasive Artifacts

The same mechanisms responsible for covering the site in sand and silt, tidal flow and storm events, in addition to the looting and field schools conducted by Hall, deposited several artifacts, some of which are definitely not contemporary to the site and some of which may or may not be. The cormorant bone mentioned above was probably not utilized as food by the crew and is likely invasive. A beer can (BISC 602) recovered during the 2012 excavation, dated to 1983-1988 by the Anheuser-Busch Corporation (2013, elec. comm.) was found in the 5-10 m

unit and was the result of either tidal flow or deposited by someone visiting the site. Along with the concreted iron fasteners recovered from the site, divers recovered several modern wire-drawn nails (BISC 592). These, too, are invasive and are either the result of some of Hall's work on the site, or more likely are fasteners that held together lobster traps. "Ghost traps" (those that are unattended or break away from their floats) are a large problem in the Park, and these nails likely held together one of these ghost traps that was lost, broken apart, and then deposited on the site.

The lone peach pit (BISC 629) may or may not be invasive. While peaches were not uncommon during the time the Soldier Key vessel would have been sailing, the likelihood of sailors traveling from Jamaica to England having fresh fruit is relatively low. However, peaches grew in Jamaica during the time the vessel sailed and the location of the wreck is not that far from Jamaica, increasing the chance the crew had fresh fruit closer to port (Browne and Ehret 1756:241). The peach pit was quite well-preserved, but many of the organics recovered were equally well-preserved. The pit, however, did not show any evidence of charring. The pit may have been deposited after the wrecking event, or by the crew members of the vessel itself.

The diminutive number of artifacts, the limited hull structure, and the lack of provenience for those artifacts make this an especially challenging site. Unfortunately, by the time of the 2012 fieldwork, the lack of provenience and incomplete artifact assemblage essentially made this a cultural history investigation. No great concentration of any artifact types in specific areas could lead investigators to infer living conditions about individual crew members or classes of crew members. The artifacts most likely to yield information (whole bottles, ceramics, rigging components, personal effects of the crew), being both the most desirable to looters and as diagnostic artifacts to archaeologists in previous archaeological investigations, have long since been removed from the site. Fortunately, historical documents can supplement the sparse

material remains to provide an overview of the Soldier Key Wreck, though likely not any specifics to this vessel.

Hopefully the 2012 excavation of the Soldier Key Wreck can serve as an example that while many wrecks have suffered previous disturbance they can still provide a great deal of data, if excavated scientifically. Many wrecks have been cast off as "tainted" after falling prey to treasure hunters or other disturbances. While much of the data from these sites have been lost, these sites can still offer significant amounts of information and they should be investigated. These sites perhaps make excellent sites on which to conduct archaeological field schools—showing how to excavate responsibly as well as what can be lost when such safeguards are not taken.

CHAPTER V

MATERIAL CULTURE DISCUSSION

As discussed previously, the interpretation of the Soldier Key Wreck posed significant challenges. Recovering few artifacts with little provenience, being constrained by the sea grass and the desire to avoid any unnecessary additional damage to the site, and uncovering 13 m (42.65 ft.) of hull structure with neither end of the vessel present or exposed, researchers had little hope of identifying the ship's name or owner. Because of the minimal chance of putting a name to the vessel, my goal, in addition to questions of how best to preserve the site, centered on placing the vessel in its broader historic context based on the few artifacts present, historical documents, and the hull remains.

Allspice/Pimento

As the only definitive commodity located on the Soldier Key Wreck, allspice (otherwise known as pimento) is pivotal to identifying the role of the ship. A much sought-after spice found at the time in only a small portion of the globe, allspice provides strong evidence for the last port of call and, to a lesser extent, its intended destination. As the only trade good recovered from the vessel, the allspice trade is key to the site's interpretation.

Christopher Columbus discovered allspice (*Pimenta dioica*) on his first trip to the New World, likely in Hispaniola. Initially, Columbus called the new spice "malagueta" for the Molluca Islands in Indonesia, commonly called the Spice Islands. Upon seeing the unground seeds of the allspice plant, the Spaniards called it "pimienta" from the Spanish word for pepper, which the seeds very much resemble. "Pimienta" itself is derived from "pigmentum," a general name for spice in Medieval Latin. Over time the British corrupted "pimienta" to "pimento." Also called "Jamaican pepper," the most common name for the spice today, allspice, comes from the

unique flavor of the berries that resembles a combination of nutmeg, cinnamon, cloves, and pepper. Today, allspice is generally used to describe the spice while pimento is used when referring to the tree (Ferguson 1889:187–197; Rodriguez 1969:2; Griffenhagen 1992:134; University of California, Los Angeles 2002). The pimento tree was classified as *Pimenta officinalis* Lindl. in 1821, and reclassified as *Pimenta dioica* (L) Merr. in 1947 (Gayle 2013:1).

The allspice berries grow on an evergreen tree that reaches an average height of about 9.14 m (30 ft.) with a trunk diameter of 12.7-15.2 cm (5 to 6 in.). The bark is white and the boughs support glossy green leaves that resemble a bay leaf. When cultivated, planters arrange the trees in "walks," or groves, sometimes with enough room underneath to also cultivate coffee in the same space. Allspice trees grow throughout the Caribbean, though during the Colonial era it was only commercially viable in Jamaica, in particular from the rocky areas of the St. Elizabeth, Manchester, Westmoreland, St. Mary, St. Ann, and Trelawny parishes (Figure 31) (Ferguson 1889:187–193; Rodriguez 1969:4; Gayle 2013:1–3).

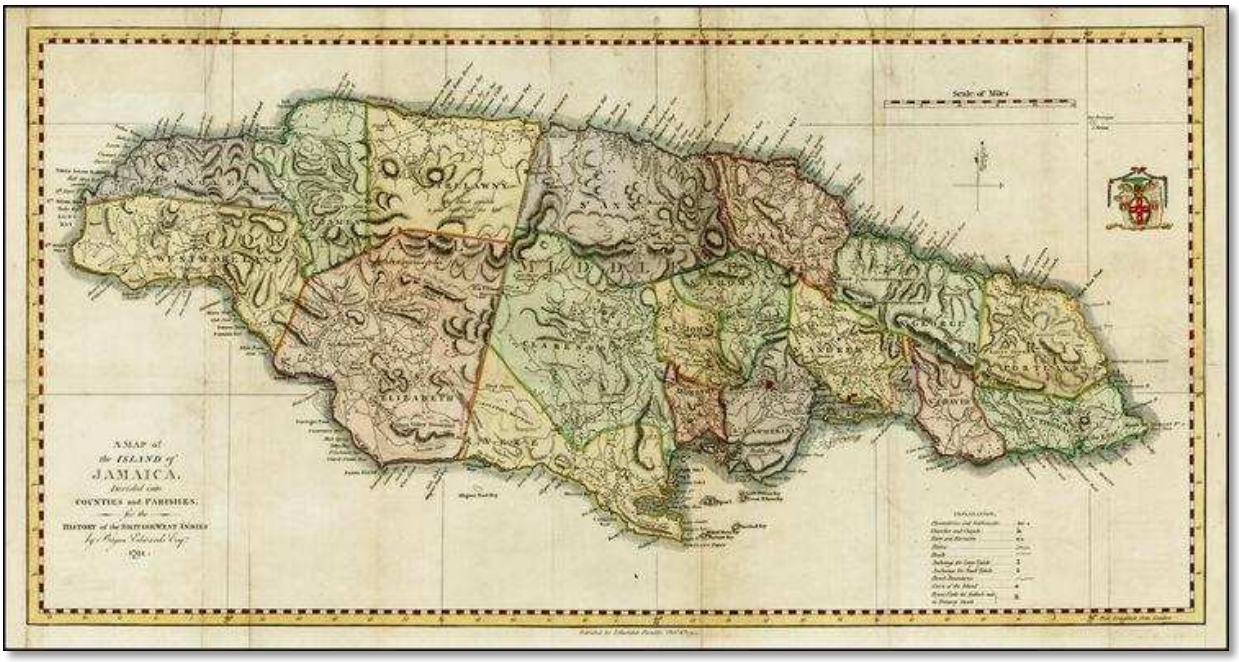


FIGURE 31. *A Map of the Island of Jamaica* by Bryan Edwards, 1794, with parishes.

Harvesting the allspice berries is a labor-intensive and time-sensitive process that has remained unchanged for centuries. Workers harvest the berries when fully matured, but before they begin to ripen. This process typically involves a young man or boy climbing into the pimento tree, tearing off branches that bear the berries, and throwing the branches to the ground. On the ground, women and young boys collect the branches and separate the berries from the branch for further processing.

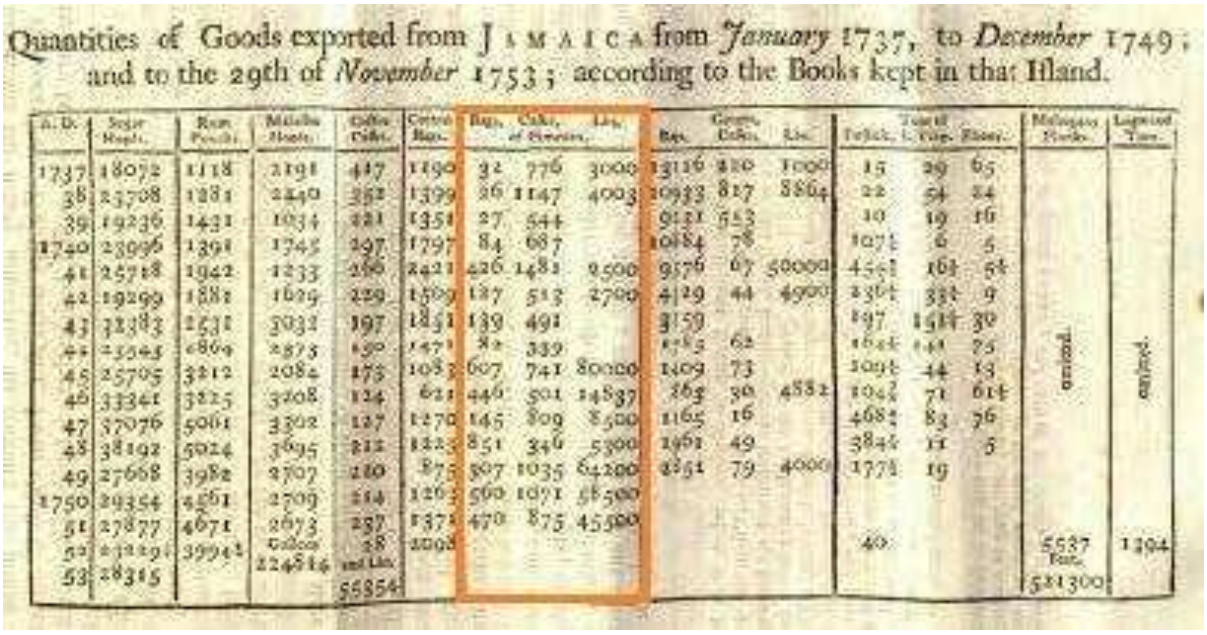
Historically, once the workers collected a sufficient quantity of berries to process, they took them to a central location, often a building constructed specifically for the purpose called a pimento house. They laid the berries out in the sun for a period of five to ten days, moving the fruit into the pimento house at night to protect the berries from reabsorbing moisture from rain or the nightly dew. During the sunning process, they turned the crop several times a day with a rake to ensure even drying. Once the fruit turned from a dark green color to a dark brown or black color, it was cured and ready for market.

During the curing process the berries lose from 38-48% of their green weight and the outer surface becomes uneven and roughened by the protuberance of tiny oil glands found in them. When dried, approximately 5,840 berries will weigh one pound (.45 kg). When properly cured, the berries can be stored for a considerable amount of time, even from one season to another, with little change in quality. In storage and transit, the spice fares best in clean and dry areas, free from insects, micro-organisms, and any odiferous material (Rodriguez 1969:13–14).

Allspice remained a Spanish commodity for the first century after its discovery. The first recorded use of allspice by the British dates to 1601 when a London druggist prescribed a medicine containing the dried berries to a man named Clusius to treat an unknown malady. Before this date, and from 1602 to 1736, little or no data survive about the exports of allspice

from Jamaica. Export data exists for the rest of the 18th century with the exception of 1763, 1764, 1776-1779, and 1782-1785 (Rodriguez 1969:20).

While mentioned regularly, the actual export quantity of allspice was rather low, particularly compared to sugar. Figure 32 shows a contemporary account of how much allspice was exported as well as the number of bags and casks in which it was transported.



Quantities of Goods exported from JAMAICA from *January* 1737, to *December* 1749; and to the 29th of *November* 1753; according to the Books kept in that Island.

A. D.	Sugar Hogsh.	Rum Puncht.	Melasses Hogsh.	Coffee Cwt.	Cocoa Bags.	Pimento Bags.	Pimento Casks.	Pimento Lbs.	Ginger Bags.	Ginger Casks.	Ginger Lbs.	Tortoise Shell Tons.	Tortoise Shell Cwt.	Tortoise Shell Quar.	Mahogany Logs.	Logwood Tons.
1737	18072	1118	2191	447	1190	32	776	3000	3126	810	1000	15	29	65		
38	23708	1281	2440	362	1399	26	1147	4003	2933	817	8864	22	54	24		
39	19236	1431	1034	221	1351	27	544		9131	653		10	19	16		
1740	23996	1391	1745	297	1797	84	687		10184	78		1071	6	5		
41	25718	1942	1233	266	2421	426	1481	9500	9576	67	50000	4561	161	5½		
42	19299	1881	1629	229	1569	137	513	2700	4129	44	4900	2361	332	9		
43	32383	2531	3032	197	1851	139	491		3159			197	1511	30		
44	25545	2869	2873	190	1471	82	339		1713	62		1641	141	25		
45	25705	3212	2084	173	1083	607	741	80000	1409	73		2036	44	13		
46	33341	3225	3208	124	621	446	501	14837	863	30	4882	1042	71	614		
47	37076	5061	3302	127	1270	145	809	8500	1165	16		4685	83	36		
48	38192	5024	3695	212	1323	851	346	5300	1961	49		3844	11	5		
49	27668	3982	2707	210	875	307	1035	64200	2351	79	4000	1771	19			
1750	29354	4561	2709	214	1203	560	1071	56500								
51	27877	4671	2673	237	1371	470	875	45500								
52	31291	3994	Gallons 224814	38	2008							40			5537 Pieces	1304
53	28315			55854											521300	

FIGURE 32. Chart showing the exported quantity of allspice, "Bags, Casks, Lbs. of Pimento," from Jamaica from 1737-1751, among other exports. (Browne and Ehret 1756:14.)

Brown and Ehret (1756:14) list the largest quantity of allspice transported from the island over the course of the survey at 80,000 pounds in 1745. A quantity of 40 tons of allspice per annum would easily fit into a single small vessel, with room to spare. A more realistic quantification of the export quantity of allspice from the same time period comes from Rodriguez's (Gayle 2013:54) account. Still, the largest quantity exported according to Rodriguez, 1,062,000 pounds in 1761, would fit in two to three large West Indiamen of the time.

Much like the dearth of information on export quantity, there is little information about the price of allspice from the 18th century, though the nature and policies of trade during that time period may explain the absence of price data. The absentee landowners of many of the estates that produced allspice lived in England and the land managers they hired to oversee their estates consigned their produce directly, or to their London agents. It was not a common practice, nor was it desirable, to attach any value to some goods exported from the island as the commodity could fetch a much higher price at market than the price the agents or landowners assigned it prior to export. The price which some of the exported commodities fetched in London was also rarely mentioned locally (Rodriguez 1969:20–21).

The English used allspice for a variety of purposes. Due to the unique flavor properties, the most common use was as a flavoring agent, and a 1723 English cookbook by John Nott (1723:144,293–294) lists "all Spice" in the preparation of cod's head and breast of mutton." The English used allspice medicinally (as in the first recorded Anglo use of the spice in 1601), and it is also an effective anti-bacterial agent. Allspice, along with garlic, onion, and oregano, inhibit every bacterium researchers have tested them on; at the other extreme, lemon and lime juice inhibit only 24% of bacteria (Billing and Sherman 1998:14).

This antibacterial property is likely responsible for the preference by early colonial marooned sailors, escaped slaves, and the desperate and poor to utilize the dried fruit not only as a spice, as in preparing "jerked" food, but also as a preservative, even using the wood as fuel in the preparation of meat in the "boucan" style (Charles 2013:145; Gayle 2013:1). These men came to be called buccaneers because of this cooking practice.

The Vessel

Shipbuilding practices changed in the first half of the 18th century, the most obvious being that vessels were simply built larger. Despite the little surviving hull structure at the Soldier Key site, some diagnostic features are present. Coupled with the photographs taken in the 1980s, acquired from local divers and Doug Biggers, which show additional diagnostic features, these changes in construction methods suggest a general timeframe of the vessel's construction.

Despite having neither terminal end of the vessel, the scantlings of the extant timbers, when compared against historical shipbuilding treatises and contemporary wrecks of the time, can give a rough indication of the size of the vessel. The scantlings of the timbers still present on the Soldier Key Wreck compare very favorably with Monceau's (Murray and Monceau 1754:14) ship of 96 ft. long and 24 ft. in breadth. Murray's scantlings are a bit more variable (Figure 33 [two vessels' scantlings transcribed in Table 6]).

SCANTLINGS of the principal Pieces of Timber in a SHIP.

BREADTH of the SHIPS / LENGTH of the SHIPS	f. 48	in. 0	f. 46	in. 0	f. 44	in. 0	f. 42	in. 0	f. 40	in. 0	f. 38	in. 6	f. 36	in. 0	f. 34	in. 0	f. 32	in. 0	f. 30	in. 0	f. 27	in. 0	f. 24	in. 0
	176	0	169	11	163	6	157	6	151	0	144	7	138	0	131	2	124	4	117	6	106	10	96	0

NAMES of the PIECES.	f.	in.	l.	f.	in	l.	f.	in.	l.	f.	in.	l.	f.	in.	l.	f.	in	l.	f.	in.	l.	f.	in.	l.	f.	in.	l.	f.	in.	l.
BEAMS. First deck square	1	4	0	1	3	6	1	2	6	1	2	0	1	1	6	1	0	4	0	11	10	0	11	2	0	10	7	0	9	6
Second deck square	1	2	6	1	0	11	1	0	5	1	0	0	0	10	9	0	10	8	0	9	1	0	8	6	0	8	0	0	7	0
Quarter deck and forecastle { Moulded	0	10	3	0	9	9	0	9	0	0	8	3	0	7	9	0	7	3	0	6	8	0	5	9	0	5	3	0	4	9
Sided	0	11	3	0	10	10	0	10	0	0	9	2	0	8	6	0	7	11	0	7	3	0	6	8	0	6	2	0	5	3
Poop { Moulded	0	7	6	0	7	1	0	6	8	0	6	2	0	5	8	0	5	4	0	4	11	0	4	5	0	3	10	0	3	4
Sided	0	5	0	0	4	8	0	4	2	0	3	8	0	3	3	0	2	11	0	2	6	0	2	2	0	1	10	0	1	7
BREAST HOOK fided on the lower deck	0	2	0	0	3	0	0	2	7	0	2	2	0	2	0	0	1	9	0	1	5	0	1	2	0	1	0	0	0	10
CRAMPS, as broad as can be had, and half as thick as the timbers to which they are fattened																														
KEEL { Deep	1	7	0	1	6	5	1	5	11	1	5	4	1	4	10	1	4	3	1	3	5	1	2	8	1	2	1	1	1	6
Broad	1	5	0	1	4	8	1	4	3	1	3	10	1	3	5	1	3	0	1	2	7	1	2	2	1	1	10	1	1	5
KNEES First deck { Sided	1	3	6	1	3	0	1	2	6	1	2	0	1	1	7	1	1	3	1	0	9	0	11	10	0	11	5	0	10	10
Moulded	1	2	0	1	1	5	1	1	0	1	0	7	0	11	3	0	10	10	0	10	2	0	9	6	0	9	0	0	8	6
Second deck { Sided	1	1	0	1	0	5	0	11	6	0	10	11	0	10	3	0	9	8	0	9	0	0	8	3	0	7	9	0	7	3
Moulded	1	0	0	0	11	3	0	10	8	0	10	0	0	9	5	0	8	10	0	8	3	0	7	8	0	6	8	0	5	11
Quarter deck and forecastle { Sided	0	11	6	0	11	0	0	10	5	0	9	11	0	9	4	0	8	9	0	8	2	0	7	6	0	6	10	0	6	2
Moulded	0	9	6	0	8	10	0	8	3	0	7	8	0	7	1	0	6	6	0	5	11	0	5	4	0	4	9	0	4	3
Poop { Sided	0	8	0	0	7	6	0	7	0	0	6	6	0	6	0	0	5	6	0	5	0	0	4	7	0	4	2	0	3	9
Moulded	0	6	8	0	5	11	0	5	5	0	5	0	0	4	7	0	4	2	0	3	9	0	3	4	0	3	0	0	2	8
Transom { Sided	0	5	4	0	5	0	0	4	8	0	4	3	0	4	0	0	3	9	0	3	5	0	3	0	0	2	8	0	2	4
Moulded	0	4	0	0	3	8	0	3	4	0	3	0	0	2	8	0	2	4	0	2	0	0	1	8	0	1	5	0	1	2
Planchers thick	0	5	0	0	5	0	0	4	8	0	4	4	0	4	0	0	3	10	0	3	6	0	3	2	0	2	10	0	2	6
STEM { Thwartships	1	5	0	1	4	8	1	3	9	1	3	4	1	2	11	1	2	6	1	2	1	1	1	8	1	1	4	1	1	0
Fore and aft.	1	3	0	1	2	6	1	2	0	1	1	7	1	1	2	1	0	9	1	0	4	1	0	0	0	11	8	0	11	4
Ditto, falle or apron thick	1	2	0	1	1	6	1	1	0	1	0	5	0	11	10	0	11	3	0	10	8	0	10	2	0	9	6	0	8	10
STERN-POST { Thick	1	5	0	1	4	8	1	4	3	1	3	9	1	3	3	1	2	9	1	2	2	1	1	7	1	1	0	1	0	6
Fore and aft { Below	1	4	0	1	3	6	1	3	0	1	2	6	1	2	0	1	1	6	1	1	0	1	0	5	1	0	0	0	11	6
Above	1	3	0	1	2	6	1	2	0	1	1	6	1	1	0	1	0	5	0	11	10	0	11	3	0	10	8	0	10	2
TIMBERS. Floor { Broad on the keel	1	3	0	1	2	6	1	2	0	1	1	6	1	1	0	1	0	5	0	11	10	0	11	3	0	10	8	0	10	2
Deep on the keel	1	2	0	1	1	6	1	1	0	1	0	5	0	11	10	0	11	3	0	10	8	0	10	2	0	9	6	0	8	10
Out and in at the head	1	1	0	1	0	5	1	0	0	0	11	6	0	11	3	0	10	8	0	10	2	0	9	7	0	9	1	0	8	7
Futtocks out and in at the lower deck	1	1	6	1	0	11	1	0	5	1	0	0	0	11	8	0	11	2	0	10	7	0	10	1	0	9	6	0	8	6
Top timber { Broad	1	1	6	1	0	11	1	0	5	1	0	0	0	11	8	0	11	2	0	10	7	0	10	1	0	9	6	0	8	6
Out and in at the lower deck part	1	0	6	0	11	11	1	0	4	0	10	10	0	10	3	0	9	7	0	9	1	0	8	6	0	7	11	0	7	5
Out and in at the head	1	0	6	0	10	6	0	9	11	0	9	4	0	8	8	0	8	1	0	7	6	0	7	0	0	6	7	0	5	9
Fashion-piece { Sided	1	2	6	1	2	0	1	1	6	1	1	0	1	0	6	0	11	10	0	11	3	0	10	8	0	10	2	0	9	8
Out and in { Below	1	2	0	1	1	6	1	1	0	1	0	6	0	11	11	0	11	4	0	10	9	0	10	3	0	9	8	0	8	8
Aloft	1	1	6	1	1	0	1	0	6	1	0	0	0	11	11	0	11	5	0	10	10	0	10	4	0	9	9	0	8	9
TRANSOMS. Wing square	1	6	0	1	5	5	1	4	10	1	4	3	1	3	8	1	3	1	1	2	6	1	1	11	1	1	4	1	0	9
Deck { Moulded	1	5	0	1	4	5	1	3	11	1	3	4	1	2	9	1	2	2	1	1	7	1	1	0	1	0	5	0	11	10
Sided	1	5	6	1	4	10	1	4	3	1	3	8	1	3	1	1	2	6	1	2	0	1	1	5	1	0	10	0	10	4
second and third { Moulded	1	2	0	1	1	4	1	0	9	0	11	11	0	11	4	0	10	10	0	10	2	0	9	6	0	8	11	0	8	3
Sided	1	5	0	1	4	8	1	4	2	1	3	7	1	2	11	1	2	5	1	1	11	1	1	4	1	0	9	0	9	3
WALES 1st and 2d { thick	0	9	0	0	8	8	0	8	3	0	7	10	0	7	4	0	7	0	0	6	7	0	6	2	0	5	8	0	5	2
broad	0	5	0	0	4	8	0	4	4	0	4	0	0	3	8	0	3	4	0	3	0	0	2	8	0	2	4	0	2	0
3d and 4th { thick	0	7	0	0	6	6	0	6	0	0	5	6	0	5	0	0	4	6	0	4	0	0	3	6	0	3	0	0	2	6
broad	0	6	0	0	5	6	0	5	0	0	4	6	0	4	0	0	3	6	0	3	0	0	2	6	0	2	0	0	1	6
5th and 6th { thick	0	6	0	0	5	6	0	5	0	0	4	6	0	4	0	0	3	6	0	3	0	0	2	6	0	2	0	0	1	6
broad	1	0	0	0	11	6	0	11	0	0	10	6	0	10	0	0	9	6	0	9	0	0	8	6	0	8	0	0	7	6

