A Submerged Cultural Resources Site Report: HMS Fowey

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A SUBMERGED CULTURAL RESOURCES SITE REPORT:
HMS FOWEY

By

Cornelia Louisa Keane Lowerre

A THESIS

Submitted to the Faculty
of the University of Miami
in partial fulfillment of the requirements for
the degree of Master of Science

Coral Gables, Florida

December 2014
A SUBMERGED CULTURAL RESOURCES SITE REPORT:
HMS FOWEY

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His Majesty’s Ship (HMS) Fowey (BISC-UW-20,8DA11948) was an 18th century British fifth-rate Man-of-War built in 1744, which sank in the Legare Anchorage, in Biscayne National Park, in 1748. Almost two and a half centuries following her sinking, HMS Fowey would gain public attention as the subject of a precedent-setting legal battle and would be caught in the path of destruction of several hurricanes. This submerged site is archaeologically significant, as it is one of a few remaining warships that could provide opportunities to understand the Royal Navy of the pre-Revolutionary war era. Like all submerged sites, HMS Fowey is a non-renewable resource and is vulnerable to destruction. Since its discovery, the National Park Service has conducted numerous studies on the site, including a number of comprehensive studies on seagrass and the possibility of fostering regrowth as a means of site stabilization. However, site stabilization through the use of sea grass is not a viable cultural resource management option as will be discussed in detail. Currently, it seems that the best method of protecting the site for the long-term would be through reburial. If this method is eventually used on the site of HMS Fowey, and found to offer the required protection, it will represent an important case study in similar future management situations.
Acknowledgments

I offer my deepest thanks to the members of my thesis committee, Michael J. Beach, Maria L. Estevanez, Dr. John A. Gifford, and Charles F. Lawson for their tremendous support in the development, research and completion of my thesis. Individually and collectively, their expertise and guidance led me to important areas of discovery, and made my experience more valuable. Likewise, I give my earnest thanks to the staff and management at Biscayne National Park and Parks Canada for their generous assistance, making available a great deal of information on HMS Fowey. Finally, I offer special thanks to Mr. Lawson for offering me a summer internship at Biscayne National Park. My work with him gave me invaluable experience in the field, and it introduced me to the diverse and important work of the National Park Service in the preservation of our priceless submerged cultural heritage.
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<tr>
<td>APA</td>
<td>Administrative Procedure Act</td>
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<td>ASMIS</td>
<td>Archaeological Sites Management Information System</td>
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<td>AHPA</td>
<td>Archaeological and Historic Preservation Act of 1974</td>
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<td>ARPA</td>
<td>Archaeological Resource Protection Act</td>
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<tr>
<td>AUV</td>
<td>Autonomous Underwater Vehicle</td>
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<td>BISC</td>
<td>Biscayne National Park</td>
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<td>BOEM</td>
<td>Bureau of Ocean Energy Management</td>
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<tr>
<td>CFR</td>
<td>Code of Federal Regulations</td>
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<td>CE</td>
<td>Common Era</td>
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<td>CAD</td>
<td>Computer Assisted Drafting</td>
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<td>CRM</td>
<td>Cultural Resource Management</td>
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<td>DEM</td>
<td>Data Elevation Model</td>
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<td>DOD</td>
<td>Department of Defense</td>
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<td>DGPS</td>
<td>Differential Global Positioning System</td>
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<td>DSM</td>
<td>Direct Survey Method</td>
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<tr>
<td>ENSO</td>
<td>El Niño/ Southern Oscillation</td>
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<td>EEZ</td>
<td>Exclusive Economic Zone</td>
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<td>FR</td>
<td>Federal Register</td>
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<td>FWS</td>
<td>Fish and Wildlife Service</td>
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<td>Freedom of Information Act</td>
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<td>GIS</td>
<td>Geographic Information Systems</td>
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<td>Abbreviation</td>
<td>Description</td>
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<tr>
<td>GPS</td>
<td>Global Positioning System</td>
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<td>GPR</td>
<td>Ground-penetrating Radar</td>
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<td>LGM</td>
<td>Last Glacial Maximum</td>
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<td>MOA</td>
<td>Memorandum of Agreement</td>
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<td>NHPA</td>
<td>National Historic Preservation Act</td>
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<td>NOAA</td>
<td>National Oceanic and Atmospheric Administration</td>
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<td>NPS</td>
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<td>NRHP</td>
<td>National Register of Historic Places</td>
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<td>OTA</td>
<td>Office of Technology Assessment</td>
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<td>Public Law</td>
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<td>PTD</td>
<td>Public Trust Doctrine</td>
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<tr>
<td>ROV</td>
<td>Remotely Operated Vehicle</td>
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<tr>
<td>RSMAS</td>
<td>Rosenstiel School of Marine and Atmospheric Science</td>
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<tr>
<td>SCUBA</td>
<td>Self-Contained Underwater Breathing Apparatus</td>
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<td>SRO</td>
<td>South Regional Office</td>
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<td>SER</td>
<td>Southeast Region</td>
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<td>SHPO</td>
<td>State Historic Preservation Office</td>
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<td>SCRU</td>
<td>Submerged Cultural Resource Unit</td>
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<td>SRC</td>
<td>Submerged Resource Center</td>
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<td>SAIP</td>
<td>Systemwide Archaeological Inventory Program</td>
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<td>UNESCO</td>
<td>United Nations Education, Scientific and Cultural Organization</td>
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<td>USC</td>
<td>United States Code</td>
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<td>DOC</td>
<td>United States Department of Commerce</td>
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<tr>
<td>Acronym</td>
<td>Full Name</td>
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<td>DOJ</td>
<td>United States Department of Justice</td>
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<td>DOI</td>
<td>United States Department of the Interior</td>
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<td>USFWS</td>
<td>United States Fish and Wildlife Service</td>
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<td>USGS</td>
<td>United States Geological Survey</td>
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<tr>
<td>UTM</td>
<td>Universal Transverse Mercator</td>
</tr>
<tr>
<td>UM</td>
<td>University of Miami</td>
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<tr>
<td>WASO</td>
<td>Washington Support Office</td>
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Introduction