Note, The Scantlings of the Knees moulded is ⅓ from the Throat.

FIGURE 33. Scantlings table from *The Elements of Naval Architecture: Or, A Practical Treatise on Shipbuilding*. Lately Published at Paris by M. Duhamel du Monceau, Carefully Abridged by Mungo Murray, 1754:14.

While the dimensions of the scantlings compare well with those of Monceau's 96 ft. (29.26 m) long and 24 ft. (7.31 m) beam vessel, it would be difficult to say that the dimensions of Monceau's French vessel with no specified purpose compare favorably to a British West Indiamen. However, Frederik Henerik AF Chapman's *Architectura Navalis Mercatoria* contains a lines drawing of "an English West India Trader." The dimensions of Chapman's West India Trader were 97 ft. (29.56 m) "Length between the perp. of Stem and Stern Post" and 27 ft. (8.23 m) "Breadth Moulded" with a "Draught of Water" of 15¾ ft. (4.80 m), strikingly similar to the dimensions listed by Monceau (Chapman 2006:iv). Chapman's work came out in 1768, after the proposed time frame of the Soldier Key vessel, though prior to its destruction the Soldier Key vessel may have looked very much like Chapman's lines drawing (Figure 34). It is worth noting that Chapman's vessel is ship-rigged and that the location of the main mast appears to be slightly aft of the center of the vessel.

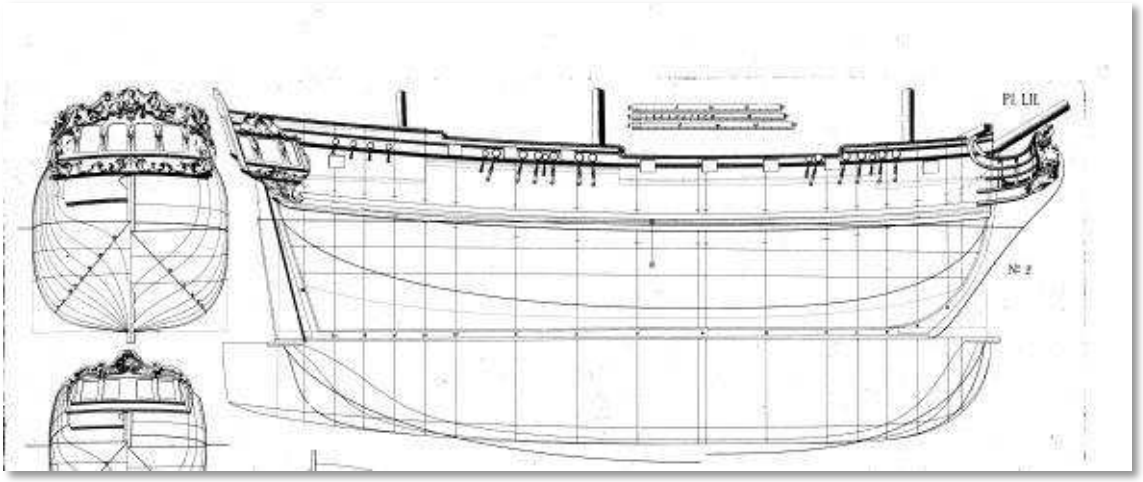


FIGURE 34. Lines drawing of a 1768 "English West India Trader." Plate 52 *Architectura Navalis Mercatoria*, Frederick Henrik AF Chapman, 1768.

With only one mast step discovered on the Soldier Key Wreck (and with only a general idea of where on the keel and keelson it sat) and little else in the way of rigging, researchers can

only speculate what sailing arrangement the vessel carried. The estimated tonnage (around 250) makes the vessel very likely to have been a ship-rigged vessel: a true ship. However, the lack of a mizzen mast step on the site suggests that it was a two-masted vessel—either a snow or brig. If the vessel carried only two masts, the more likely rig would have been that of a snow, as that rig was more common for open-ocean vessels than a brig rig (Davis 1956:77).

The mast step on the Soldier Key Wreck was quite large for a merchant ship of the time period, matching closely the dimensions in Ollivier's 1737 treatise for contemporary naval vessels. Ollivier had studied naval shipyards and as such the vessels he described are significantly larger than the typical West Indies merchant vessels of the time—much closer to the East Indiamen, and often built in the same shipyards by the same shipwrights. He wrote:

> The mast steps of the main and foremasts in the English ships present us with an object lesson in economy which deserves attention. We (the French) form both of these mast steps using a floor rider of the same or greater scantling than the ordinary floor riders, with two mast step carlings or side-pieces which are very broad and 5 or 6 ft. [1.62-1.95 m] long, two filling timbers and two or four large wedges. All these timbers save only the filling timbers are fastened to the bottom of the hull with more than 20 iron bolts. The English shipwrights make these two mast steps for a lesser cost. If there is a floor rider beneath the main or foremast, they make this floor rider of greater scantling than the others and cut a mortise in it into which the tennant at the heel of the mast is fitted. If there be no floor rider to hand, they fay to the keelson athwartships a timber 6 or 7 ft. [1.95-2.27 m] in length, in which there is a mortise to accept the heel of the mast. This timber is shown in Fig. 39 (Ollivier's original volume); it is scored beneath to fit over the

> keelson, and is fastened with 4 or 6 iron bolts. Its breadth fore-and-aft is equal to the given diameter of the mast or greater by two or three in. [5-8 cm], and it rises 16 to 22 in. [43-60 cm] above the keelson, according to the size of the ship. (Ollivier and Roberts 1992:87)

While little exists in the way of rigging, the few artifacts recovered, and the notes about those recovered by Cockrell, Biggers, Hall, and others, are of interest. The 1980s fieldwork resulted in a note and map regarding the general area where the chain plate and deadeye were recovered. While not providing exact provenience, the articulated chain plate appears to have been associated with the main mast, likely on the starboard side (Biggers and Hall 1982). The few rigging components recovered are not indicative of the sailing rig the vessel carried and give no greater indication as to whether the vessel carried two or three masts.

While not as heavily built as a warship, the vessel was carefully, though economically, constructed. There was some variance in where the first futtocks originated or terminated in the bilge and it appears, at least in the case of futtock number 10, that the shipwright changed his mind on where the timber was to be cut as a cut mark from a saw cross-cuts the futtock approximately 20 cm (7.87 in.) from the actual final terminus in the bilge (Figure 35). The terminal ends of all of the futtocks are somewhat variable as they do not follow a consistent measurement from the keel. None of the timbers were so rough as to have extant bark on them, though the eastern-most of the two exposed second futtocks did still have visible saw marks. While these unfinished timbers would not have affected the functionality of the vessel and would have been covered by the ceiling planking, it does show that less care was taken in refining the vessel. Such inconsistencies, while acceptable for a merchant vessel, would reflect back on the shipyard that produced it. Merchant shipyards generally produced ships as good as, or better

than, those of the Royal Naval shipyards as they ran as businesses and were therefore dependent upon profit and reputation rather than government contracts (Mitchell 1994:20).

FIGURE 35. Detail of futtock number 10 showing cross-cut. (Courtesy of the National Park Service, 2012.)

Archaeologically, the Soldier Key Wreck is remarkably similar to the Ronson shipwreck discovered in New York City in 1981 (Riess 2015). Fortunately, the Ronson Ship is more intact, having been used as fill after its usefulness or seaworthiness had declined. The scantlings of the various timbers are very comparable between the two and the proposed timeframe for the Ronson Ship's construction (1700-1740) is contemporary with the Soldier Key vessel's years of

sailing. The Ronson Ship was ship-rigged, around 100 ft. (30.48 m) long, had a beam of about 27 ft. (8.23 m), and a draft of 11 ft. (3.35 m). The ship had two decks; the depth of the cargo hold below the lower deck is 7.5 ft. (2.28 m) deep. The overall measured tonnage would have been about 260 tons. The ship had six gun ports on the lower deck, designed to carry six-pound guns. This small amount of artillery suggests the Ronson Ship was a merchant vessel rather than a warship (VanHorn 2004:67–72). The dimensions of the Ronson Ship compare favorably with Monceau's vessels and the Soldier Key Wreck, as well as the "English West India Trader" drawn by Chapman (Table 6).

TABLE 6

SCANTLINGS OF THE SOLDIER KEY WRECK, THE RONSON SHIP, AND TWO OF MONCEAU'S SHIPS

M. Duhamel du Monceau's Dimensions			Soldier Key Wreck	Ronson Ship		
Ship Length	96'	106'10"	Unk.			100
Ship Breadth	24'	27'	Unk.			27'
Keel "Deep"	13"	13.6"	Unk. (20" according to Hal	l)	4"	
Keel "Broad"	10"	10.7"	11.42-12.2"			12"
Floor "Broad on Keel"	7.6"	8.2"	7.78" avg.			8.5
Floor "Deep on Keel"	11.6"	12.6"	13.81" avg.			8.5
Futtocks "Out and in at the Lower Deck"	6.6"	7.1"	7.35" sided avg.	10.58" molded avg.	8.5"	
Planchers "Thick" (Planks)	2.6"	2.9"	1.73" avg.			2"

William Sutherland's 1711 English treatise on shipbuilding lists several construction features not found on the Soldier Key Wreck. Of particular note is Sutherland's (1711:70) reference to a "Keelson scor'd into the Floor-timbers". While the keelson was no longer present on the Soldier Key Wreck by the 2012 excavation, photographs from the 1980s show it in place

and sitting above the floors without mortises cut to accept the floor timbers. Another feature mentioned by Sutherland (1711:70) that is inconsistent with the construction of the Soldier Key Wreck is his reference to "Every other Floor-timber to be bolted through the Keel with a Bolt in Diameter…". Unlike Sutherland's vessel description, every extant floor timber on the Soldier Key Wreck was bolted directly to the keel with an iron drift bolt.

The Soldier Key Wreck shares some construction features with at least one other contemporary vessel as well. The Rose Hill Wreck exhibited first futtocks that did not extend all the way to the keel or keelson, similar to those of the Soldier Key Wreck. This feature was a carryover from before vessels were built with more space between the frames to allow greater airflow in an effort to reduce rot in the bilge (Wilde-Ramsing et al. 1992:47). Another diagnostic construction feature shared by the two vessels is the rabbet location near the top of the keel. This feature was typically seen prior to 1780, and usually on naval vessels; merchant vessels usually had the rabbet cut around 50% the depth of the keel. The rabbet location suggests that the shipwright may have had formal training at a naval yard prior to constructing merchant vessels (Goodwin 1987:7).

The least conclusive indicator of 18th-century construction is the sacrificial wooden sheathing applied to the outside of the hull. Sacrificial wooden sheathing is by no means a definitive indicator of construction prior to 1800 as sacrificial wood sheathing was still the preferred sheathing for merchant vessels until well into the 19th century, even in such teredo-prone areas as the West Indies. It is, however, all that was available to shipwrights as a viable solution prior to deciphering the problems associated with copper sheathing in the late 18th century (Staniforth 1995:22–26).

The exclusive use of white oak in the construction of the Soldier Key vessel, with the exception of the sacrificial sheathing, is rather typical of most British vessels and not especially diagnostic. The preference for using white oak in ship construction by English shipwrights was well established by the 18th century. White oak is heavy, hard, strong, tough, and durable, shrinks moderately, warps little, and holds fasteners well. The elasticity of white oak makes it ideal curved timbers, such as frames, used in constructing a vessel. For these reasons, as well as its plentiful range and generous amounts of both compass and straight timbers, oak was a preferred wood for shipbuilding. There are several drawbacks however: the acidity of oak is known to react with iron fittings, it can shrink tangentially, and it takes significantly longer to season than many other woods (Mitchell 1994:84).

There are two types of white oak, European white oak (*Quercus rober*) and American white oak (*Quercus alba*). The differences between the two, even on a microscopic level, are miniscule, if present. Once one factors in the variables in individual trees, telling the two apart is impossible. Similar issues arise in analyzing the sacrificial sheathing. Scots pine (*Pinus sylvestris*) is a European wood, while red pine (*Pinus resinosa*) is a New World wood. These woods, too, are indistinguishable at the microscopic level. Sheathing, of course, was designed to be eaten by shipworms and would be replaced more frequently wherever necessary, New or Old World. While the ability to decipher the continent from which the wood used in constructing the Soldier Key Wreck came would be desirable, it would not necessarily determine on which continent the vessel was constructed. Definitive proof of European white oak construction in the frame of the vessel would favor English construction. Conversely, given the nature of timber trade between the colonies and England at the time, the vessel could have nothing but New World oak in its construction and still have been built on the Thames (Mitchell 1994:83,91).

The practice of using non-native wood stems from centuries of over-harvesting of British forests. To combat this problem, shipwrights, both naval and merchant, began importing timber from both the Baltic and the North American colonies. The Trade and Navigation Acts of 1651 complicated the importation of timber from both the Baltic and North America. The acts strained relations in the Baltic, particularly with Sweden, who, in 1702, refused to sell England any naval stores unless Sweden could deliver them in their own ships and at their price and quantity. The loss of Baltic naval stores resulted in England seeking to be self-sufficient in naval stores by utilizing the resources available in its North American colonies.

North America, and particularly the colonies in the northeast, was rich in timber and settlers began exporting it soon after settlement. As the northern colonies were not as productive agriculturally as the southern colonies and those in the West Indies, timber became one of the northern colonies' chief exports. Because lumber was plentiful, agriculture was not, and the topography was ideal, the northern colonies also became involved in shipbuilding. The vessels built in the colonies were much cheaper to build. By the mid-18th century building a ship in Boston cost £8 per ton and £10.10 in the Carolinas, compared to £15.5-16.6 in England. Colonial-built vessels, like many other colonial products, acquired a bad reputation. The vessels built in New England were considered British-built and as such English owners could purchase them without violating the Navigation Acts (Mitchell 1994:32–33). Despite their bad reputation, English shippers continued to purchase colonial-built ships. By 1730, perhaps one in every six English vessels was of American origin; by 1760 it was one in four. Still, American-built vessels were used only to a small extent in the West Indies (Davis 1972:66–68). The vessels built in America looked no different than those produced in England at the time (Chapelle 1967:11).

The Soldier Key Wreck was likely an English-built vessel, though it may have been built in the colonies. The vessel was purpose-built as a merchantman, and the shipwright likely had some training or at least influence from naval shipyards. The lighter build of the vessel indicates it was not intended to carry guns or to sustain much damage from those used against it. Speed was secondary in the consideration of the building of the vessel with cargo capacity being the principal factor. The size of the vessel suggests that the vessel carried a true three-masted ship's rig.

Bricks

The brick fragments recovered were too few to represent primary cargo of the vessel and were most likely the remains of the hearth. The bricks are listed in conjunction with the hull of the vessel instead of the cargo or personal effects of the crew for this reason. No completely intact bricks were recovered during the 2012 project, but one (BISC 636) was nearly intact and, after conservation, researchers could determine the thickness and width. While there was variability in size, even within the same batch, the general size of English bricks was prescribed by statute. According to Richard Neve's 1736 *Builders Dictionary*, statute bricks should measure 9 x 4 ½ x 2 ¼ in. (22.86 x 11.43 x 5.71 cm), though the statute of Elizabeth I (1571) called for bricks 9 x 4 ¼ x 2 ¼ in. (22. 86 x 10.8 x 5.71 cm), and the statute of George I (1725) specified two different kinds of bricks: place bricks and stock bricks. The newer statute called for an additional quarter inch (.64 cm) of thickness for place bricks bringing the dimensions to 9 x 4 ¼ x 2 ½ in. (22.86 x 10.8 x 6.35 cm). The statute called for yet another eighth of an inch of thickness for stock bricks bringing the dimensions to 9 x 4 ¼ x 2 ⅝ (22.86 x 10.8 x 6.67 cm) (Nöel Hume 2001:81).

The dimensions from BISC 636 (15.9 x 10.6 x 5.55 cm [6.26 x 4.17 x 2.18 in.]), or specifically the width and thickness, as the length was clearly broken off, are roughly consistent with the earlier Elizabeth I statute. Both dimensions are approximately the same amount off of the statute specifications, and given the variability of the bricks at that time and that the other brick fragments are so badly eroded, erosion could also account for the reduced dimensions.

In addition to variability in size, the bricks varied in hardness even within the same batch due to their location in the kiln. Neve's book separates these into three categories: "clinkers" are the hardest bricks that were closest to the fire, those of the poorest quality that erode quickest are "samel" or "sandal-bricks" which lie farthest away from the kiln, the unnamed type between clinkers and samel bricks in hardness and quality were fired between the other two (Nöel Hume 2001:81).

The bulk of the brick fragments recovered from the Soldier Key Wreck appear to have been samel bricks as they were very badly eroded—some to the point of having no flat sides. These samel bricks were likely cheaper than the other two varieties and may have been an attempt to economize when fitting out the ship. Since the bricks' function was more for insulating the vessel from fire than long-term wear as a building material, samel bricks would likely have been sufficient. While the provenience of the site was severely compromised by the time the crew conducted the 2012 fieldwork, Hall or Biggers also mention a "brick oven" in the few field notes obtained by the Park Service (Biggers and Hall 1982). Research has turned up no other notes or photographs from the 1980s work regarding the hearth, but the bricks possibly were distributed in such a way as to lead them to that conclusion. This would be somewhat unusual on the current extant portion of the ship in 2012, as the hearth was typically located in

the bow of the vessel—a portion of the vessel which was no longer present (VanHorn 2004:80–81).

Ceramic Assemblage

The ceramics recovered from the Soldier Key Wreck are few in number, utilitarian in nature, and appear to be the personal effects of the crew. The majority of the small amounts of ceramics recovered in the 2012 excavation are brown lead-glazed coarse earthenware (Figure 36). The paste of most of the sherds is buff to tan, though the thinner, more refined sherds possess an off-white or gray paste. The glaze on all of the lead-glazed sherds is dark brown, varying in thickness from relatively thin to very thick where it pooled inside the container to which the manufacturer applied it. The mottled brown glaze, the variability of the paste, and the occasional turned bands are indicative of manganese mottled ware (Draper 1984:12; Jefferson Patterson Park and Museum: State Museum of Archaeology 2002).

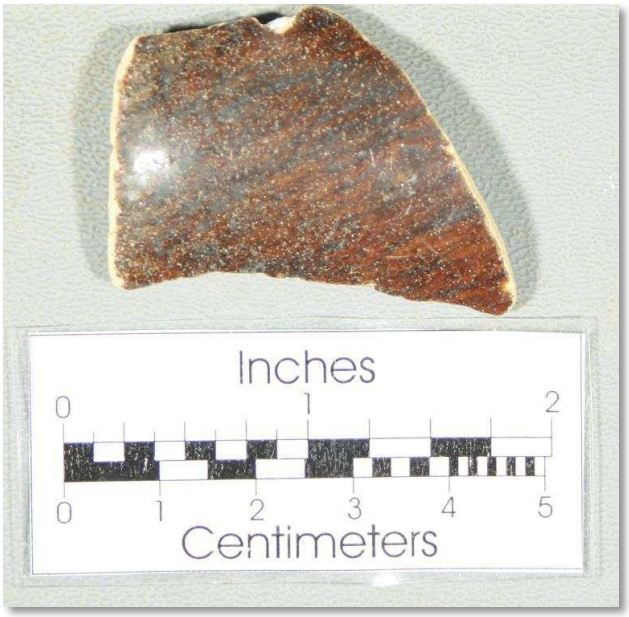


FIGURE 36. BISC 650. Manganese mottled ware recovered from the Soldier Key Wreck. (Photo by author, 2014.)

Documentary evidence suggests that potters were manufacturing manganese mottled ware in Staffordshire by the mid-1670s. Traditionally, archaeologists have assigned manganese mottled ware a date range of 1680-1750, though potters likely manufactured it through 1780. The height of popularity for manganese mottled ware was during the late 17th century and early decades of the 18th century. While generally associated with Staffordshire, and for that reason it is also frequently referred to as Staffordshire mottled ware, manganese mottled ware was also manufactured in Yorkshire, Bristol, and various centers in northwest England, as well as Buckley, Wales. Differentiating where a particular piece was manufactured is very difficult, however (Jefferson Patterson Park and Museum: State Museum of Archaeology 2002). In addition to English manufacture, American colonists were attempting to emulate British (and other countries' as well) ceramics by the early 18th century, further confusing the provenance of the ceramics. Colonial potters copied manganese mottled ware in particular by retaining the natural iron impurities in the lead glazes (Pendery 1985:112).

Divers located a single piece of slipware during the 2012 excavation, BISC 587 (Figure 37). The small single rimsherd has a white paste, and a single band of a greenish brown slip placed over a reddish slip, visible on the inside of the vessel. Vessel shape, given that the sherd is a rimsherd, is likely a plate, saucer, or serving platter. Slipware was being made in England from the early 17th century. While numerous types of slipware were made in England, the most easily identifiable attribute of this sherd, lacking any decoration other than the tiny band indication that it is slipware, is the white paste. Earlier slipwares from Harlow, Wrotham in Kent, and the "Metropolitan" slipwares of Essex all utilized a red paste in their construction. Later slipware dishes from Staffordshire utilized white paste and were made within almost the exact same time as the manganese mottled ware (1675-1770s). This Staffordshire slipware often was combed

with very dark slip giving the dishes a wasp-like appearance. The most likely type of slipware for the sherd on the Soldier Key site, lacking any other sherds to go by, is a type found on sites in the West Indies that was shaped over bat molds decorated with incised ornamentation that transferred to the dish. The dish was then decorated with brown slip and clear glaze over the white paste and then fired. This technique was common in the late 17th century and saw a revival in the second quarter of the 18th century, though the latter incarnation had simpler decoration (Nöel Hume 2001:102–104,134–137).

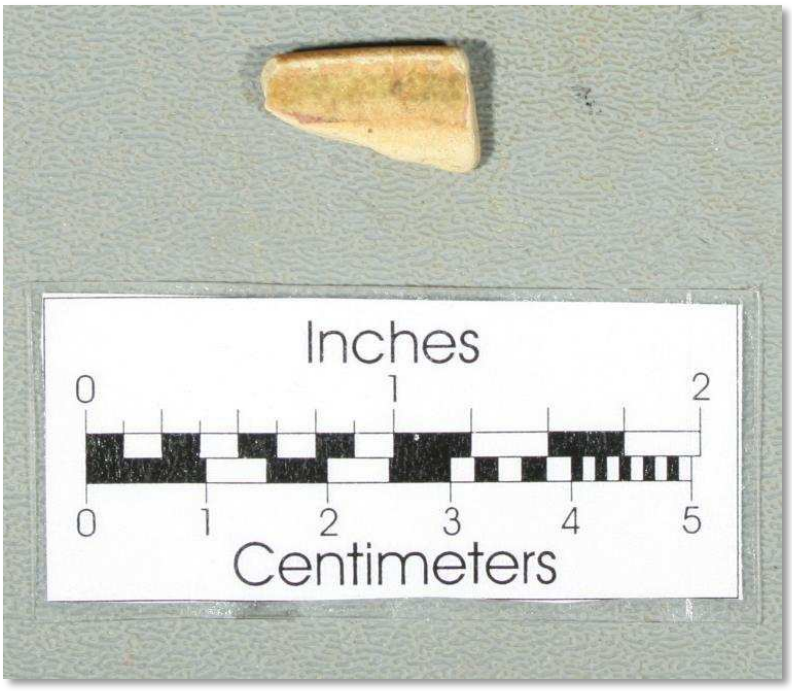


FIGURE 37. BISC 587. Slipware rimsherd. (Photo by author, 2014).

The presence of several sherds of Spanish storage jar on the wreck is temporally diagnostic. The term "Spanish storage jar" serves as a catch-all category to describe utilitarian coarse earthenware vessels with olive jar paste, but in forms that are distinct from olive jars such as straight sides, flat bases, wide mouths, etc. (Florida Museum of Natural History 2014). What the vessels contained is unknown, but the nationality is unquestionable. The presence of Spanish

ceramics on a British ship is not uncommon, specifically given the time and region within which the vessel was operating.

In the early 18th century Jamaica was "as much a trading colony as a plantation;" the height of this trade took place in the 1730s and 1740s, but had declined considerably by the 1760s (Burnard 2001:511). So much illicit trade occurred that Spain and England experienced much conflict leading up to war over mercantilism and sovereignty in the War of Jenkins' Ear (Temperley 1909). The presence of Spanish ceramics on a British merchant vessel indicates trade (likely illegal) with the Spanish. Given the vessel's course from Jamaica to where it wrecked in Florida, such trade likely took place in Cuba or the surrounding waters.

Doug Biggers donated several pieces of ceramic, as well as a chain plate and deadeye (the BISC Accession 420 collection), to the NPS prior to the 2012 excavation after receiving an inquiry from Charles Lawson. Unfortunately, the sherds (and the other items returned to the Park Service supposedly from the Soldier Key Wreck) were scattered among artifacts from several other wrecks and Biggers identified them as being from the Soldier Key Wreck from memory. Because Biggers' collection lacks provenience, and the artifacts are not necessarily from the wreck, they are given secondary consideration for diagnostic features or characteristics. Photographs from Biggers taken in the 1980s, though not on site, as well as some crude drawings and maps, suggest that the artifacts he identified as belonging to the Soldier Key Wreck are likely from the wreck. For that reason, and the general lack of properly provenienced artifacts, these items are not discounted entirely. The ceramics donated by Biggers, despite being nearly intact vessels, are untyped utilitarian lead glazed coarse earthenwares. One (BISC 662) is a plate with a buff paste and greenish-yellow glaze (Figure 38). The other (BISC 663) is a galley pot with annular incised bands (Figure 39). The galley pot also has buff paste, a yellowish glaze on

the interior and exterior of the pot, and was partially mended by Biggers using an unknown adhesive.

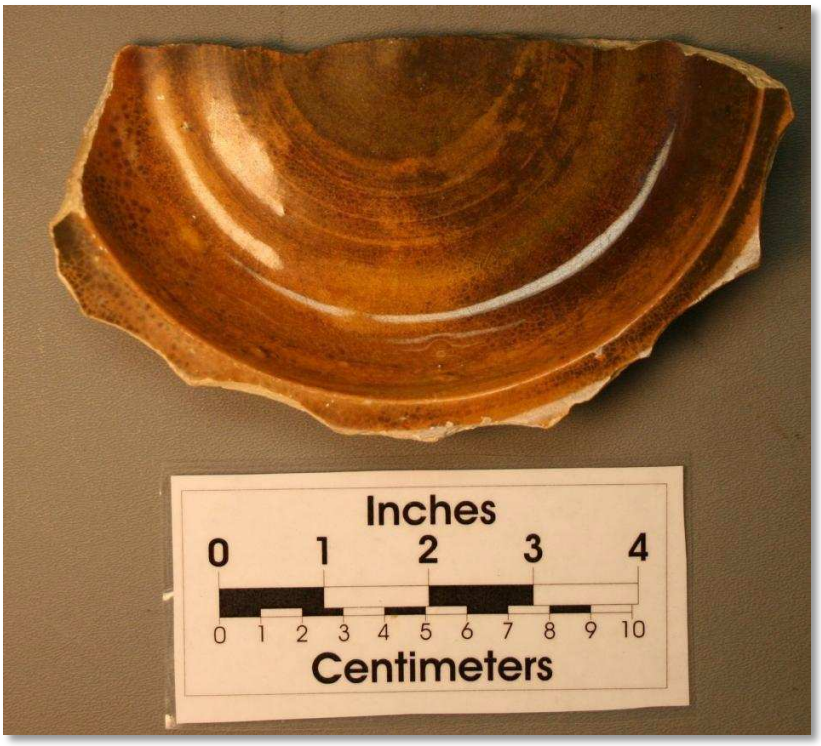


FIGURE 38. BISC 662. Ceramic plate from the Biggers collection. (Photo by author, 2014.)

FIGURE 39. BISC 663. Galley pot from the Biggers collection. (Photo by author, 2014.)

Aside from the sherds recovered from Biggers, the Park Service has not located any ceramics from Hall's excavation, nor from the surface collections obtained by the BAR in 1976. However, records from the BAR and SEAC collections list the site as having porcelain (Cockrell 1976a), stoneware (Cockrell 1982b), Olive Jar (Florida Master Site File 2008:Supplementary Printout), and two additional nondescript types listed as "coarse earthenware" (National Park Service 1985a), and "glazed fine earthenware" (National Park Service 1985b).

Glass Assemblage

The presence of glass on the site is associated more with the sailors themselves than with a commodity being shipped. While rum would have been a likely cargo from Jamaica, it was more economical to ship bulk commodities such as alcoholic beverages in large containers (Mathias 1959:172), making the presence of bottle glass more likely associated with the personal drinking habits of the crew onboard the vessel.

The glass assemblage recovered in 2012 is relatively small, lacks provenience, and has only one immediately apparent diagnostic feature: an applied string finish. The artifact with this finish (BISC 615) (Figure 40) is temporally diagnostic as well. By 1700 the applied string was located only millimeters from the mouth of the vessel. This V-shaped applied string finish lasted until the 1770s. This singular diagnostic feature puts the date of this vessel from 1700-1770s (Jones 1986:43). The collection is, of course, also incomplete. Hall and others removed the more complete, easily obtained, and desirable pieces. While the bulk of the glass is an odd light blue color, it appears that this blue glass was actually dark olive green (also called black bottle glass) that took on the blue hue as a result of impurities imparted during the heat/melting from the contemporary salvage.

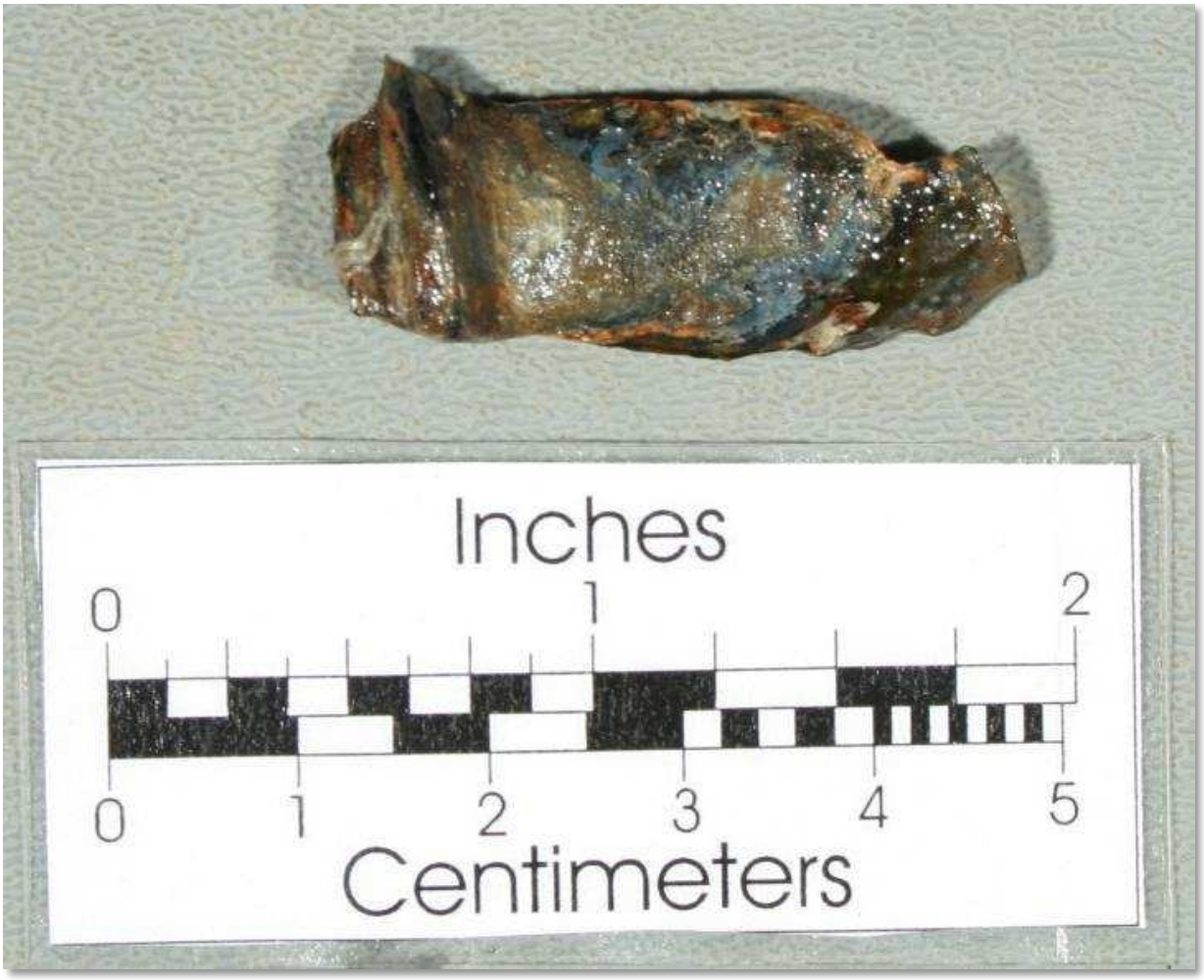


FIGURE 40. BISC 615. Applied string finish bottle treatment. (Photo by author, 2014.)

Faunal Assemblage

The bones that Cathy Parker, faunal specialist at the University of West Florida, identified to species and anatomical location are mostly bovine (*Bos taurus*) and consist of vertebra from the thoracic (BISC 627) and lumbar regions (BISC 598) of at least one animal, and a rib and a spirally fractured radius (BISC 649) and other long bones. The single lumbar vertebra recovered exhibited unfused epiphysis (Cathy Parker 2013, pers. comm.), suggesting a younger individual. While in general, pork was preferred over beef for salting due to the saturated fat in the meat readily absorbing the salt (Oliver 2005:118), researchers only recovered a single pig

(*Sus scrofa*) bone from the site in 2012. This pig bone was an unfused proximal epiphysis of a number one phalynx (toe). Again, the unfused epiphysis suggests a younger individual, less than two years old (Cathy Parker 2013, pers. comm.). Defining the cuts of meat skeletally using modern terms to define the cuts, the beef assemblage consists of the thoracic vertebrae and the rib bone corresponding to "ribs," and the lumbar vertebra, the loin. The broken cow radius corresponds to the front shank, and the single pig phalynx epiphysis is (obviously) part of a pig's foot (Lyman 1979:541).

While pork was the preferred meat for salting, certain fatty beef cuts were also quite suited for salting such as beef brisket and beef sausages. However, for curing meat for an extended period of time, such as in provisioning a ship for a transoceanic voyage, butchers would salt almost the entire animal, which made some of the cuts particularly tough (Oliver 2005:118). Harvesting marrow from the bones of butchered animals was also not an uncommon practice and not one that sailors practiced exclusively. Collecting marrow was, in fact, such a common practice that a special utensil, the marrow spoon, was developed specifically to aid in this task (Tunis 1999:84). A contemporary (Nott 1723) cookbook calls for marrow for almond florendine [*sic.*], artichoke dishes, meat balls, barley pudding, bean tarts, bouillans [*sic.*], white broth, bustards, calf's chaldron pudding, calves foot pudding, roast calf's head, boiled chickens, and in many other recipes. Clearly, marrow was an important part of the 18th-century diet (Nott 1723:13,36,39,45,50–51,53,79,86,89,98,99–101,126). Nott (1723:365) also mentions how to prepare pigs' feet, or as they were called, "petty toes", in addition to the beef dishes.

Cattle were a product of colonial Jamaica even before Jamaica became an English colony in 1655, and were in fact the biggest industry prior to slaves. Cattle and slaves have always been connected in the history of Jamaica. Slaves were a valuable commodity and were often listed

alongside or even with cattle in listing a plantation's assets. John Pinney, a Nevis planter, said that, "slaves and stock ... are the sinews of a plantation" (Morgan 1995:47).

The sugar economy did not evolve in a vacuum: cattle production was tied in with slavery to expand production of sugar cultivation. In 1774 Edward Long explained how sugar had expanded, but not at the expense of farms and pens: "It is more probable, that the augmentation of sugar-estates has been the means of increasing the number of penns, by enlarging the demand for pasturage and stock" (Morgan 1995:48). Certainly, and necessarily, there were ample supplies of beef to provision the West Indiamen that transported Jamaica's goods.

Researchers only found two bones that were not used in victualing during the 2012 fieldwork. A single rat (*Rattus*) bone from the artifact collection BISC 627, in conjunction with the cattle (*Bos taurus*) thoracic vertebrae, also from BISC 627, that exhibited rodent gnaw marks show evidence of vermin on the vessel. Rodents were normal stowaways on vessels.

The other non-food bone is a worked artifact (BISC 603) (Figure 41) from a bone tool or knife handle scale (a scale is part of a handle, usually wood or bone, that attached to either side of a either a folding knife or a fixed blade knife with a full tang). The shape of the artifact, asymmetrical to conform to one's hand, suggests that it was attached to a tool used vertically, rather than to a tool, such as a fork, which would have symmetrical scales affixed horizontally (Nöel Hume 2001:182).

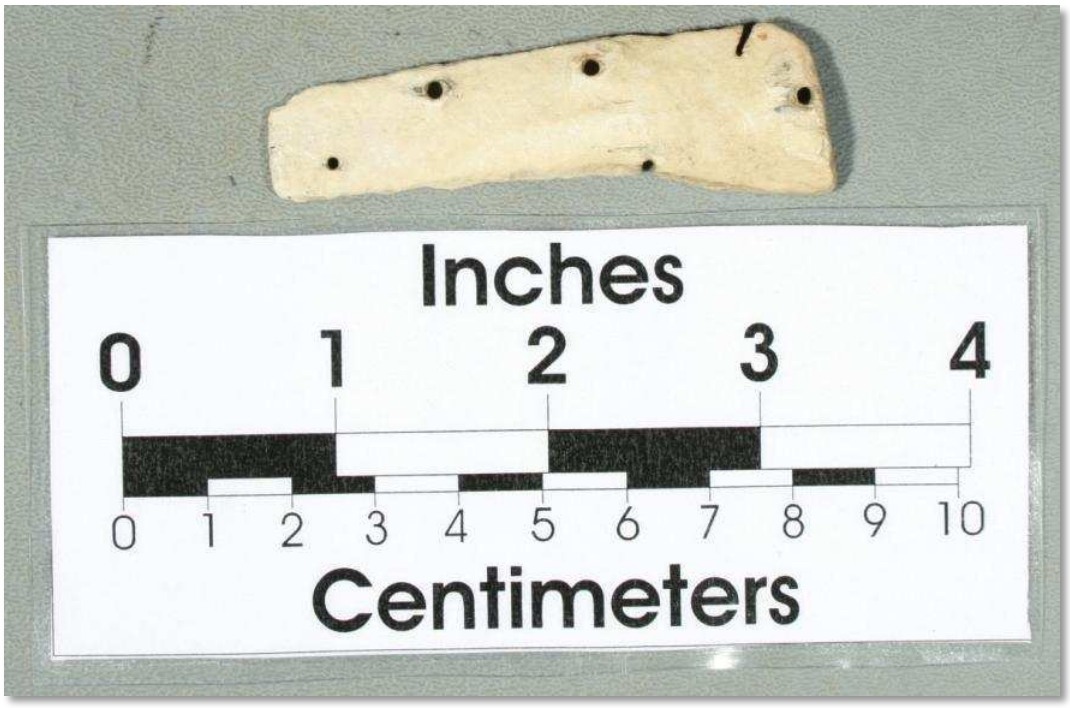


FIGURE 41. BISC 603. Bone knife handle scale. (Photo by author, 2014.)