All human existence is tied to the ocean. Throughout history, vessels have navigated Earth’s waters, carrying cargo reflective of their culture. While nautical technology has evolved over time, the curiosity to explore beyond the sea’s horizon remains universal. Over time, ship technology evolved, giving humans the capability to travel to distant locations bringing diverse culture together and creating new opportunities for trade and exploration. Most ancient mariners were successful in their voyages, but some were not. Maritime archaeology, the study of the material remains of human activities on the seas and interconnected waterways (Muckelroy, 1978: 04), is fundamentally focused on shipwrecks.

Underwater archaeology refers to the study of the remains of prehistoric and historic human activities found underwater. These remains generally include, shipwrecks (both scattered and intact), lost objects, and submerged prehistoric sites (U.S. Congress Office of Technology Assessment, 1987: 01). Shipwrecks are the most numerous and distinctive type of site studied by the maritime archaeologist. Although the field encompasses many other types of sites such as harbors, submerged land surfaces and coastal settlements the uniform characteristics of shipwrecks, regardless of date, place, and type, means that virtually all of them can be investigated using the same methodologies and research strategies (Gibbins & Adams, 2001: 279). The arrival of a sunken ship on the seabed is only the first in a series of steps that turn a lost vessel into an archaeological site (Bowens, 2009).
Once a ship sinks beneath the surface and settles to the sea floor, it becomes a “time capsule” - a term commonly used by maritime archaeologists - referring to the momentary event of the sinking ship when the totality of the artifact assemblage produces a unit of contemporaneity in the archaeological record (Gould, 2011: 15; Ballard, 2001: 695). In a [sailing ship] is concentrated the accumulated knowledge of half a dozen crafts through many generations. Like public buildings, ships are expression of societies that create them (Richards 2008: 45). Shipwrecks are important to the study of the past because they represent high levels of technical achievement and reflect how people were living when their vessel sank; the fact that wrecks often contain relatively well preserved artifacts greatly furthers our knowledge of that particular culture.

Archaeology is the search for, and explanation of past human behavior based on physical remains. Archaeologists utilize theories about society and culture in relation to material objects made by people to better understand all aspects of pre-modern culture including social, religious, political, and economic elements. The challenge for underwater archaeologists today will always remain the application of the latest scientific methods to that particular subset of the archaeological record in order to reconstruct a picture of the human past minimally distorted by intervening natural processes and human activities - the so-called filters. Muckelroy (1987) defined three primary cultural dimensions of a ship relative to the strengths and weaknesses of archaeological evidence: (a) the ship as a machine designed for harnessing a source of power in order to serve as a means of transport; (b) the ship as an element in a military or economic system, providing
its basic *raison d’être*; (c) the ship as a closed community, with its own hierarchy, customs, and conventions.