Folding knives of the day tended to be rather long and slender with correspondingly slender handles. While often manufactured from bone, the typical arrangement to affix the handle to the center scale (an undecorated piece, usually metal, that gave the knife structural support) and spring was a series of three pins. Often metal bolsters were present on either end of the bone or wood scale (Perret and Benard 1771:chap. 12, Plate XXXI) (Figure 42). The same arrangement was also used to affix handle scales to fixed blade knives with full tangs, though many omitted the aft bolster. BISC 603 has a total of five pin holes, an unusual number and one still not often seen on modern folding knives that utilize bone for handle: the preference for three pins still exists. Additionally, the shape of the artifact is a bit unusual, not conforming to the slender folding knife handles of the time (Nöel Hume 2001:182) or to the pistol grip-shaped handles of flatware knives of the time.

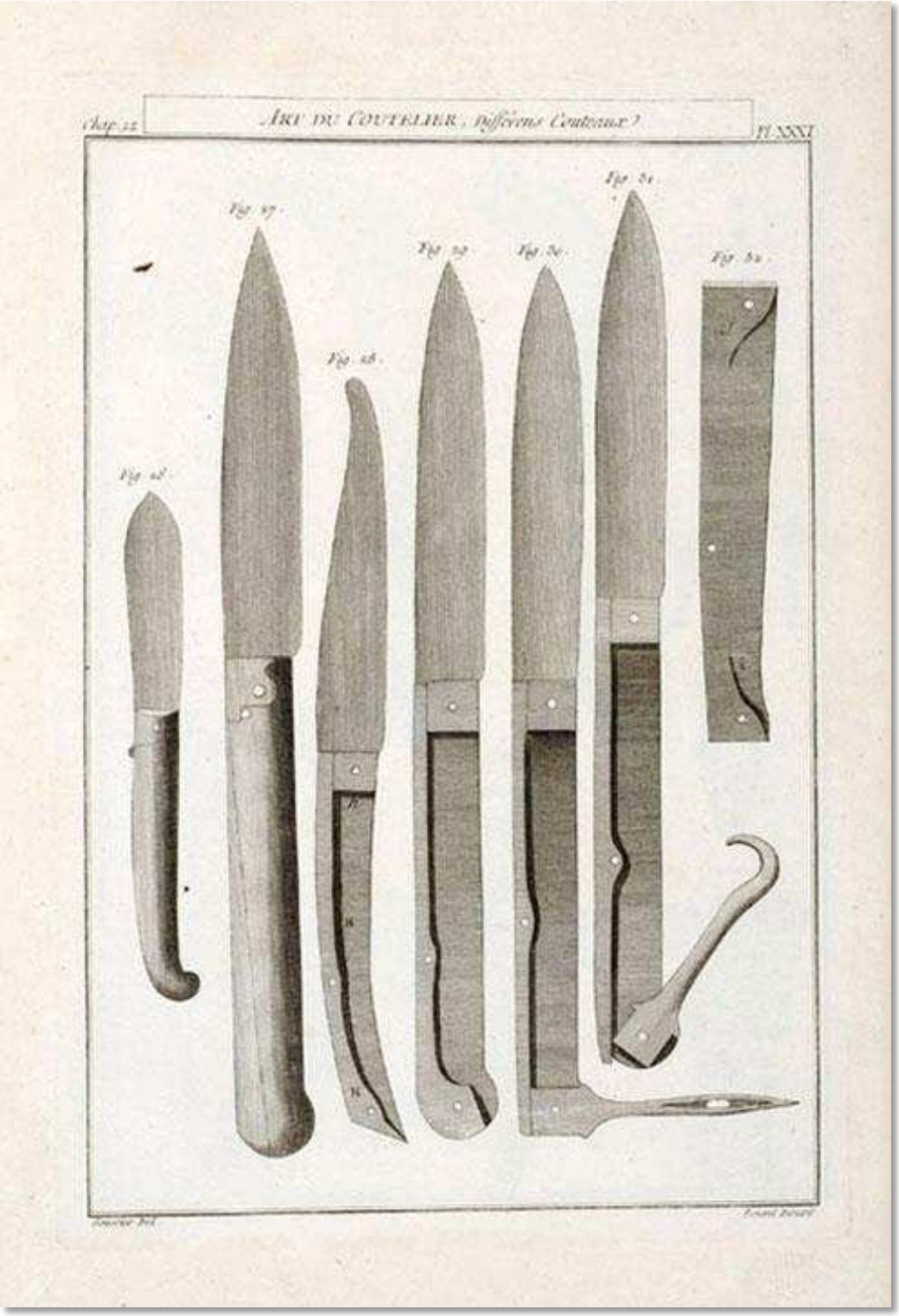


FIGURE 42. Eighteenth-century folding knives cutaway view (Perret and Benard 1771:chap. 12, Plate XXXI).

The remains of the ship, as well as the scant number of artifacts recovered from the site, suggest that the Soldier Key Wreck was an economically-built British West Indiaman of around 100 ft. (30.48 m) long, 25 ft. (7.62 m) in breadth, of around 250 tons displacement, ship rigged, and carried the utilitarian personal effects of British sailors of the second quarter of the 18th century. The vessel was transporting allspice from Jamaica, likely back to England, when it wrecked. It was provisioned with cuts of beef and pork, probably salted. More could have been ascertained from this wreck had the records and artifacts from the previous investigations been available for study. Still, given the scant amount of material culture present, the wreck yielded enough information to understand the environment in which the vessel and its crew sailed.

CHAPTER VI

CONTEXT DISCUSSION

With the material culture recovered from the Soldier Key Wreck indicative of a British West Indiaman sailing from Jamaica in the early 18th century, an economic and political analysis of British interests in the Caribbean at that time is necessary to contextualize the vessel. Slavery, illegal trade, and continental issues all played heavily in this analysis. As there is no definitive indicator of which particular vessel the Soldier Key Wreck is, a broader contextual approach was explored to investigate how the Soldier Key Wreck came to be cast upon the grass flats where it now rests.

"*Jamaica is a Constant Mine, Whence Britain Draws Prodigious Riches*"

While the British extracted considerable wealth from their colonies, Jamaica was singularly the most profitable of the British West Indies. Charles Leslie wrote in the mid-18th century, "Jamaica is a Constant Mine, whence Britain draws prodigious riches" (Burnard 2001:506). Scholars have long argued the degree to which sugar made the West Indies, and in particular Jamaica, wealthy (Sheridan 1965, 1968; Thomas 1968; Ward 1978; Coclanis 1990; Burnard 2001). Many commodities were extracted from Jamaica; since shortly after taking possession of the island from the Spanish, British merchants left Jamaican ports with indigo, cochineal, ginger, coffee, mahogany, ebony, lignum vitae, cotton, vanilla, cacao, hides, black pepper, and, of course, allspice (Browne and Ehret 1756:12–16,119,130,158,283,326). Sugar, and the rum and molasses produced from the sugar cane, were the products on which the rich planters profited most heavily. In one Jamaican parish in the mid-18th century, sugar and rum were responsible for 85% of the total export-earned revenue (Mulcahy 2006:67).

Anthropologist Sidney W. Mintz describes Caribbean sugar production as a protoindustrial endeavor that combined the methods of field and factory (Mintz 1986:47–51; Smith 2005:41). Production of sugar relied not only on an immense amount of manual labor, but also on technology in the form of sugar presses and subsequent procedures to render the cakes of sugar. In addition to the raw sugar, planters sought to profit from the byproducts of the sugar cane, molasses, and scum (unrendered molasses) used in the production of rum. British Caribbean sugar planters ran an especially robust rum distillation industry, pulling far away from their Spanish and French counterparts, with Barbados and Jamaica at the forefront (Smith 2005:41).

The quality of the sugar cane depended on the soil in which it was planted. Consequently, some sugar cane was relegated strictly to the production of rum. Jamaican sugar planter Edward Long noted that cane grown on the north side of the island produced sugar cane juice "so viscid that it often will not boil into sugar." The plantations from which this cane came, however, produced "an extraordinary quantity of rum" (Smith 2005:42).William Beckford also noted that the cane grown in the mountainous north was better suited for rum production (Smith 2005:42).

Regardless of the intended final product that the sugar cane was to produce, the process for extracting the juice from the sugar cane was the same. The cane was harvested every year in the Caribbean, usually in the dry season between January and May. The cane went bad quickly after being cut, so processing the cane in a timely manner was crucial. The cane was initially brought to the mill and pressed to release the juices. These juices were then boiled in large copper cauldrons. While boiling, impurities would rise to the top in the form of foam that the boilers called scum; this was skimmed off by the boiler. This process continued through successively smaller cauldrons until the boiler believed that the juice had reached the appropriate

viscosity. At this point the thickened juice was transferred to wooden barrels or earthenware molds in the purging house. In the new containers the last of the impurities, now called molasses, drained off and left a loaf of still-wet brown sugar or muscavado. The scum and molasses were used in the production of rum (Smith 2005:43–44).

Although the 2012 fieldwork produced no evidence of sugar production or transportation on the Soldier Key Wreck, the economy of the time in Jamaica virtually guaranteed that the vessel carried sugar, molasses, or rum. Even in the unlikely event that the vessel was not carrying sugar, or one of its byproducts, as cargo, sugar is the crop on which Jamaica's wealth was based and the cultivation of sugar affected the vessel directly or indirectly. The English sugar trade with the West Indies ended almost exclusively in London, with that port still handling 75% of the sugar trade by the middle of the 18th century (Davis 1956:270).

Jamaica was rich not only because of sugar, but also because the white landowners and land managers profited from the 92% of the population whom they owned as property. Very little of the wealth produced in Jamaica trickled down to the majority of its population. Slaves, as property, could not by law own property; what property they did possess illegally was very limited. Slaves obviously earned no wages and, beyond the initial cost of purchase, cost almost nothing to maintain as they were generally self-sufficient, subsisting through what little they could provide for themselves. Still, slaves generally lived perilously close to starvation (Burnard 2001:508). The practice of slavery allowed the West Indies to prosper and, as will be explained shortly, led to many issues between the countries that possessed colonies in the Caribbean.

Colonial Trade and the Vessels Employed

The vessels employed in the transportation of manufactured goods and human cargo to the West Indies, and in the transportation of the raw materials and exotic commodities produced

on the islands back to England, like many other types of vessels, began to take on a distinct suite of characteristics. Typically, the vessels employed in trade to the West Indies, like those employed in trade in the East Indies, engaged in that trade, and only that trade, for the life of the vessel. The only disruption to this pattern was war (Davis 1956:195).

The characteristics that make up the West Indies merchant vessels are somewhat less specific than those that make up the East Indiamen, because of their less-specific nature and the larger variety of shipyards that built these vessels. The East Indiamen were very similar to naval vessels in both armament and size throughout their usage, often built in the same yards and with input from the Navy Board. Their massive displacements required true ship rigging whereas the West Indiamen carried a variety of sailing configurations (Barnard 1997:2–7). However, the Royal Navy ended contracts with private shipyards in 1710 and did not commission any ships from private yards again until the outbreak of the War of Jenkins' Ear in 1739 (Mitchell 1994:20). West Indiamen, like East Indiamen, took a form that maximized their utility while not wasting valuable cargo room. The duration of a voyage for an East Indiaman was usually twice that of a typical West Indiaman (Davis 1972:257–266,370), and as such there was a greater specialization of skills for a greater number of personnel, again much like a naval vessel.

The greatest influence on English shipbuilding at the turn of the 18th century was that of the Dutch. Dutch ships began dominating the European trade around the turn of the 17th century. Around this time they developed the "fluyt," "flute," or sometimes listed as "fluit:" in English, a flyboat (Figure 43). Generally agreed that it had become a vessel type by 1595, the flyboat naturally was the result of much experimentation and modification. The flyboat influenced English shipwrights and rightfully so (Davis 1972:48).

The flyboat dominated shipping simply because it was cheaper to operate. This economy came from a much-reduced crew over other competing nationalities. A flyboat could sail with little more than half the crew of a comparably sized English ship in the same conditions. Despite a long keel, the Dutch shipwrights seemingly concentrated on the inside of the hold rather than the exterior lines of the hull. In doing so, the shipwrights minimized much of the useless space in the hold that had previously been occupied by timbers necessary to maintain the sleek lines of the English ships of the day. The bottoms were relatively flat, the rake was small, and the bows were bluff. George Waymouth wrote in 1610 that, "The ships of the Low Countries are built longer according to their bredth and depth, than our Ships are. They bee built with broader and longer bottoms proportionable to their length, than our Ships bee" (Davis 1972:49). The Dutch ships had a much higher volume of accessible cargo space relative to their main dimensions.

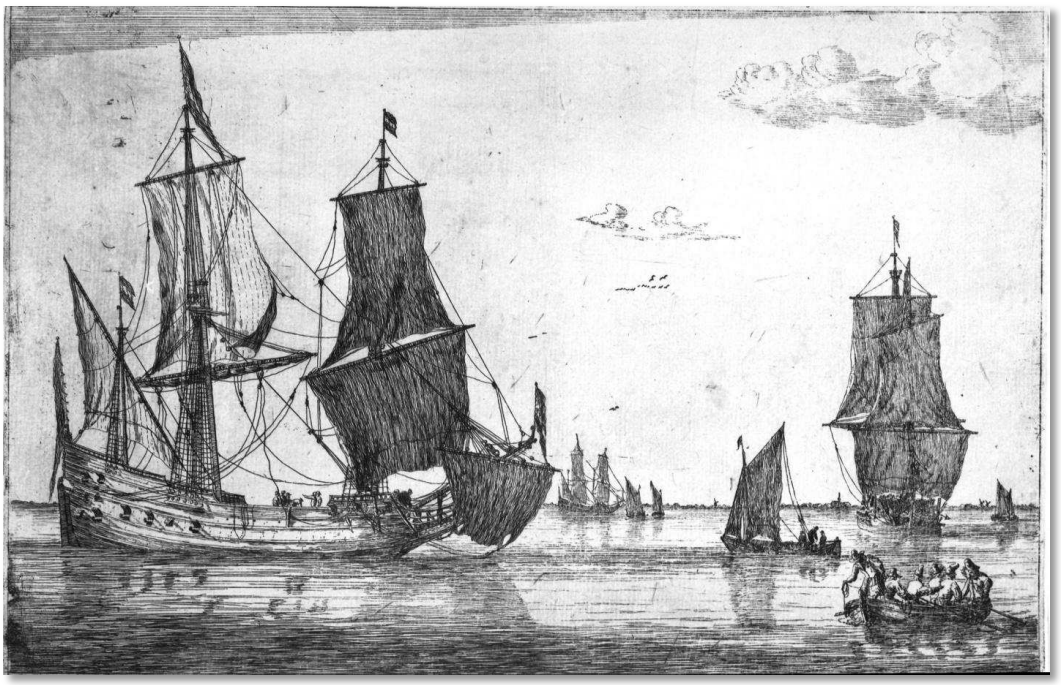


FIGURE 43. Mid-17th century Dutch flute (left); note the small amount of armament. (*Naval Harbours with Shipbuilding*, Reinier Zeeman ca.1650-1667 © Trustees of the British Museum, London, England, 2014 [Copyright permission in Appendix D].)

The flyboats, not being much concerned with speed, carried a relatively small area of sail. The sail area was the chief determinate in the size of the crew of any given ship. Designed as slow cargo carriers, the flyboats had other advantages: they were lightly built as they neither had to bear the load and recoil of cannon nor were designed to accept fire from enemy cannon (Davis 1972:49–50).

The English adoption of many of the traits of the flyboat was relatively slow and took the capture of large numbers of Dutch vessels during the Dutch wars of the 17th century for the English to fully appreciate the design. By the early 18th century, English shipwrights had adopted many of the traits of the Dutch flyboats for their own merchant vessels as the Dutch Wars could not be expected to carry on to supply this demand forever (Davis 1972:50–55). While the Dutch influenced changes in the design of English ship construction of the time, the English were still excellent shipwrights and adapted many of the Dutch traits rather than adopting them wholesale. Many treatises of the era recorded construction features in addition to just the dimensions and lines of the vessels (Sutherland 1711; Riley 1750; Ollivier and Roberts 1992; Chapman 2006).

The economy in the use and building of flute-type vessels became apparent to merchants by the late 17th century. The Dutch competition was simply too cheap for British sailors and merchants to ignore. Sir George Downing wrote in 1663:

> And for our English ships they are rather tubs than ships, made to look like a man of warre, and yet not of strength to defend themselves against a single chaloupe by reason of their shortness and their fore castles and steerages they are so little in hold and so bigg above water, that there is noe good to be done with them…In a word I doe not know of anything more worthy of his Maj^{ty} & the Duke of Yorke

> in point of Trade then to force those that trade from London to Norway & the Baltique to employ our owne shipping, & to putt them upon the building (though it were but one or two) merely for bulk without any Guns Steerage or Roundhouse, whereby she may carry a greate deale & be sailed with few men. I confess it were good that all our ships were fitt to make Men of Warre if it were possible; But the Question here is whether it is not better to have ships of our owne, though without Guns, & your owne Seamen employed your owne Victualls Spent in the victualling of them, the Money paid for freight & Wages kept at home, then to have foreigne ships and Seamen Employed, their Victualls Spent, & So much Money carried out of the Kingdome as is yearly for freight & Wages. The East India, Turky & other rich Trades, will beare the employing of Ships with Guns, but the Norway and Eastland Trade can by noe means beare it. (Barbour 1930:264–265)

The lack of guns seems counterintuitive in a region and era so full of potential perils. However, by 1726 piracy had been essentially quelled as the result of a variety of British governmental actions (Rediker 1989:282–283). The average guns-per-man for vessels in Jamaica was .34 from 1729-1730 and dropped further to .23 from 1753-1754 (Walton 1967:72). As the goal of merchant vessels was to transport goods as cheaply as possible and with the minimal amount of crew to adequately sail the vessel, hiring additional hands to man guns cut into profits and was not prudent. It was also not advisable to attempt to engage vessels armed and manned specifically to engage in warfare or piracy (Caribbean pirates and Spanish *garda costas*) with a minimalist crew. While not heavily armed, vessels sailing in the Caribbean did take some precautions to avoid being viewed as easy prey. Merchant vessels were known to paint false gun

ports on the side of their hulls to discourage any would-be attackers from a distance (Konstam 2007:80).

The layout for vessels from the 17th to 18th centuries, and even into the 19th century, changed very little. The bow of the ship was subject to greater turbulence and took on the most water. Consequently, the bow of the ship housed activity areas such as the galley, and the boatswain's and carpenter's cabins and storerooms. Goods and materials more susceptible to moisture were stored in the drier and calmer stern area. The stern typically held the bread room, magazine, and map room (VanHorn 2004:80–81).

These Dutch-inspired cargo vessels were common on the seas by the 18th century. These vessels were not exclusively used in the Caribbean, but the transatlantic voyage required larger vessels rather than the coastal vessels that could be used in trading with other parts of Europe. The Soldier Key Wreck was likely one of these vessels built with cargo capacity as the foremost concern, with little armament.

Crews: Sailors, Captains, and Masters

The commanders, masters or supercargoes, and those who sailed relied on the vessel on which they sailed to provide them with their livelihood, their housing, and their physical safety. For merchantmen, that meant striking a delicate balance between using as few sailors as possible while retaining enough to adequately man the vessel in any condition they were likely to encounter. In the area and time that the Soldier Key vessel sailed this meant manning for transatlantic voyages to the West Indies, possibly via Africa, the exchange of goods in the West Indies, and then the voyage back to England. Potential threats on such a voyage included pirates, privateers, the Spanish Coast Guard, weather, dangerous reefs and shoals, and the possibility of

impressment from your own country's navy. If any vessel was unfortunate enough to be grounded or sunk close to shore, the threat of Indians was yet another concern.

Dealing with so many potentially perilous environments required a crew with a varied complement of skills. Obviously the captain or master oversaw the vessel, but long voyages often carried a number of other specialists as well. Cooks, carpenters, and boatswains were all individuals specializing in as specific task, though they often did not perform it exclusively. Sailmakers, tailors, smiths, caulkers, and armorers were less common, particularly on West Indiamen, though depending on circumstances and the size of the vessel, it was not unheard of to employ armorers, or gunners. Each of these specialists may have had one or more mates on an East Indiaman, though they would be fortunate to have even one on a West Indiaman, if such a specialist position even existed. Beyond the specialists, crew members that lacked any particular skill set beyond being able to "hand, reef, and steer" were necessary. Finally, the ship's boy was a standard member of the crew. Often an apprentice to a master, the boy would, in addition to learning how to be a competent sailor, typically be left to watch over the vessel while the others went ashore when they finally made port (Davis 1956:112–113).

Crews became smaller per tonnage of vessel over time. This reduction in manpower was a result of more efficient ship design, a general increase in the size of the vessels employed, and reduced hostilities. The number of larger vessels carrying only two masts, brig or snow rigged, as well as the evolution of rigs using fore-and-aft rigged (lateen) sails such as barks, sloops, and, later, schooners, also came about in the 18th century. These changes also led to smaller crews (Davis 1972:77–78; Gardiner 2000:27). The average tons per man for ships entering London from Jamaica increased from 8.6 in 1726 to 11.4 in 1751 (Davis 1956:71). With the estimated

tonnage of the Soldier Key vessel at around 250 tons, the number of crew was likely around 25, though if the vessel was sailing during times of war, it could have been higher.

Jamaica and the Early Asiento

Spain, while heavily invested in the New World, was never a great importer of enslaved Africans. The slave trade was an endeavor that was "closed to her (Spain's) own subjects by their religion, customs, lack of capital and manufactures" (Aimes 1907:20). The Spanish were, however, a great consumer of Africans brought to the Caribbean by English, Dutch, and French slavers. The method employed to transfer slaves from the British, Dutch, and French to the Spanish was the asiento, or assiento. The asiento was an exclusive contract between the Spanish crown and a group of "asientists," private contractors, and later the British government, to trade slaves to the Spanish colonies (Nettels 1931:1; Harman 2004:7–12).

Asientists obtained their slaves from Curacao, Barbados, and elsewhere in the West Indies. Jamaica, however, with access to the ports of Cartagena, Porto Bello, Havana, and Vera Cruz, became the central hub of the Caribbean slave trade even before the British held the asiento. In 1680, a ship from Spain arrived in Jamaica, bearing licenses to trade with the English for slaves. By 1682, the Spanish government allowed the governors at Havana, Porto Bello, and Cartagena to send to Jamaica for slaves. The Jamaican trade became so extensive that the island could not supply the demand. The Dutch, losing out on significant trade, removed their asiento agent. For a time the Jamaican slave trade was neglected, but the Dutch realized their error and reinstated him in 1688. This agent settled in Jamaica and the English trade once again flourished. Jamaica now secured the majority of the asiento business (Nettels 1931:1–3; Sorsby 1975:8).

Jamaica's status as the central hub for the slave trade in the Caribbean did not come without its complaints from Jamaican planters. While the trade with the Spanish was

advantageous to the asientists, it created several problems for the plantations. The slave trade with the Spanish drove up prices on slaves. A slave that sold for £17 in 1680 sold for £22 in 1688. In addition to paying more, the planters received lower quality slaves: the slavers sold the strongest and healthiest slaves to the asientists. Yet another issue that arose between the planters and the slavers was that of payment. The slavers began to demand coin for their slaves in Jamaica, as they received their payment from the Spanish in coin. This demand for hard currency upset the previously accepted practice of bringing the products of the plantations— sugar, rum, indigo, allspice, and cotton—back to England to then sell and get paid for the slaves they supplied to Jamaica: the classic depiction of "triangular trade" (Knight 1728:50; Nettels 1931:4–5; Davis 1956:188).

The Royal African Company (which retained a monopoly in the English slave trade) enjoyed selling slaves at higher prices, receiving payment in coin or bullion, and not extending credit to their customers—a situation that occurred frequently with Jamaican planters. The government saw that the trading of slaves opened up the possibility to trade additional goods since Spain could not adequately supply its vast colonies. In addition to simply increasing trade, England desperately needed the gold, and most importantly the silver, that they acquired from the trade with Spain. England's demand for silver greatly exceeded its supply. Every year England shipped away vast quantities of bullion in the course of the East India trade, the annual export amounting to some £400,000. Since England did not possess an independent supply of the precious metals, the continuance of its India trade required a large yearly importation of foreign silver. The asiento trade assured that the much-needed precious metals would make their way to Jamaica and then back to England (Clark 1928:262; Nettels 1931:7–8).

In order for Jamaica to thrive as a productive colony beyond just a slave trading center, the planters needed their own slaves to work their plantations. England enacted a series of laws and regulations to assure that the Royal African Company would continue to supply the planters and not just the Spanish. In 1680 the government set quotas on how many slaves must be available to planters (initially 5,000 the first year and 3,000 thereafter, though the company successfully protested and had the first year reduced to 3,000 as well). The crown set price caps on how much slaves could be sold for (£18 if paid within six months with a 10% discount for paying cash rather than credit and a £20 fine for transactions not meeting these criteria). As an added measure, in 1681, Henry Morgan, then governor of Jamaica, levied a £5 per slave export tax. The Royal African Company could not, or would not, supply the demand, and in 1697 England allowed independent slavers to operate, ending the company's monopoly on the trade (Nettels 1931:11–13).

The Treaty of Madrid in 1670 and the Navigation Acts prohibited the sale of goods other than slaves to the Spanish, or to any other country. However, the 1670 treaty also allowed "kind entertainment" for British vessels in distress in Spanish ports. The allowance to dock in Spanish ports while in distress was a concession never granted to any power in any treaty by the Spanish crown. This concession led to many British vessels entering Spanish ports under the pretense of distress, though with the intent of illicit trade. The British government generally overlooked the illegitimate trade in Jamaica, with English vessels involved in transporting slaves to Spanish colonies often laden with additional trade goods as well. This additional trade, often in vital provisions, did not continue without competition. By the turn of the 18th century, both the French and the Dutch began encroaching on the steady and valuable trade with the Spanish. The

Dutch generally undercut Jamaican prices at Curacao, while the French were slightly more ambitious (Stanhope 1849:474; Nettels 1931:14–16; Harman 2004:5–6).

Shortly before 1700, the French governor of Hispaniola, M. du Casse, thought it would be more profitable to establish legal trade with the Spanish rather than just seize Spanish ships, as the French were harassing Spanish shipping as well. As a result, he convinced Versailles to allow him to reestablish the French Guinea Company, with himself as the head of the company, to secure trade with the Spanish. By 1699, the company arrived in the West Indies, the ships bearing letters from the French king to all the Spanish ports (Nettels 1931:18).

At the death of Charles II of Spain in 1701, du Casse persuaded Louis XIV to obtain the asiento for France. Diplomatic negotiations between Spain and Portugal, through the influence of Louis XIV, resulted in the annulment of the former asiento to the Portuguese company that previously held the contract. Spain then awarded the asiento to the reorganized French Guinea Company. The new agreement awarded the asiento to the French for a ten-year period and permitted the company to sell 4,800 slaves per year in the Spanish colonies. The company also obtained the right to send its vessels directly from French ports to the Spanish colonies and to bring back money and goods without entering Spain. In addition, it allowed French ships to engage directly in the trade. Spain had never granted either of those concessions to previous asientists. Although the grant forbade trade in goods other than slaves, much like the Jamaican trade, the power and immunity which the company received were extensive enough that the French could easily carry on additional illicit commerce (Aimes 1907:20; Nettels 1931:18; Sorsby 1975:6).

The French acquisition of the asiento was one of the principal factors that brought England into the War of the Spanish Succession. For 20 years England had been using every

conceivable means to broaden its trade with the Spanish colonies, and doing so rather successfully. Should the anticipated French asiento become effective, the French would no longer use Jamaica as their chief source of supply. All English vessels would almost certainly be excluded from the Spanish colonies if the combined resources of Spain and France were used to enforce the French monopoly in the West Indies (Aimes 1907:20; Scelle 1910:650; Nettels 1931:16,19; Sorsby 1975:7).

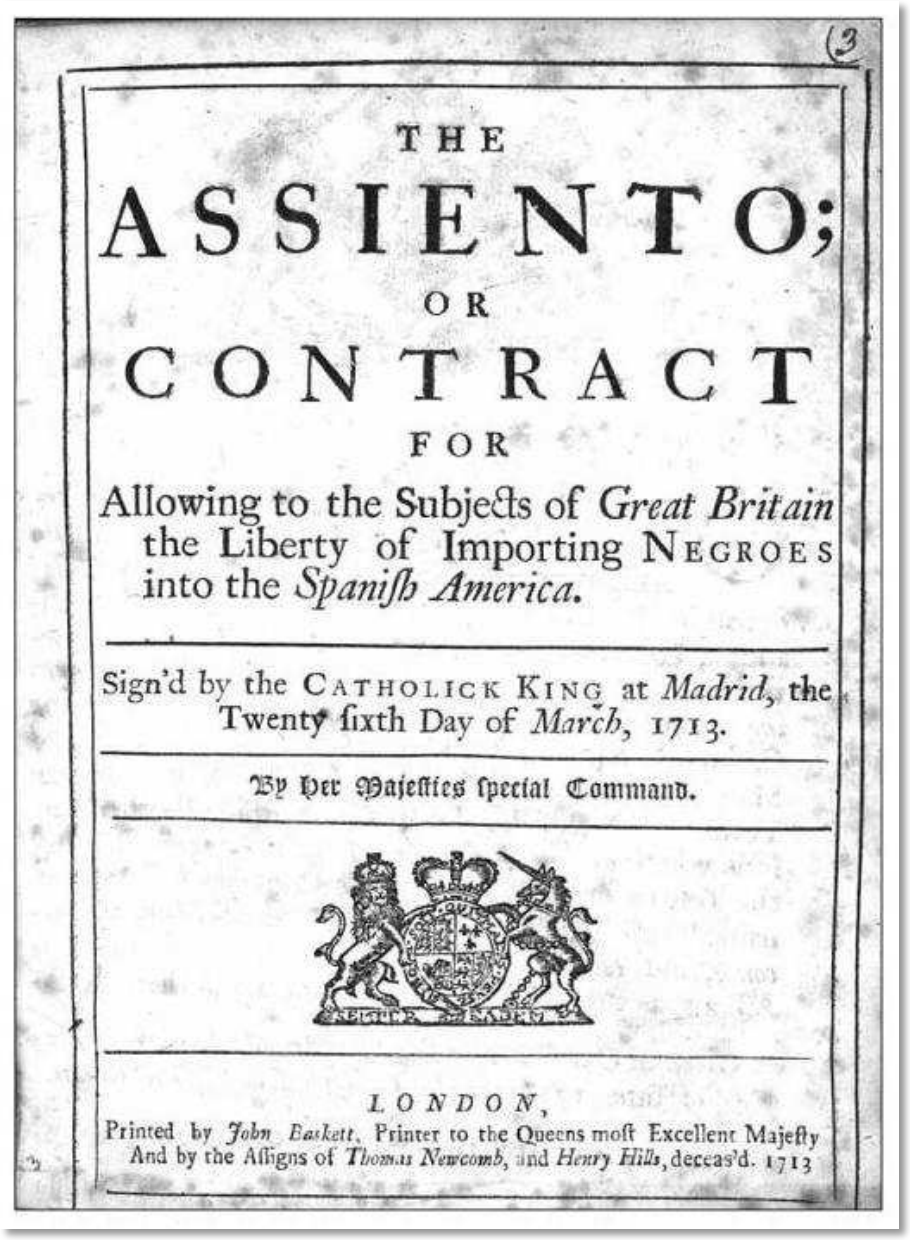
For many reasons the War of the Spanish Succession ensued. At its core was the question of whether or not Philip would succeed Charles II of Spain. On 16 November 1700, Louis XIV publicly announced that his second grandson, Philip, Duke of Anjou, was to succeed Charles II of Spain as the ruler of all of Spain and its colonies. On 15 May 1702, England, the Dutch Republic, and the Holy Roman Emperor, Leopold I, all declared war on France. England and the Dutch Republic then also declared war on Spain, although they recognized Philip as king; the emperor, however, who had not done so, declared war on the Duke of Anjou and his followers, though not on Spain itself. While convoluted continental issues lent the War of the Spanish Succession its name, colonial issues played a large part in the conflict as well since Spanish succession was tied directly to Spanish possessions (Thomson 1954:111).

The individual military campaigns are too numerous and varied to include in this thesis. The political results, however, as they relate to Jamaica, the Caribbean, and the colonial powers in the Caribbean, transmit directly to the trading climate in the Caribbean during and after the war. The Treaty of Utrecht, 1714, or more accurately, the Treaties, or Peace, of Utrecht, were actually a series of treaties signed between 1713 and 1714 that ended the War of the Spanish Succession. Several concessions were made that affected the Caribbean for the next several decades. Ultimately, the English were awarded the asiento for 30 years (Scelle 1910:652).

Jamaica and the British Asiento

The asiento granted to the British was issued for 30 years, three times longer than previous asientos. Additionally, it included several other concessions not previously established in other asientos. The first concession was the allowance of a single trip by the British during the 30 years of the asiento to the Canary Islands of a ship of up to 300 tons in order to secure wine, rum, and Madeira to be sold in the Spanish colonies. The second, and rightly most controversial concession, was that which allowed a single ship to trade 500 tons of goods duty free to Cartagena, Portobelo, and Vera Cruz each year of the asiento. This concession was granted in consideration of losses sustained by past asientists, to avoid illicit trade on the slave ships, and to demonstrate Spain's good intentions. The final concession was the continuation of all of the privileges and concessions granted to all of the previous asientists and the demand that the outgoing asientists, the French Guinea Company, cease all of their trade (Sorsby 1975:13).

The Baron of Lexington for England and the Marquis of Bedmar for Spain signed the asiento at Madrid on 26 March 1713. This asiento was unlike any previous asientos, however: this asiento was between two nations rather than between a nation and a private trading company (Figure 44). Queen Anne of Great Britain would administer who would be permitted to conduct the trade under the asiento. The administration of the asiento ultimately fell to the South Sea Company. The South Sea Company was a British "joint-stock company" founded in 1711, created as a public-private partnership to consolidate and reduce the cost of national debt. The company was also granted a monopoly to trade with South America, hence its name (Sorsby 1975:59–60).



THE
ASSIENTO;
OR
CONTRACT
FOR
Allowing to the Subjects of *Great Britain* the Liberty of Importing NEGROES into the *Spaniſh America.*

Sign'd by the CATHOLICK KING at *Madrid*, the Twenty ſixth Day of *March*, 1713.

By Her Majeſties ſpecial Command.

LONDON,
Printed by *John Baskett*, Printer to the Queens moſt Excellent Majeſty And by the Aſſigns of *Thomas Newcomb*, and *Henry Hills*, deceas'd. 1713

FIGURE 44. Title page of an English translation of the asiento. (John Baskett 1713.)

In 1720, a great crash, due in part to embezzlements and especially to the political hatred of the Whigs, who returned to power at that time, caused the failure of the South Sea Company's financial ventures. The commercial development of the asiento was apparently no more successful. The directors cared little for the slave trade whose profits appeared meager compared to the incredible profits from the contraband goods trade. They devoted themselves almost

exclusively to the commerce of merchandise, to the detriment of the shareholders, whose dividends were always insignificant (Scelle 1910:656).

The Jamaican planters were still not pleased with how the asiento affected them under control of the English. The South Sea Company, heavily invested in the contraband trade, was encroaching on a trade that had been rather exclusively the Jamaicans' and one that was almost a consolation prize for suffering the slights of the Royal African Company in their preference for Spanish slave buyers in the decades prior. Their own government was now squeezing the Jamaicans out of the contraband trade with no relief in their slave acquisition issues. A contemporary recount of the difficulties sounds strikingly similar to the complaints of 30 years prior:

> The (South-Sea) Company's sending ships to Guinea, advancing the Price of Negroes, and supplying the Spaniards with the very best, while the British-Planters must accept of the worst, and such as they refuse, are plain and undeniable Instances of the Damage; which the Colonies in general may sustain by it. (Knight 1728:iii)

Similarly, those aligned with the South Sea Company had nothing but complaints about the Jamaicans:

> …Advantages would accrew to the Company and to the Nation thereby, to magnify those which had been enjoy'd by Jamaica during the War, [as if, Britain at that Time had no Concern in it] under the ungrateful Denomination not only of a Secret, but a fraudulent and unlawful Trade, and therefore an Inference was drawn [how reasonable will appear immediately] that the Island of Jamaica was for the future to be avoided as a Rock in the Sea, and the Jamaica Merchants to be

> regarded as no better than Robbers and Pyrates in Trade, who ought to have been punish'd by the Governor Of Jamaica. (South Sea Company 1714:4)

This illegal trade that stemmed from the British acquisition of the asiento led to, or at least contributed to, several short conflicts between Spain and England. The War of the Quadruple Alliance (1718-1720), the Blockade of Porto Bello (1726), and the Anglo-Spanish War (1727-1729) predated, and contributed to, the War of Jenkins' Ear (1739-1748) though after 1742 the War of Jenkins' Ear was subsumed under the War of the Austrian Succession until the Treaty of Aix-la-Chapelle concluded the war in 1748 (Olivas 2013:108).

The War of Jenkins' Ear

The plethora of illegal trade that sparked smaller skirmishes ultimately escalated into war. The odd namesake for the War of Jenkins' Ear involved an incident between an English merchant, Robert Jenkins, and a Spanish privateer or *garda costas* captain, Don Juan de León Fandiño, on 9 April 1731. León, upon searching Jenkins' vessel, the brig *Rebecca*, discovered a considerable sum of Spanish gold, an abundance of fresh provisions, and the vessel too far off its listed course to be an innocent merchant vessel. León became incensed at this and cut off Jenkins' ear and reportedly instructed Jenkins to "Take this to your king and tell him if he were here I would do the same to him" (Lawson 1958:34) (Figure 45). León then relieved the *Rebecca* of all of its gold and a good part of its provisions (Hildner 1938:324; Harman 2004:39). Jenkins made port in the Thames Estuary on 11 June 1731, and after reporting the incident, was permitted to state his case to King George II. The public excitement soon died down about Jenkins' ear, but there was now an incident around which the English could rally (Lawson 1958:34).

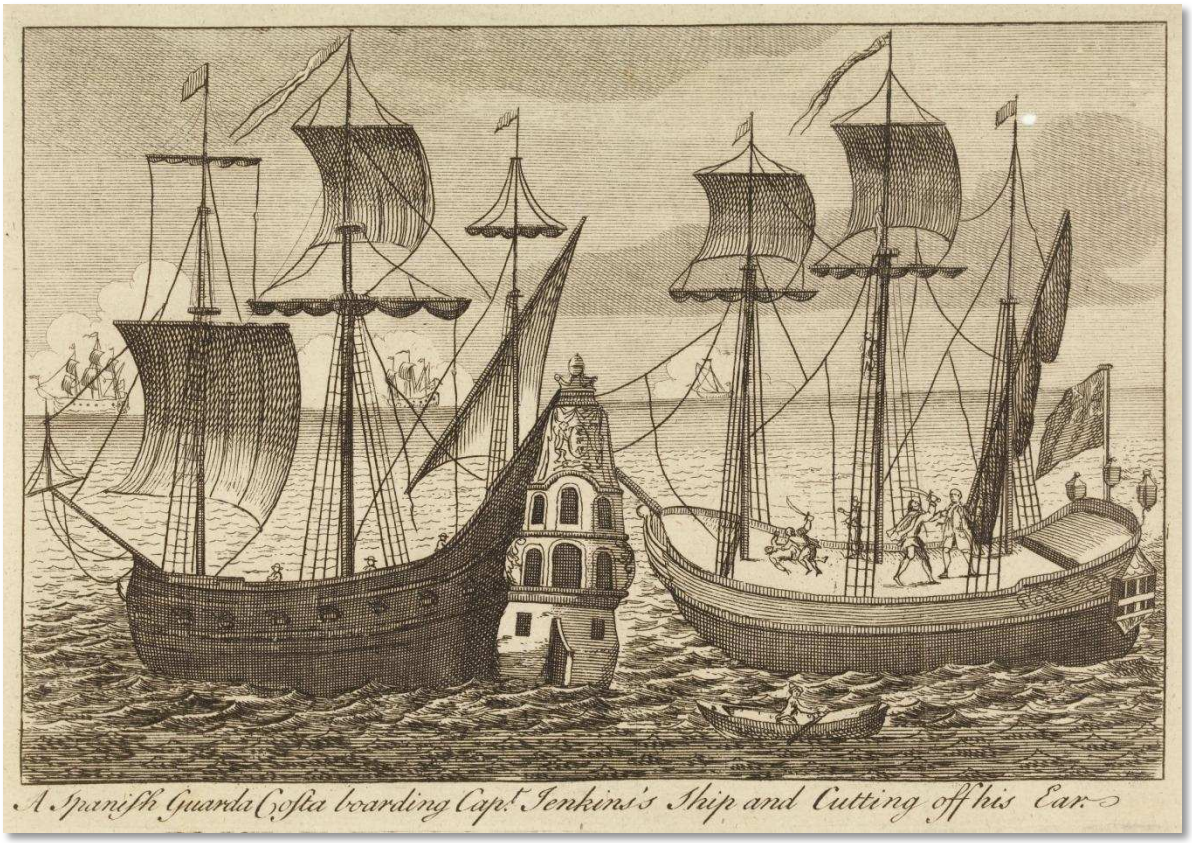


FIGURE 45. A cartoon showing Don Juan de León Fandiño cutting off Captain Robert Jenkins' Ear. (Anonymous ca. 1731 © Trustees of the British Museum, British Museum, London, England, 2014 [Copyright permission in Appendix D].)

The Caribbean became ground zero for the hostilities leading up to the War of Jenkins' Ear. Ships exchanged hands as prizes numerous times both from and to the English and the Spanish. Prior to the official declaration of war, England had directed its colonial governors to issue commissions of marque and reprisal for fitting out private ships of war. In retaliation for Spanish aggressiveness, these privateers were to seize the vessels and goods of the Spanish crown. Spain, for its part, was all too happy to continue to allow its ships to engage in privateering: they could still obtain the necessary goods from the English that Spain could not adequately supply, and now not pay for them (Harman 2004:34).

Harassment by the Spanish became so bad that, according to *The Political State*, in October 1731, just four months after Jenkins told his story of having his ear cut off, Parliament met in a committee of the whole House to consider petitions of merchants claiming similar treatment from the Spanish. Parliament heard reports from captains and owners of vessels that told of over 1,000 ships being taken or plundered by the Spanish, without, according to those testifying, "any just Pretence of their having been carrying on a contraband Trade with any of the Spanish Dominions" (Harman 2004:25). The committee made two resolutions: the first was that the claimants had proved the allegations. The second was that the committee should proceed with asking the king to obtain satisfaction for those already affected, and also to ensure the security of English vessels from future depredations (Harman 2004:25).

In January 1732, King Philip V directed a cédula (royal order in Council) to the Spanish governors in response to the allegations brought against them. His cédula was essentially meaningless as it specified that the governors were to ensure English ships were not molested by the Spanish as long as they were not "concerned in any illicit Commerce," thus allowing the continued stopping and inspecting of suspect vessels for such illicit commerce. The cédula also instructed the governors to enforce the royal laws and to punish those who obtain "unlawful" prizes and to hear complaints from the English and administer justice to those whose losses were "unjustly sustained" (Harman 2004:25–26).

The hostilities continued for the following seven years with other continental issues flaring up periodically. In 1733 the issue of Polish succession consumed France. Spain became France's ally in the resulting warfare in Europe and that alliance transferred to the New World as well. Still, the English government was wary of the likely sensationalized claims of the English merchants and was reluctant to engage in a full-scale war. Ultimately, both governments knew

that there was wrongdoing on both sides and attempted to placate one another. Illicit trade was carried on by other nationalities and was also punished by the Spanish. The Dutch, when caught engaging in illegal trade, simply accepted that they were caught; the English, however, thought they had a mechanism for recourse and regularly used it (Temperley 1909:199–205).

By1737 the relations between Spain and France had cooled and that made it an ideal time for England to attempt to make Spain pay for the perceived grievances. In October 1737, a case was again brought before the "Lords of the Cabinet Counsel" and was sympathetically answered by King George. On 17 March 1738, the war's namesake, Captain Jenkins, is famously said to have addressed the House of Commons with his ear in a jar (Figure 46).

FIGURE 46. *In Place*, a 1738 satirical cartoon depicting Captain Robert Jenkins presenting Prime Minister Robert Walpole his severed ear while his companions remove his wig to show the injury. (Anonymous © Trustees of the British Museum, British Museum, London, England, 2014 [Copyright permission in Appendix D].)

The one thread that maintained the diplomatic relations between the two countries throughout all the hostilities was the asiento that was still, despite the grievances, advantageous to both nationalities. In May 1739, Spain suspended the asiento over money that was owed to the crown by the South Sea Company; the South Sea Company countered by saying the damages they suffered amounted to more than four times the amount owed. This led to increased tensions between the nations and led to England sending a naval vessel, HMS *Phoenix*, to South Carolina in June to "commit all sort of Hostilities against the Spaniards" (Temperley 1909:232). War was inevitable. The War of Jenkins' Ear officially began 23 October 1739 (Harman 2004:33).

In the end, little was gained by any of the belligerents in the War of Jenkins' Ear. France and Spain wanted the English to withdraw from Georgia, which General James Ogelthorpe had begun colonizing in late 1732. The English foothold in Georgia may be the greatest prize of the war by either side and was not relinquished. France also wanted the British to relinquish the asiento, presumably so that they would again be granted the contract. The asiento, which being issued for 30 years beginning in 1713 had technically expired in 1743, was still bought out from the South Sea Company by the Spanish crown for the sum of £100,000 as terms of the end of the war under the Treaty of Madrid in 1750 (Fisher 1998:125–126). Scelle (1910:657) may have summarized the entire period best: "There is not a diplomatic negotiation in the course of these forty years (1710-1750) in which difficulties between the Spanish Government and the South Sea Company are not taken up and discussed interminably."

Tempests and Furacáns

While the threat of being taken by an opposing force's agents was a constant threat, the Caribbean had atmospheric hazards as well. The shallow depth of the remains of the Soldier Key Wreck, the even shallower flats surrounding the site, the lack of any evidence of the bow

structure of the vessel, and the small ballast scatter to the west of the main site suggest that a storm tossed the vessel upon the shallow flats. Conceivably the only storm that could have caught a vessel sailed by seasoned mariners so off guard was a tropical system—a tropical storm, or most likely, a hurricane.

The Spaniards brought back with them a new word for violent storms from the Native Americans: furacán. Once the kingdoms of Aragon and Castile united in 1474, prior to the discovery of the New World, changes in the Spanish language began taking shape; one of those changes involved the pronunciation of words beginning with the letter "f." Consequently, the Native American word for such storms, furacán, was pronounced as huracán by the Spanish and the rest of the Europeans based their words for these storms on the Spanish pronunciation, leading to the English pronunciation, hurricane (Millas 1968:xi–xiii; Mulcahy 2006:35).

While there was no official standard for measuring hurricanes at the time, such as the modern Saffir-Simpson scale, colonists did compare storms to each other and to storms in Europe and those encountered in other locations. Beginning in the 17th century, colonists recognized a hierarchy of winds ranging from "a stark calm," to "a small Gale," to "a Top-Sail Gale," to "a fret of Wind," and finally, "a Tempest" (Mulcahy 2006:17). A colonist in Jamaica that witnessed three hurricanes in the 18th century, Thomas Thistlewood, ranked them and compared them to storms he had experienced in England. He ranked the hurricane of 1751 a 6, the 1780 storm a 10, and the 1781 storm a 4 ½. He concluded that, "The greatest I ever saw at home about a 3" (Mulcahy 2006:21).

The lack of meteorological data available at the time led the early colonists to speculate the cause for these storms that were so unlike any they experienced in Europe; the easiest attributable source was the divine. Whether to punish the natives, impudent slaves, vessels and

colonies of other nations, the straying of the British themselves, or a combination thereof, early British colonists generally saw hurricanes as a manifestation of God's wrath (Figure 47). Sophia Nöel Hume, a Quaker living in South Carolina during the 15 September 1752 hurricane, wrote that the storm "was a humbling visitation from the most high God," sent as a "Mark of his Displeasure against your Transgressions; and at the same time, an Evidence of his Compassion towards you" (Mulcahy 2006:38).

FIGURE 47. Frontispiece of the opening scene of William Shakespeare's *The Tempest* from Rowe's 1709 edition. (The Works of Mr. William Shakespear: Adorn'd with cuts. Revis'd and Corrected, with an account of the Life and Writings of the author. 6 vols.; Vol. I, Nicholas Rowe, ed. 1709.)

Hurricanes, while a devastating force to contend with, and regardless of divine intentions, did not stop colonial agriculture or commerce. The riches of the West Indies, and the competition from other nations, were too great to allow occasional storms to force farmers back to England or to colonies safer from hurricanes. The plantations in the British Greater Caribbean generated tremendous profits and made the planters there the richest colonists in British America (Mulcahy 2006:66). Regardless, these storms had a tremendous impact on the sugar industry and the cane fields themselves. Typically, they struck a few months before the harvest of the cane and were a great threat to the mature cane. While planters would attempt to salvage what they could, under or overripe cane had little value and, unless crushed and processed shortly after, was almost useless (Mulcahy 2006:71). Eighteenth-century Jamaican planter William Beckford (1790:130) explained, "The old canes having been lodged, broken off, or uprooted, although they may be immediately cut after the calamity shall have happened, will yield, at best, but little produce." This was compounded by the probability, of course, that the rendering facilities, and the enslaved workforce that operated them, had sustained damage from the hurricane as well, and that rapid processing of the sugar cane would not be possible.

Another aspect in which hurricanes caused great damage is the most sensitive of all: the trade and utilization of enslaved Africans. Hurricanes claimed the lives of slaves held on ships prior to being unloaded and sold, such as the 200 slaves who lost their lives when the slave ship *Kingston* was shipwrecked in 1722, shortly after arriving in Jamaica. The risk to the human cargo was great enough that Henry Laurens warned a correspondent in July 1755 against having slaves delivered in late summer: "We would not choose them [slaves] sent in the Hurricane Season" (Mulcahy 2006:73). The human toll was great, but the monetary loss of such an expensive commodity was the chief concern of those engaged in the trade.

The damage the slaves suffered due to hurricanes was not limited to loss aboard ship; land was no safe refuge either, particularly in the meager buildings in which they were forced to live. For those fortunate enough to survive the storms, hurricanes also created additional hardships for the slaves in the form of additional work to be done in the wake of the storms, reduced food available, and constant, often armed, supervision from masters who feared a rebellion during a period of chaos and reduced arms and fortifications (Mulcahy 2006:95–99).

In addition to the direct destruction of the crops and related plantation infrastructure, the transportation of the sugar and other goods, the most relevant to this particular study, also was greatly affected. Even before leaving on the perilous open-ocean journey back to England or to the northern English colonies, disaster could strike. Shipping issues related to hurricanes were especially problematic as not only was whatever cargo aboard a vessel likely lost, but the numerous wrecks and debris found in a harbor after a hurricane also inhibited ships coming in bringing aid or trying to restore commerce with a colony. In 1712, a hurricane sank numerous vessels in Kingston harbor, which after the storm appeared "full of Wrecks…and great Quantities of Goods and Dead Bodies float[ed] from Place to Place, as the Wind blew" (Mulcahy 2006:72). Hurricanes were responsible for numerous lost ships and their cargoes and crew; the Soldier Key Wreck is almost certainly one of them.

All of these factors: desirable raw materials from Jamaica, illegal contraband trade with the Spanish stemming from the slave trade, the predacious treatment of English sailors by the Spanish, the war that resulted from the illegal trade, the wages the sailors were willing to endure these hardships for, and a fateful storm, combined to wreck the Soldier Key vessel where it currently sits. Despite the extensive disturbance of the site, researchers, through one final, careful excavation, as well as historical, documentary, and archival research, have established the likely

final port of call, a general timeframe during which the vessel sailed, likely the intended destination, and the purpose of the vessel. Unfortunately, with the scarce number of artifacts, the limited hull structure present or exposed, and the large number of vessels that wrecked in the area (Appendix B), researchers cannot accurately attribute a sailing rig, a name, or the exact dimensions to the vessel. Still, given the limited data set, the story of the Soldier Key Wreck has been told as well as it can be with current technology and with documentary research available.

CHAPTER VII

CONSERVATION AND MANAGEMENT

Archaeological site management is paramount to the National Park Service mission. The National Park Service Organic Act (1916) clearly laid out this mission of the NPS as promoting and regulating:

> …the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations (National Park Service 1916).

An important aspect of this mandate is site management and conservation. Maintaining archaeological sites, particularly sites located underwater, is challenging. They are prone to disturbances from visitors that range from uninformed recreationists who often are simply unfamiliar with the laws governing archaeological sites on federal land to malicious individuals intent on looting—often equipped as well as, if not better than, archaeologists.

As a relatively new subfield of a marginally new science, managers of submerged archaeological resources are still learning how best to deal with underwater sites. There are four factors to consider in how to manage a site as suggested by Firth (1996:85): 1) the character of artifacts and sites, including their archaeological features, their survival, and the degree of damage that might be anticipated; 2) aspirations relating to research, learning, conservation, and

appreciation; 3) concern for the quality of archaeological work and the assimilation of archaeology with other activities; and 4) the "tools" available to managers, such as statutes, incentive schemes, and publicity.

Biscayne National Park faces numerous management issues and has arguably the most diverse array of tools for managing underwater archaeological sites in the National Park Service. Of the 172,000 acres that comprise Biscayne National Park, roughly 95% are underwater (National Park Service 2012a). Despite being nearly completely underwater, the Park still hosts three to four times the number of visitors per acre compared to the other National Parks in south Florida (National Park Service 2012b). With Biscayne National Park's close proximity to Miami, clear and warm water, and abundant underwater archaeological sites, management of Biscayne National Park's underwater cultural resources is one of the Park's more pressing issues.

Prior to the 2012 documentation and restoration efforts, the Soldier Key Wreck suffered from the common afflictions shared by many of the wooden-hulled wrecks in the park: most portable artifacts are long gone, and the ballast and sediment that originally covered the wreck were removed and never replaced, leaving the wreck susceptible to shipworm and storm damage. The primary concern from the Park's standpoint, in addition to documenting what remained of the wreck, was how best to preserve the remains of the vessel using the original ballast that covered the structure and the surrounding sediment and sea grass.

Preceding the 2012 fieldwork, the NPS had no idea of the site's integrity aside from the seven iron drift pins exposed above the sand. The 2012 excavation showed that a good portion of what researchers and looters found in the 1970s and 1980s still remained in good condition with some notable exceptions. The keelson, mast step (Figure 48), and stern (Figure 49), all noted in earlier photographs, are now missing; they likely were lost to storms since being uncovered,

though potentially were intentionally removed at some point. Once divers excavated most of the portable artifacts from the site, excluding the drift pins that anchored the floors to the keel, the remnant wooden hull comprised the entirety of the wreck. Consequently, the preservation of the wood was the most pressing concern and the primary focus of the project.

FIGURE 48. Keelson and mast step of the Soldier Key Wreck in the 1980s. (Courtesy of the National Park Service, 2012.)

FIGURE 49. Stern of the Soldier Key Wreck in the 1980s. (Courtesy of the National Park Service, 2012.)

Mechanisms of Degradation

In a marine environment, bacterial and fungal actions degrade the cell wall components in wood. Research has shown that over 500 different fungal species and an unknown number of bacteria deteriorate wood (Bjordal 2011a:65). Wood polymers, cellulose, hemicelluloses, and lignin are composed principally of carbon, hydrogen, and oxygen. Wood cell walls are composed of 40–50% cellulose, 25–40% hemicelluloses, and 18–33% lignin (Bjordal 2011b:54). In general, water-soluble substances, such as starch and sugar, are the first to leach from waterlogged wood. In time, through hydrolysis (decomposition of a chemical compound by

reaction with water), cellulose in the cell walls disintegrates, leaving only a lignin framework to support the wood. Eventually, lignin also breaks down creating spaces between the cells and molecules resulting in the wood becoming porous. Voids in the permeable wood created by deterioration are then filled with water. The remaining lignin structure and the water that the wood has now absorbed preserve the shape of the wood. The loss of the finer cellulose tissue does not cause significant alteration in the gross volume of wood, but the porosity increases—thus the wood absorbs water like a sponge. A waterlogged wooden object will retain its shape as long as it is kept wet. However, if exposed to air the water evaporates, and the resulting surface tension forces of the evaporation cause the weakened cell walls to collapse. This reaction causes considerable shrinkage, distortion, and fragility to the wood. The amount of shrinkage is dependent upon the degree of disintegration and the amount of water present. Wood degradation is classified into three categories based on the percentage of water retained compared to the weight of the remaining wood structure: class I, over 400%; class II, 185–400%; and class III, less than 185%. Researchers can determine the amount of water in waterlogged wood by the following formula:

$$\%\text{water} = \frac{\text{weight of wet wood} \quad \text{weight of oven dried wood}}{\text{weight of oven dried wood}} \quad 100$$

Once the crew dredged the sand off the Soldier Key Wreck, the remaining wood on the vessel appeared relatively stable. Further testing in the laboratory revealed that the wood on the vessel suffered differential degradation—the wood ranged across the spectrum, from the floor timber (BISC 654), which was least degraded to the ceiling planking (BISC 656), which contained 513.6% water, making it the only sample that suffered class I degradation. The remaining wood samples, the keel (BISC 655), the outer hull planking (BISC 653), and sacrificial sheathing (BISC 652), were all class II degraded woods (Hamilton 2010:24) (Table 7).

The relative strength of the wood, particularly the timbers situated lower in the sediment, meant that they could likely support the weight of the ballast, sediment, and sand that would be required to stabilize the site and that recovering the structure would not crush the timbers, rendering the conservation effort useless.

TABLE 7

WOOD SAMPLE DEGRADATION

Artifact Number	Field Sample Number	Field Sample Location	Wet Weight	Dry Weight	Percentage of Water	Level of Degradation
BISC 652	10	Sacrificial Sheathing	106.7 g	25.3 g	321.74	II
BISC 653	11	Outer Hull Planking	70.7 g	14.5 g	387.58	II
BISC 654	12	Floor No.7	180.1 g	72.5 g	148.1	III
BISC 655	13	Keel	24.7 g	6.7 g	268.66	II
BISC 656	14	Ceiling Planking	193.9 g	31.6 g	513.6	I

Biological degradation of organic materials decreases considerably with burial depths greater than 50 cm (19.69 in.). The decrease in oxygen diffusion, which adversely affects the activity of microorganisms such as fungi and bacteria, is directly responsible for this decrease in activity (Richards 2011:3). David Gregory (1998) conducted a wood degradation experiment in Denmark using sapwood oak (the Soldier Key Wreck is constructed entirely of white oak except for the sacrificial hull planking). Gregory divided the wood into three groups: the first left exposed to seawater, the second buried just below the surface of the sediment, and the third buried 50 cm (19.69 in.) below the surface of the seabed. Gregory placed a Shirley Soil Burial Test Fabric next to the wood to assess the cellulolytic microbial activity (which causes hydrolysis of cellulose) because of the short-term nature of the experiment. This fabric was 96%

cellulose and, although there was no lignin, it could provide a good indication of the presence of cellulose-degrading microorganisms. Gregory examined the specimens at 4-week intervals up to 16 weeks and then again at 32 and 52 weeks. In addition to test samples, he monitored the environment for dissolved oxygen content, pH, reduction-oxidation potential, ammonium, and nitrate. These experiments indicated that the dissolved oxygen content of the sediment rapidly decreased over time at both burial depths and the reduction-oxidation potential at both depths became increasingly negative. There was very little variation in pH, and the ammonium decreased and stabilized just below the seabed. Nitrate content increased in surface and shallow burial samples, suggesting oxidizing conditions, but decreased at 50 cm (19.69 in.), indicating that conditions were trending towards an anoxic environment. This experiment illustrates that oak specimens buried under 50 cm (19.69 in.) of sediment will begin to stabilize within a year of burial (Gregory 1998:343–358; Curci 2006:23). Using this data researchers determined that in order to restore the wreck as close as possible to its pre-disturbance condition, all of the exposed wood of the hull, and the little bit of iron that made up the drift pins, should be covered in at least 50 cm (19.69 in.) of available sand and ballast.

NPS managers briefly considered the option of conserving the iron drift pins but ultimately decided against it for several reasons. Iron is relatively easy to conserve in situ: sacrificial anodes can reverse some of the corrosion process and actually draw chlorides out of the metal, even while still immersed in saltwater (Gregory 1999:164). Attaching sacrificial anodes to the exposed drift pins would be cheap and effective, but they would also provide differential, unnatural degradation of different material types. The anodes would be sacrificial, and therefore temporary, and replacing them would be counterproductive to the project in the

first place. Moreover, the goal was to use only natural materials to restore the site to as close to its original condition as possible.

In addition to researchers actively covering the wreck in sand and ballast at the end of the excavation, the environment is ideal for the passive covering of the site by sediment and sand from long-term tidal movement. The fine state of preservation Hall enjoyed in the 1980s and the sand the 2012 team observed and removed from the voids in the wood of the hull and the disturbed ballast surrounding the site offer proof of the passive reburial. Complicating efforts was the recent discovery that areas of the wreck that researchers believed Hall had excavated prior to the 2012 excavation in fact retained their integrity, indicating that Hall had not completely excavated the site. Researchers discovered a lens of allspice, Feature 2 (Figure 50) on the northern side of the wreck, on the starboard side of the vessel between the ceiling planking (the only area where divers uncovered any ceiling planking) and the ballast covering it. As a result of this discovery, excavation of this area stopped and Charles Lawson, the NPS Principal Investigator, decided not to disturb the stones anywhere around the feature. Furthermore, divers placed additional ballast in the area of the feature in an effort to stabilize it.

FIGURE 50. Feature 2. In situ lens of allspice. (Courtesy of the National Park Service, 2012.)

Tidal flows and weather events had embedded many of the ballast stones in the surrounding sand and grass matrix, further illustrating passive reburial. These stones were not used in the reburial of the wreck as their removal could result in further destabilization of the site. Generally, the trough formed by the hull of the wreck was to be filled in as much as possible, first actively by the divers, and then hopefully passively by sediment deposited in the ballast and grass. Equally important, however, was to avoid removing too much material from either side of the wreck and creating scour areas that, if eroded away, would reveal more of the outside of the hull to the elements.

Reburial

Following successful recording of the site, initial efforts in management began by reburying the site in an effort to restore an anaerobic environment. Researchers used the same

dredge used to excavate the wreck, without the mesh bag, to redeposit sand back on the site. Tidal action during the two weeks of excavation and reburial washed some of the sand off the site, so researchers carefully deposited the remaining sand to fill the area between the floors, futtocks, along the keel, and hull and ceiling planking until sand covered all previously exposed wood. This surface sand was intended primarily to protect the fragile wood from the heavy ballast stones that would initiate the in situ conservation of the site.

Next, researchers placed the ballast removed during the excavation and the loose ballast surrounding the site back over the hull, starting with carefully placed piles of stone around each of the extant iron drift pins and around Feature 2. These stones were placed to protect the drift pins from the remaining ballast. Following the protection of the drift pins, workers placed ballast between the piles around the drift pins and out to the edge of the site where sea grasses ensure additional sediment will not be lost. The remaining ballast was spread out over the site to encourage complete coverage in sediment, and hopefully to camouflage the site to casual boaters and anglers.

The shallow tidal nature of the wreck site makes management of casual looting more difficult, but it is also necessary for the proposed stabilization of the site. The area between Soldier Key and Key Biscayne is composed of nine km (5.59 mi.) of tidal flats with cross-cutting tidal channels throughout. This area, known as the Safety Valve (Figure 51), runs generally north-south between Key Biscayne and Soldier Key. Tidal mixing between Biscayne Bay and the Atlantic Ocean is efficient, with the entirety of the Bay theoretically being exchanged every six tidal cycles (three days). In reality, the greatest exchange of water takes place in the northern area, and particularly in the Safety Valve (Everglades National Park 2008:8). The significant tidal flow occurring at the Safety Valve results in the deposition of sediments from two areas

with different bottom compositions. The larger silicone sand (.5mm) of the Atlantic to the east and the silt and mud particles (.25mm) from Biscayne Bay in the west pass through the tidal flats daily (McNulty et al. 1962:212).

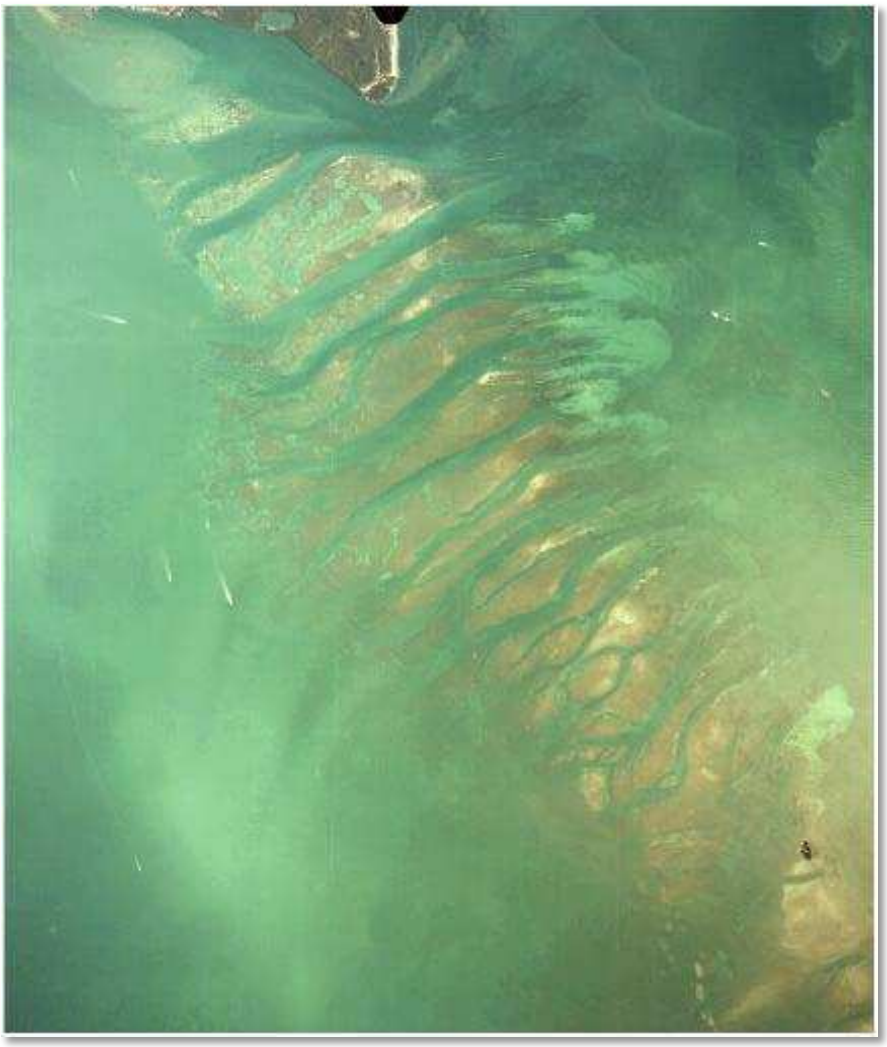


FIGURE 51. The Safety Valve, Key Biscayne, and Soldier Key. (Courtesy of NOAA, 2012.)

The *Thalassia testudinum* and *Syringodium filiform* grasses that surround the wreck site and surrounding flats are essential to the stabilization of the site and the surrounding environment. Typically known as turtle grass and manatee grass respectively, the grasses are essential to accumulating and maintaining sediment. The sediment depth in the Safety Valve tends to be high, offering hope for the rapid deposition of sediment over the wreck (Biber

2002:228). Sea grasses are so effective at accumulating sediment over a site that synthetic sea grasses have been used to help stabilize shipwrecks in the past, with varying results (Oxley 1998:159; Ortmann 2009:11; Richards 2011:344), and have been used with little success within several miles of the Soldier Key Wreck on the site of the HMS *Fowey* (Skowronek and Fischer 2009:96).

Lessons Learned from the HMS Fowey

Gerald Klein and his son discovered a wreck while spear fishing in 1978 in Biscayne National Park. That wreck turned out to be the HMS *Fowey*. The fifth-rate British warship sank in 1748 during the War of Jenkins' Ear roughly 10 miles (16.09 km) south of the Soldier Key Wreck site. Klein, believing the wreck to be a Spanish treasure ship, attempted to arrest the wreck in court in order to salvage the treasure he believed to be on the wreck. A lawsuit ensued as the wreck was located on the submerged bottomlands of a National Park.

The resulting legal battle called for the NPS to locate the wreck to bolster their claim of constructive possession of the site. The litigation led to the location and limited excavation of the wreck. Evidence provided from the NPS investigation was sufficient to deny Klein's admiralty claim, which prompted some of Klein's sympathizers to vandalize the site by dragging boat anchors through the wreck and NPS excavation grids. The excavations and vandalism of the site proved the need for a specific management and conservation plan .

The reburial and management of the Soldier Key Wreck benefits greatly from lessons learned through issues arising from looting, excavation, and in situ preservation of the HMS *Fowey*. While the *Fowey* lies several miles to the south and in deeper water (9.01 m [30 ft.]) with less tidal flow, the overall environment is quite similar. Some of the failed reburial efforts made on the *Fowey* would likely succeed on the Soldier Key Wreck provided they remained

unmolested by visitors. For example, the use of artificial sea grass at the *Fowey* site involved placing Seascape, a fiberglass sandbag with strips of artificial fronds attached, along the sides of the sandbags used to cover the wreck. Styrofoam on the end of each frond buoyed the artificial blades of grass to keep them upright in the water column. Archeologists filled the bags with sand on land and then deposited them around areas especially susceptible to looting or deterioration. The idea was that the floating blades would intercept floating sediment like real grass and deposit it over the site.

The experiment failed. Engineers designed Seascape for use in shallow coastal environments and in that application it was effective in that application. However, at 9 m (30 ft.) of depth the Styrofoam that buoyed the fronds compressed and lost buoyancy and therefore effectiveness. The shallow depth of the Soldier Key Wreck site would not affect the buoyancy of such fronds should their application ever be necessary. Though if additional reburial efforts are necessary in the future on either site, and artificial sea grass is sought as an option, better options likely are available today than in 1983.

In another attempt at passive reburial of HMS *Fowey*, the park oceanographer transplanted live *Thallasia* grass from surrounding grass flats to the center of the wreck using twelve-penny nails to secure the grass to the wreck. This experiment also failed. The grass died either as a result of an electrolytic process from contact with the steel nails or due to the oceanographer transplanting the grass into significantly deeper water than that to which it was acclimated. The oceanographer transplanted additional grass around the outside of the site but did not anchor this grass with nails. The grass that was not anchored appeared to have survived transport and thrived, suggesting that the depth was not the cause of the failure of the nailed grass, but the nails themselves. The oceanographer used 1,500 modern steel nails to anchor the

failed grass. These nails still litter the site and may affect remote sensing or other archaeological work in the future (Skowronek and Fischer 2009:96–97).

Researchers expect the Soldier Key Wreck site to stabilize and therefore require no transplanting of sea grass at this time. *Thallasia* grows on every side of the site and in between the ballast that Hall displaced when he excavated 30 years ago. While not likely a short-term project, the natural revegetation of the site seems entirely possible and is certainly preferable. However, should a storm or looting event damage the site before it stabilizes and grass transplantation becomes necessary, Biscayne National Park employs staff that specializes in transplanting sea grass for modern prop scars and groundings.

In addition to the depth of the site affecting passive reburial efforts, the fact that the *Fowey* was a British naval vessel rather than a merchant vessel affected the amount of sediment that accrued on the site. As a British naval vessel, *Fowey* employed pig iron as ballast rather than the various-sized stones that merchant vessels of the time still utilized. The ballast pile on the *Fowey* consisted of a stack of iron bars three feet (91.44 cm) long by six inches (15.24 cm) square in cross section. The ballast pile covered an area approximately six square meters (64.58 square ft.) and rose a half meter (1.64 ft.) above wooden architectural remains of the ship; the ballast represents around 13.44 tons of deadweight (Skowronek and Fischer 2009:111–112). The bars that stack so nicely and are therefore advantageous in the confines of the hull of a ship do not seem to lend themselves to preserving the site as well as stone ballast. The less dense and irregularly shaped stone ballast of the Soldier Key Wreck spread out among the cargo in the hold of the ship as it sailed. Therefore, once the ship wrecked and salvors or weather removed everything above the waterline, the many voids in the loose ballast could immediately begin trapping sediment (and small artifacts) that washed across it and the stabilization of the site could

begin. The large mound of iron that provided ballast to the *Fowey* lacked the distribution on the sea floor and the resulting crevices to collect sediment to cover the hull of the *Fowey.*

The final issue that arose during the revolutionary federal case that involved the legal battle and excavation of the HMS *Fowey* was that Klein, after the courts ordered him to end "any and all salvage operations"(Skowronek and Fischer 2009:169), publicized the location of the *Fowey* by labeling it a treasure ship and printing it on paper place mats at his wife's restaurant. Patrons were encouraged to bring the placemats home. As there was no way to prevent Klein from publishing the location of the wreck, the National Park Service was left with few options. The ultimate management decision for the *Fowey*, and the one most difficult to enforce, was to make the Legare Anchorage, where the wreck site is located, completely off limits to anchoring, swimming, snorkeling, diving, or even looking below the surface of the water with a mask or glass-bottomed bucket (Skowronek and Fischer 2009:169).

Local knowledge of the Soldier Key Wreck seems to be limited. This lack of local knowledge may be because all of the treasure hunters in the area are aware that there are no guns, treasure, or even portable artifacts on the Soldier Key Wreck. It may also be due to the shallow depth and the fact that the area does not experience the pressure from scuba divers and snorkelers to which areas farther offshore are subjected. Either way, the wreck appears safe from wholesale looting. However, visitors who stumble upon the site, believing they discovered a new wreck, may still disturb the ballast and accumulating sediment.

Biscayne National Park's Maritime Heritage Trail

At the opposite end of the spectrum from the off-limits *Fowey* is the Maritime Heritage Trail at Biscayne National Park. The Maritime Heritage Trail at Biscayne is the first and only one of its kind in the National Park Service, though not the only one of its kind in the area. Roger

Smith (et al. 1990) and the Florida Bureau of Archaeological Research (BAR) began looking at the 1733 fleet as potential underwater parks in 1977. The project was revitalized in 1988 to encourage heritage tourism and to increase public awareness of the fragility of archaeological sites, particularly in an area with such a celebrated history of looting shipwrecks as the Florida Keys. Smith and his associates looked at numerous factors in determining the suitability of a site as an underwater park. The following criteria were given to researchers to assess on a scale of one (poor) through five (outstanding) which wrecks, if any, should be included as part of a publicized underwater park (Smith et al. 1990:16):

- Visibility: how do silt, light, and bottom conditions all affect underwater light?
- Currents: do water conditions hinder normal movement or lessen a diver's enjoyment?
- Aquatic Life: how interesting is the native fish community?
- Coral Structures: how extensive and how varied is the coral life on the site?
- Ballast: does the site still resemble a shipwreck, and are there parts of the wooden hull or artifacts present?
- Intrusive Features: is there modern debris littering the site?
- Location: is the site easily accessible by boat and is it removed from heavy traffic lanes?
- Research Potential: would further archaeological research, including excavation, be justified?
- Overall Park Potential: all factors considered, how would an ordinary diver, snorkeler, or glass-bottom boater like the site?

Smith ultimately decided that the *San Pedro* was ideal as an underwater park, receiving ratings of five (outstanding) in several categories and receiving no less than a three (good) in any category. However, Smith (et al. 1990:17) noted that five activities should take place, by the government, private industry, or the public, prior to the site becoming widely publicized:

1) The wreck site should be enhanced by the placement of cannon replicas and an anchor around the ballast pile so that it resembles an undisturbed wreck site.

2) The state should develop and distribute a brochure to inform the public of the *San Pedro*'s location and history.

3) An underwater plaque should be placed adjacent to the ballast pile to identify the site as a State Underwater Archaeological Preserve and to acknowledge its sponsors.

4) The state or local dive shops could provide a water-resistant printed guide, identifying historical and biological features of interest, to visitors to orient them and sustain their interest.

5) The state should provide moorings secured to the seabed away from the ballast pile so that visiting boats do not anchor on the site or in surrounding sea grass.

Smith's model has proven effective for the state's on-going Underwater Archaeological Preserve program and the National Park Service generally followed the same guidelines as the state when establishing the Biscayne Maritime Heritage Trail. However, one notable exception exists: enhancing the site with the addition of replica anchors and cannon from another wreck is inconsistent with the National Park Service's mission of preserving the cultural resource *unimpaired* (emphasis mine). The Park is fortunate enough to possess the wrecks of several iron-hulled vessels in its waters. While they may lack the romance of a 1733 Spanish treasure galleon (Biscayne National Park possesses one of those as well, *Populo*, though the NPS considers it too

susceptible to disturbance and looting to be included in the Trail), the remains of the iron hulls are more easily identifiable as shipwrecks to most sport divers and snorkelers.

The Biscayne National Park Maritime Heritage Trail consists of six shipwrecks, five of which are iron-hulled. *Erl King* (sank 1891), *Alicia* (sank 1905), and *Lugano* (sank 1913) are best enjoyed by scuba divers due to the depths of 5.49-7.62 m (18-25 ft.). The remaining two iron vessels, *Arratoon Apcar* (sank 1878) and *Mandalay* (sank 1966), can accommodate snorkelers or divers as parts of the *Arratoon Apcar* wreck are as shallow as 3 m (10 ft.), while parts of the *Mandalay* sit close enough to the surface that it is a hazard to navigation. The Park researched the history of each of the iron vessels, included in the pamphlets published by the National Park Service.

The remaining wreck on the trail is most similar to the Soldier Key Wreck: the "19th Century Wooden Sailing Vessel." Consisting mostly of a ballast pile, the wreck visually represents what many of the wrecks in the Park look (or looked) like prior to disturbance from divers. The wreck had no extant anchor or cannons, and the NPS did not relocate any to the site or add replicas, again, unlike the state Underwater Archaeological Preserves. A number of colonial and early American shipwrecks in the Park look nearly identical on the sea floor. Consequently, there is no reason to list numerous wooden shipwrecks publicly, as that could encourage looting, or at least disturbance of the fragile environment essential to the stabilization of the sites.

Similar to Smith's recommendations, the NPS has now installed at least two mooring buoys on each of the wrecks on the Maritime Heritage Trail, both to mark the sites as well as to provide a place for boats to tie up, eliminating anchor damage to the sites or to the delicate environment around them (National Park Service 2014).

At least one wreck in the Park, the English China Wreck, is not publicized and is not off limits to the public (as is the *Fowey*), but has a slightly muted sign reminding any potential visitors that it is against federal law to disturb an archaeological site. This particular wreck is visible from the surface, as it lies in a grassy area with sand outlining the wreck, has numerous portable artifacts, and looters have disturbed the site on several occasions. Despite regular patrols and surveillance, the site continued to be disturbed. The sign (while relatively new at this writing) appears to have helped stem looting activities to date. The previous looting events and the location of the wreck suggest that sport divers likely stumble onto the site, think they have found a previously undiscovered wreck, and the looting occurs as a result of this activity rather than professional treasure hunters intent on salvage. The presence of the sign lets visitors know that the NPS is aware of the site as well as reminding them that disturbance is illegal. The sign is not threatening, however, and actually welcomes visitors and reminds them to enjoy their visit. It even provides a little interpretation in the form of the nationality of the vessel and the date range in which it sank, another nod to the fine line that the National Park Service straddles between preserving resources and visitor enjoyment and accessibility.

Signage would likely not be effective on the Soldier Key Wreck site. After reburying the site in 2012, it was no longer identifiable as a wreck to casual visitors. Placing a sign on the site in such shallow water would likely attract boaters to the site. While visiting the site is not illegal, it does not need to be encouraged. The fragility of the surrounding *Thallasia* grass, as well as of the site itself, makes it especially vulnerable and the site could be compromised if it experiences too much traffic. For that reason, and because the site type is well represented by the 19th Century Sailing Vessel already on the Maritime Heritage Trail, the Soldier Key Wreck should not be considered for inclusion on the Maritime Heritage Trail.

While Biscayne National Park contains numerous shipwrecks with varied management strategies, each wreck is individual and the Park treats them as such. The National Park Service assigns each site an annual, five year, or ten year site assessment period. Those most susceptible to looting or disturbance (natural or anthropogenic) as well as all of the wrecks on the Maritime Heritage Trail are on the annual inspection rotation, though they are typically inspected more frequently. Park cultural resource managers should initially place the Soldier Key Wreck on the annual rotation due to the recent work conducted on the site, both to ensure the passive in situ conservation of the site is occurring as expected and to make sure the attention the NPS paid to the site in the summer of 2012 does not attract attention from looters. The annual inspection conducted by the cultural resource staff nearly a year later, on 4 June 2013, showed that the site has not suffered any major looting attempts and that the sediment is filling in the ballast (Figure 52). If sediment continues to accrue on the site passively, managers may elect to place the wreck on a more infrequent inspection rotation.

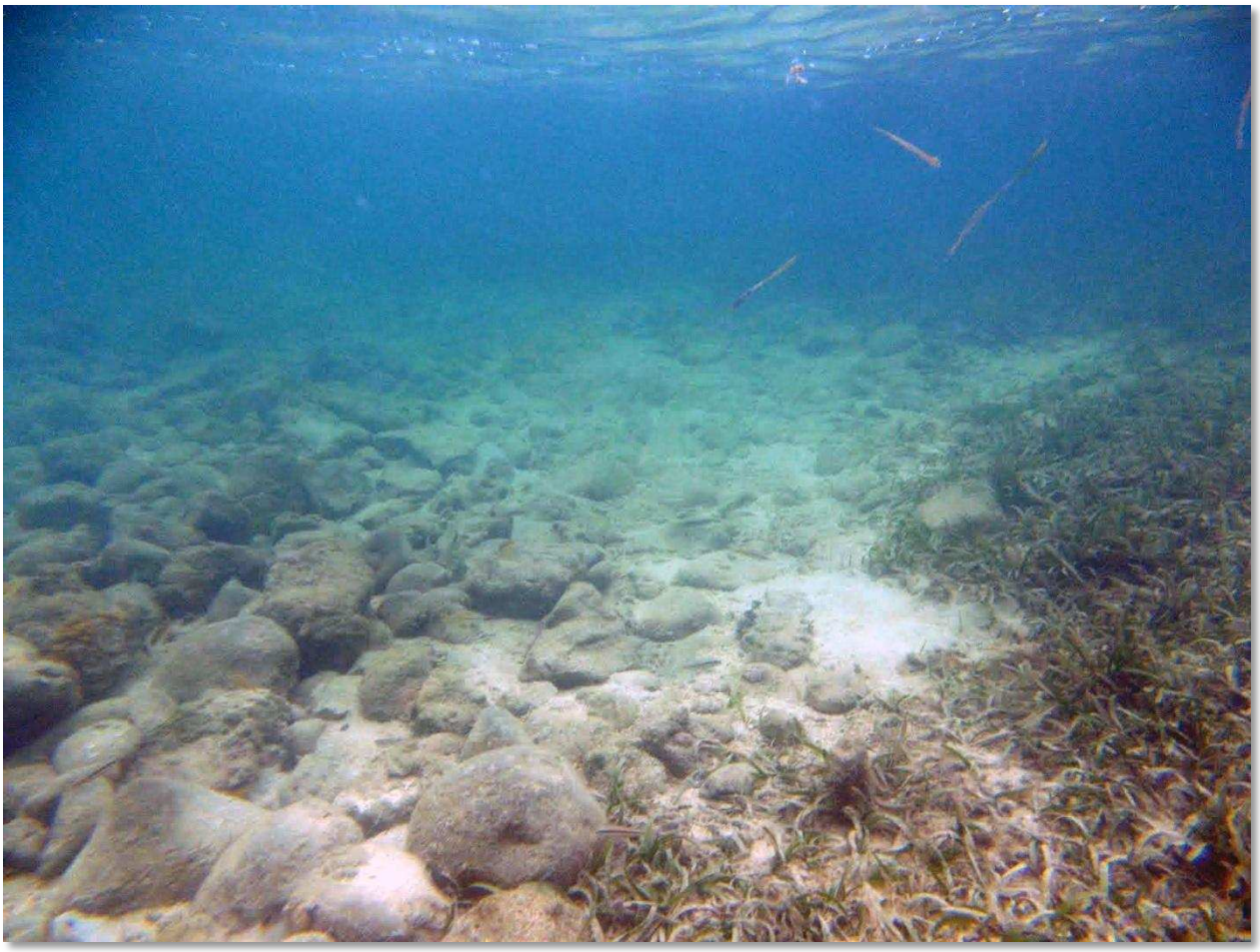


FIGURE 52. 2013 site assessment photo. (Courtesy of the National Park Service, 2013.)

Ultimately, the Soldier Key Wreck falls into the "middle ground" class of wrecks so abundant in Biscayne National Park. These sites are not publicized or off limits to visitors and they do not require special attention. The Soldier Key Wreck is a historically important wreck; though no portable artifacts are left on the site, that also means no artifacts are in danger of being looted (at least not in the portion of the hull excavated in 2012). The wreck's location does not lend itself to responsible visitation and it, like the wrecks of all stone-ballasted wooden vessels, is already represented on the Maritime Heritage Trail by the 19th Century Sailing Vessel. Archaeologically, the site yielded all of the information it likely can provide during the 2012 excavation. The best management for the Soldier Key Wreck currently involves monitoring the

site for passive reburial and looting. Beyond that, the site should be left to (hopefully) become covered in vegetation and look like any other grass flat in the Safety Valve.

CHAPTER VIII

CONCLUSION

The story of the Soldier Key Wreck will hopefully serve as an example of both how not to excavate a wreck as well as how to properly conserve and curate a site in the future. All shipwrecks are unique in the information they can provide and in the management that best suits each site. Though the site was far from pristine, the two principal goals of this project were accomplished to some extent. First, the primary goal of the project, the preservation of any extant hull remains, was accomplished. The secondary goal, the identification of the vessel, was determined as much as possible given the historical and archaeological constraints. This information has been provided to both the National Park Service and the State of Florida (Appendix C).

Given the information researchers were able to obtain about the wreck, the Soldier Key Wreck is most likely a fairly large British West Indiaman that sailed during the very uneasy period surrounding and including the War of Jenkins' Ear, with a complement of approximately 25 crew members. The scantlings of the vessel compare favorably with a ship of around 100 ft. (30.48 m) in length and 25 ft. (7.62 m) in breadth. Using the ceramic typology as well as the ship construction methods, the likely date range during which the vessel sailed was from 1720-1750. Due to the large number of ships known to have occurred around Cape Florida (Appendix B); the vague nature of many historical records, and records missing (particularly *Lloyd's List*); and the lack of artifacts, features, and provenience from Hall's fieldwork, the name of the Soldier Key Wreck was not possible. The possibility exists that researchers could discover the identity of the vessel at some time in the future. Even with a thorough investigation, the name of the vessel may not be discovered or a name may be improperly attributed to the wreck.

While the ceramic assemblage, construction features of the vessel, and the allspice cargo aboard all suggest a British West Indiaman, the fluid nature of commodities and even of vessels at the time casts doubt even on that general assessment. The vessel could have been a prize captured by Spanish privateers or coast guard, it could have been a British North American colonial vessel built using the same techniques used in England, or it could have been a Spanish trade vessel legally acquired from a British or North American colonial merchant, as was the case with the 1733 plate fleet vessel *San José* (Division of Historical Resources 2005). Still, the most likely conclusion is that it was a British West Indiaman carrying allspice, and almost assuredly other goods, from the West Indies back to England, likely London. The shallow depth, destruction/loss of the bow, and ballast scatter to the west of the main site suggest that the vessel was cast onto the flats by a storm rather than sunk by fire, combat, or scuttled as a derelict vessel. The hostility of the Indians in the Keys to the British at that time also supports the vessel not being scuttled.

While the historical record is incomplete, numerous sources may reference the destruction of the Soldier Key vessel. One is particularly noteworthy as it records grounded ships and smaller vessels working around them (presumably wreckers from the Bahamas salvaging the ships) after a large storm during the proposed timeframe during which the Soldier Key ship sailed: “Capt. Chandler in the Loyal Jane from Jamaica is said to have seen five or six sail of large ships on shore on the Martieres (keys) near Cape Florida on the 1st of August, and several smaller vessels on float near them” (*London Evening Post* 1733). The storm that would have destroyed these ships was the same hurricane that was responsible for the loss of the 1733 Spanish Plate Fleet to the south of the location of the Soldier Key Wreck. There is no way to know for sure if the Soldier Key Wreck was one of these vessels, but it could well have been.

Though many wrecks are known to have wrecked in the vicinity of Cape Florida, the Soldier Key Wreck is the only one that shows up in the Safety Valve on a nautical chart from 1858 (Figure 53).

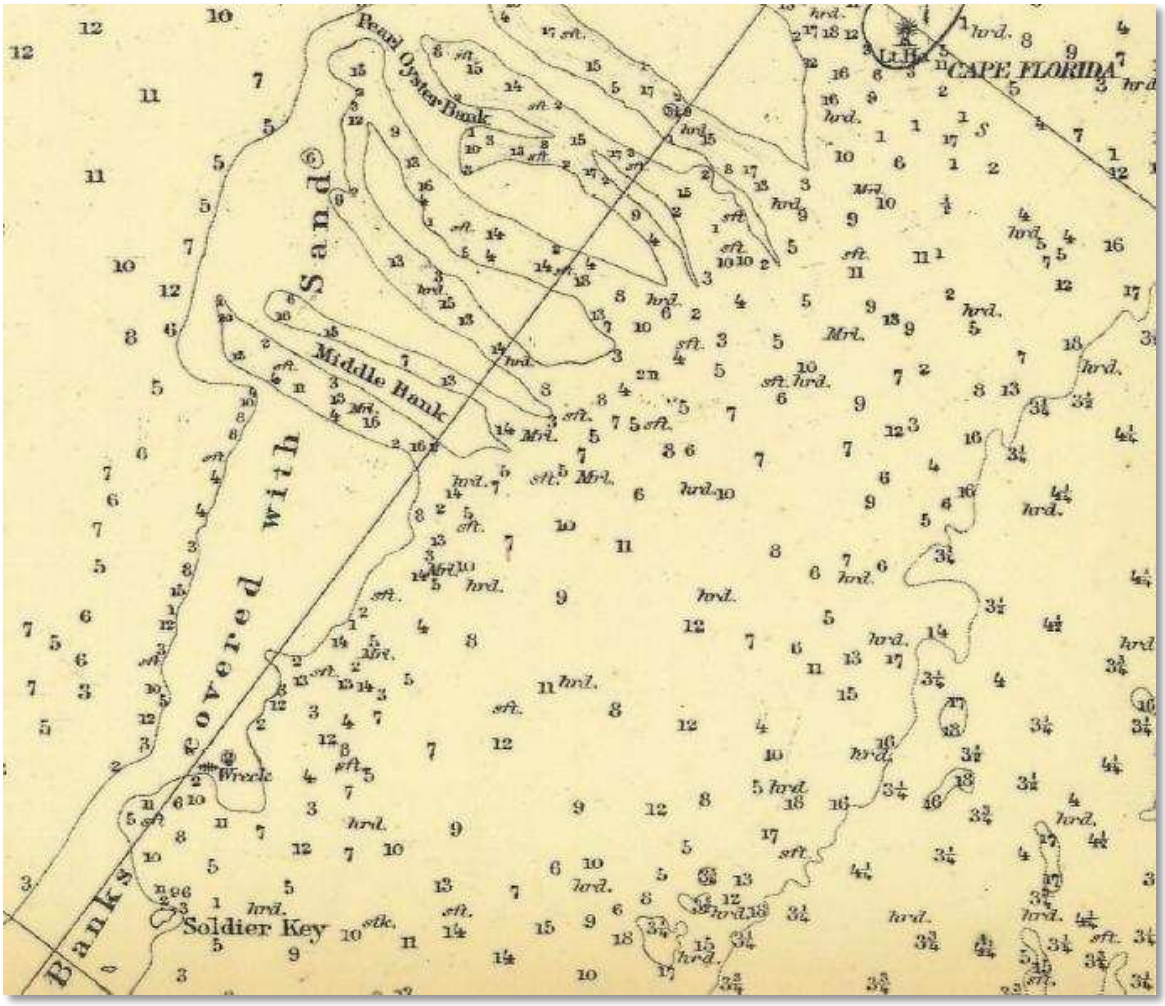


FIGURE 53. The Soldier Key Wreck as it appears in an 1858 nautical chart. (Preliminary Coast Chart No. 68: Florida Reefs From Key Biscayne To Carysfort Reef, U.S. Coastal Survey Office, 1858.)

While what we may be able to learn about the vessel archaeologically is scarce, the destruction of the site by Hall's field schools and the weather gives us a great chance to investigate conservation in the shallow tidal flats of the area. Sadly, conservation of disturbed

sites has become a main concern within Biscayne National Park. Given the state that the site was left in after Hall's excavations in the 1980s, the site has fared reasonably well. The loss of the keelson, mast step, and stern is unfortunate, but the preservation of the timbers that survived was better than expected. The quick, though minimal, reburial of the site via the tidal action that occurs twice daily protected the wood from shipworms and appeared to offer some protection from bacterial and fungal degradation. Reestablishing the layer of ballast and the additional sediment that the stones will catch as the tides sweep sand and sediment across the site should ensure an anaerobic environment that will retard further degradation, provided the "cap" over the site remains unmolested.

To my knowledge, the Soldier Key Wreck is the only British West Indiaman that has been discovered from the time period of the War of Jenkins' Ear in the United States. Numerous colonial vessels have been discovered in U.S. waters, as have the three naval vessels from the War of Jenkins' Ear that sank in the Keys, but no other purpose-built British merchant vessels sailing from the West Indies back to Europe. While the casual observer may consider this just another shipwreck, the rarity of this vessel makes this truly unique and important. While extensive research has been conducted on this site, should means become available to mine archives in England and/or Jamaica, continued efforts should be made to identify this vessel.

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APPENDICES

APPENDIX A

Original Specifications Submitted by the State of Florida

to John Hall, University of Miami, to

Excavate the Soldier Key Wreck

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18. A typewritten final report of the project will be submitted to the Division on or before September 15, 1984.

19. Copies of other reports, both published and unpublished, will be submitted to the Division for placement in its reference library following their presentation at meetings, publications or filing with the Department.

20. The office of the Florida Marine Patrol will be notified on the days in which field work is being conducted to assist in their protection of the site.

21. The Superintendent of the Biscayne National Park will be kept informed of project activities during the field work.

If the Department of Anthropology agrees to the above stated conditions, the proposed Glauber-Biggers wreck site (8Da416/BISC-UW-22) project may proceed, as soon as written confirmation of agreement is received and accepted by the Division. If, for some reason, the conditions are not satisfactory, please feel free to call and discuss any objections you may have. I suggest that you direct any inquiries or comments to Louis D. Tesar of my staff.

Sincerely,

L. Ross Morrell
Assistant Director,
Division of Archives, History
and Records Management

LRM:Teb

cc: John E. Hall
Richard D. Faust

APPENDIX B

Contemporary Accounts of Shipwrecks Coming from Jamaica to England or Northern Colonies that Wrecked Near Cape Florida

Vessel: *Robert and Samuel*

Captain: Austin

Coming from: Jamaica

Going to: London

Wreck Location: “near Cape Florida”

Other information: N/A

Newspapers reporting the wreck:

Publication	Date of Publication	Issue	Place of Publication
Daily Post	Saturday, Dec. 11, 1725	1939	London, England
Parker's Penny Post	Monday, Dec. 13, 1725	97	London, England
Dublin Journal	Tuesday, Dec. 21, 1725	LXX	Dublin, Ireland

Vessel: N/A

Captain: N/A

Coming from: N/A

Going to: N/A

Wreck Location: Cape Florida

Other information: "Capt. Chandler in the Loyal Jane from Jamaica is said to have seen five or six sail of large ships on shore on the Martieres near Cape Florida on the 1st of August, and several smaller vessels on float near them."

Newspaper reporting the wreck:

Publication	Date of Publication	Issue	Place of Publication
London Evening Post	Oct. 2, 1733-Oct. 4, 1733	916	London, England

Vessel: *Ashley*

Captain: Jenkins

Coming from: Jamaica

Going to: London

Wreck Location: “on Cape Florida”

Other information: "Master and Men were all sav'd"

Newspapers reporting the wreck:

Publication	Date of Publication	Issue	Place of Publication
London Evening Post	Feb. 3, 1737-Feb. 5, 1737	1439	London, England
Daily Post	Friday, Feb.4, 1737	5429	London, England

Vessel: *Betty’s Hope*

Captain: Souers

Coming from: Jamaica

Going to: London

Wreck Location: “near Cape Florida”

Wrecking date: Dec. 12, 1737

Other information: “Master and most of the crew got to South Carolina.”

Newspapers reporting the wreck:

Publication	Date of Publication	Issue	Place of Publication
London Evening Post	July 22-July 25, 1738	1668	London, England
Daily Gazeteer (London Edition)	Monday, July 24, 1738	953	London, England

Vessel: *Nero*

Captain: Balion

Coming from: Plymouth

Going to: North Carolina

Wreck Location: “lost near Cape Florida”

Other information: "taken by the Spaniards, sent to the Havannah, but lost near Cape Florida."

Newspapers reporting the wreck:

Publication	Date of Publication	Issue	Place of Publication
St. James's Evening Post	July 4-7, 1747	5845	London, England
Whitehall Evening Post or London Intelligencer	July 4-7, 1747	218	London, England
Westminster Journey or New Weekly Miscellany	July 11, 1747	293	London, England

Vessel: N/A

Captain: N/A

Coming from: N/A

Going to: N/A

Wreck Location: “near Cape Florida”

Other information: "There is advice that four Spanish Xebecks with some British ships they had taken, are lost near Cape Florida, part of their crews saved."

Newspaper reporting the wreck:

Publication	Date of Publication	Issue	Place of Publication
Remembrancer (1747)	Saturday, Aug. 14, 1748	36	London, England

Vessel: *Dolphin*

Captain: Baggot

Coming from: N/A

Going to: North Carolina

Wreck Location: “near Cape Florida”

Other information: "She had been taken and met with the Accident as the Spaniards were going with her for the Havannah."

Newspapers reporting the wreck:

Publication	Date of Publication	Issue	Place of Publication
Penny London Post or Morning Advertiser	Oct. 17-19, 1748	1015	London, England
Jacobite's Journal	Saturday, Oct. 22, 1748	47	London, England

APPENDIX C

Updated Site Card Submitted to the Florida Master Site File Following the 2012 Fieldwork

Page 1

☐Original
☒Update

ARCHAEOLOGICAL SITE FORM
FLORIDA MASTER SITE FILE
Version 4.0 1/07

Consult *Guide to Archaeological Site Form* for detailed instructions

Site #8 DA00416
Field Date 7-20-2012
Form Date 3-16-2015
Recorder #

Site Name(s) Soldier Key Wreck — Multiple Listing (DHR only)
Project Name BISC-22 — Survey # (DHR only)
Ownership: ☐private-profit ☐private-nonprofit ☐private-individual ☐private-nonspecific ☐city ☐county ☐state ☒federal ☐Native American ☐foreign ☐unknown

LOCATION & MAPPING

Clear Location Values

USGS 7.5 Map Name ARSENICKER KEYS — USGS Date 1997 — Plat or Other Map
City/Town (within 3 miles) — In City Limits? ☐yes ☒no ☐unknown — County Dade
Township 57S — Range 40E — Section 16 — ¼ section: ☐NW ☐SW ☒SE ☐NE — Irregular-name:
Township — Range — Section — ¼ section: ☐NW ☐SW ☐SE ☐NE
Landgrant — Tax Parcel #
UTM Coordinates: Zone ☐16 ☒17 Easting 566890 Northing 2816480
Other Coordinates: X: Y: — Coordinate System & Datum NAD 83
Address / Vicinity / Route to: Site within Biscayne National Park. Site location withheld due to sensitive nature of the resource. Contact BISC for location
Name of Public Tract (e.g., park) Biscayne National Park

TYPE OF SITE (select all that apply)

SETTING

☐Land (*terrestrial*)
☐Lake/Pond (*lacustrine*)
☐River/Stream/Creek (*riverine*)
☐Tidal (*estuarine*)
☒Saltwater (*marine*)
☐Wetland (*palustrine*)
☐usually flooded
☐usually dry
☐Cave/Sink (*subterranean*)
☐terrestrial
☐aquatic

STRUCTURES OR FEATURES

☐log boat
☐agric/farm building
☐burial mound
☐building remains
☐cemetery/grave
☐dump/refuse
☐earthworks (historic)
☐fort
☐midden
☐mill
☐mission
☐mound, nonspecific
☐plantation
☐platform mound
☐road segment
☐shell midden
☐shell mound
☒shipwreck
☐subsurface features
☐surface scatter
☐well

FUNCTION

☐campsite
☐extractive site
☐habitation (prehistoric)
☐homestead (historic)
☐farmstead
☐village (prehistoric)
☐town (historic)
☐quarry

Other Features or Functions (Choose from the list or type a response.)
1. Historic shipwreck — 2.

CULTURE PERIODS (select all that apply)

ABORIGINAL

☐Alachua
☐Archaic (nonspecific)
☐Archaic, Early
☐Archaic, Middle
☐Archaic, Late
☐Belle Glade
☐Cades Pond
☐Caloosahatchee
☐Deptford
☐Englewood
☐Fort Walton
☐Glades (nonspecific)
☐Glades I
☐Glades II
☐Glades III
☐Hickory Pond
☐Leon-Jefferson
☐Malabar I
☐Malabar II
☐Manasota
☐Mississippian
☐Mount Taylor
☐Norwood
☐Orange
☐Paleoindian
☐Pensacola
☐Perico Island
☐Safety Harbor
☐St. Augustine
☐St. Johns (nonspecific)
☐St. Johns I
☐St. Johns II
☐Santa Rosa
☐Santa Rosa-Swift Creek
☐Seminole (nonspecific)
☐Seminole: Colonization
☐Seminole: 1st War To 2nd
☐Seminole: 2nd War To 3rd
☐Seminole: 3rd War & After
☐Swift Creek (nonspecific)
☐Swift Creek, Early
☐Swift Creek, Late
☐Transitional
☐Weeden Island (nonspecific)
☐Weeden Island I
☐Weeden Island II
☐Prehistoric (nonspecific)
☐Prehistoric non-ceramic
☐Prehistoric ceramic

NON-ABORIGINAL

☐First Spanish 1513-99
☐First Spanish 1600-99
☒First Spanish 1700-1763
☐First Spanish (nonspecific)
☐British 1763-1783
☐Second Spanish 1783-1821
☐American Territorial 1821-45
☐American Civil War 1861-65
☐American 19th Century
☐American 20th Century
☐American (nonspecific)
☐African-American

Other Cultures (Choose from the list or type a response. For historic sites, give specific dates.)
1. First Spanish Period 1720-1750 — 3.
2. — 4.

OPINION OF RESOURCE SIGNIFICANCE

Clear Evaluation Values

Potentially eligible individually for National Register of Historic Places? ☒yes ☐no ☐insufficient information
Potentially eligible as contributor to a National Register district? ☒yes ☐no ☐insufficient information
Explanation of Evaluation (required if evaluated; use separate sheet if needed) Eligible under Criteria D. This vessel represents the remains of a British West Indiaman sailing around the time period of, and possibly during, the War of Jenkins' Ear. Should be included in Offshore Reefs Archeological District
Recommendations for Owner or SHPO Action Continued monitoring and inclusion into Offshore Reefs Archeological District

DHR USE ONLY	OFFICIAL EVALUATION	DHR USE ONLY
NR List Date ☐Owner Objection	SHPO – Appears to meet criteria for NR listing: ☐yes ☐no ☐insufficient info Date Init. KEEPER – Determined eligible: ☐yes ☐no Date NR Criteria for Evaluation: ☐a ☐b ☐c ☐d (see *National Register Bulletin 15*, p. 2)	

HR6E045R0107 Florida Master Site File / Div. of Historical Resources / R. A. Gray Bldg / 500 S Bronough St., Tallahassee, FL 32399-0250
Phone (850) 245-6440 / Fax (850)-245-6439 / E-mail SiteFile@dos.state.fl.us

ARCHAEOLOGICAL SITE FORM

Site #8 DA00416

FIELD METHODS (select all that apply)

SITE DETECTION			SITE BOUNDARY		
☐no field check	☐exposed ground	☐screened shovel	☐bounds unknown	☒remote sensing	☐unscreened shovel
☒literature search	☐posthole tests	☒screened shovel-1/4"	☐none by recorder	☐exposed ground	☐screened shovel
☒informant report	☐auger tests	☐screened shovel-1/8"	☒literature search	☐posthole tests	☐block excavations
☒remote sensing	☐unscreened shovel	☐screened shovel-1/16"	☐informant report	☐auger tests	☐estimate or guess

Other methods; number, size, depth, pattern of units; screen size (attach site plan) Hull not obscured by sea grass dredged into mesh bags and then screened through 1/4" hardware cloth onboard research vessel.

SITE DESCRIPTION

Extent Size (m^2) 78 Depth/stratigraphy of cultural deposit Hull of vessel located at a max depth 2 meters seawater and currently under a meter of ballast stone, sand, and sediment. Hull was under a very thin layer of sand at the time of excavation.

Temporal Interpretation - Components (check one): ☒single component ☐multiple component ☐uncertain

Describe each occupation in plan (refer to attached large scale map) and stratigraphically. Discuss temporal and functional interpretations:
Site represents a British West Indiaman, a merchant vessel constructed for trade with the Caribbean islands. The allspice indicates the vessel was en route back to England from Jamaica when wrecked.

Integrity - Overall disturbance: ☐none seen ☐minor ☐substantial ☒major ☐redeposited ☐destroyed-**document!** ☐unknown

Disturbances / threats / protective measures The site was excavated for three field seasons without a report produced. The site was then left uncovered. Local snorkelers and divers have been on the site and removed artifacts.

Surface collection: area collected 78 m^2 # collection units 4 | Excavation: # noncontiguous blocks

ARTIFACTS

Clear Artifact Values

Total Artifacts # 83 ◉count ○estimate | Surface # | Subsurface # 76

COLLECTION SELECTIVITY

☐unknown ☐unselective (all artifacts) ☐selective (some artifacts) ☒mixed selectivity

SPATIAL CONTROL

☐uncollected ☐general (not by subarea) ☐unknown ☒controlled (by subarea) ☐variable spatial control ☐other (describe in comments below)

ARTIFACT CATEGORIES and DISPOSITIONS

A	-	Bone-animal or unidentif
A	-	Building materials/brick
A	-	Encrusted Object
A	-	Glass
S	-	Lithics
S	-	Plant remains
A	-	Textiles
A	-	Miscellaneous historic

select a disposition from the list below for each artifact category selected at left

A - category always collected
S - some items in category collected
O - observed first hand, but not collected
R - collected and subsequently left at site
I - informant reported category present
U - unknown

Artifact Comments Units were 5 m units. Ceramics consisted of mostly manganese mottled ware with a single piece of slipware and some Spanish storage jar. Bottle glass present. Allspice seeds present.

DIAGNOSTICS (type or mode, and frequency: e.g., *Suwanee ppk, heat-treated chert, Deptford Check-stamped, ironstone/whiteware*)

1.	Manganese mottled ware	N= 6	4.	Allspice seeds	N= 694	7.	Pipestem	N= 1
2.	Spanish storage jar	N= 8	5.	Glazed red earthenware	N= 7	8.	Comb cleat (rigging)	N= 1
3.	Green bottle glass w/applied string	N= 1	6.	Brick fragments	N= 64	9.	Carbonized wood	N= 150

ENVIRONMENT

Clear Environment Values

Nearest fresh water: Type Swamp Name Distance from site (m)
Natural community MARINE SEAGRASS BED Topography Elevation: Min m Max m
Local vegetation Turtle grass and manatee grass
Present land use National Park recreational use-fishing and boating.
SCS soil series Soil association

DOCUMENTATION

Clear Documentation Values

Accessible Documentation Not Filed with the Site File - including field notes, analysis notes, photos, plans and other important documents

1) Document type All materials at one location Maintaining organization National Park Service, Region One
Document description Field notes, Masters thesis File or accession #s BISC-322, BISC-420

2) Document type Maintaining organization
Document description File or accession #s

RECORDER & INFORMANT INFORMATION

Informant Information: Name
Address / Phone / E-mail

Recorder Information: Name Allen Wilson Affiliation Former Archeological Field Technician at Biscayne National Park
Address / Phone / E-mail 9701 Mabel Street Pensacola, FL 32514 (850) 501-8024

Required Attachments

❶ PHOTOCOPY OF 7.5' USGS QUAD MAP WITH SITE BOUNDARIES MARKED *and* SITE PLAN
Plan at 1:3,600 or larger. Show boundaries, scale, north arrow, test/collection units, landmarks and date.

APPENDIX D

Letters of Permission to Use Copyrighted Images

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