When a shipwreck is well preserved, the archaeological remains reveal often unrecorded details of its actual construction in detailed ways that drawings and plans (historical evidence) cannot; this exemplifies the importance of underwater archaeology as a means of directly reconstructing past human activity from physical remains. Not only do well-preserved shipwrecks expand our knowledge of nautical technology (which many consider to be a reflection of ‘leading edge’ technologies of the parent society) but also reveal undocumented information about naval warfare and marine technology as well as a unique view of shipboard societies (Muckelroy, 1987: 230).

This thesis serves two functions, Primarily, it provides a summary of the archaeological history of HMS *Fowey* from both a technical and legal standpoint; and secondarily, it presents the best option for long-term cultural resource management of HMS *Fowey*. 
Chapter 1 - Biscayne Bay

Biscayne Bay is a shallow tropical marine lagoon located on the extreme southeast coast of Florida (Figure 2.1).

![Figure 2.1 Biscayne Bay, Florida.](image)

It is bordered on the north, west and southwest by Miami-Dade County which includes greater Miami\(^1\) and Miami Beach as well as, the Homestead area, and to the south Monroe County, specifically the northern Florida Keys\(^2\). The eastern boundary of the Northern Bay is defined by the barrier islands of Miami Beach and Key Biscayne; from there southward, the eastern boundary of the Bay comprises a linear chain of low,

\(^1\) Originally named *Mayaimi*, a Spanish mission established in 1567 (NPS, Oct., 2006).

\(^2\) The term “key,” derived from the Spanish word *cayo*, meaning “islet,” is given to the coral islands that form a line of keys off the southern Florida coast (Burris, 1984: 01).
limestone barrier islands, which eventually merge into the northernmost Florida Keys.

The western shore is the Florida mainland. Biscayne Bay is connected to the Atlantic Ocean by several channels and cuts, some natural and some man-made. Major tributaries (from north to south) are Arch Creek, Biscayne Canal, Little River, Miami River, Coral Gables Waterway, Snapper Creek Canal, Black Creek, Goulds Canal, North Canal, Florida City Canal and Model Land Canal. Tidal flow enters the Bay (north and south) at Bakers Haulover Cut, Government Cut, Norris Cut, Bear Cut, the Safety Valve, Sands Cut Caesar’s Creek, Broad Creek and Angelfish Creek (Figure 2.2; Burrus, 1984: 02).

There are many islands located in Biscayne Bay, most of which are artificial and date to the early 20th century. The geology of Biscayne Bay as described in Wanless (1969) is relatively young, having formed during the late Holocene as rising postglacial sea levels flooded; a natural depression in the Key Largo Limestone. Thus, it is not a
drowned river valley like many embayments. Also, unlike many other estuaries and embayments, Biscayne Bay does not receive an appreciable sediment load from major river systems. Most of its sediments are produced by local biota (Wanless, 1976; Cantillo et al., 2000). Prior to the early 20th century, major changes to Biscayne Bay ecosystems were caused only by climatic events. Since then, human activities have become the primary cause of major alterations (Cantillo et al., 2000).

With the exception of the Arsenicker Keys (located at the extreme southern end of Biscayne Bay; see Figure 3.1) these islands form a natural north-south barrier between Biscayne Bay and the living coral reef platform. Three of the keys (Adams Key, Boca Chita Key and Elliot Key) are popular visitor use areas in Biscayne National Park. The keys contain various habitats including hardwood hammocks, mangrove wetlands, sandy beaches, and rocky intertidal areas (Adams, 1998: 07). Australian Pine, an early 20th century, invasive species in southern Florida, used to be the dominant species found on the islands. As a result of effective invasive species removal efforts, native vegetation, such as Buttonwoods, Coconuts, saltwort, glasswort, and sea purslane have slowly begun to return to the islands in Biscayne National Park. In the interior of the larger islands, such as Elliot Key, hardwood hammocks, mahoganies, geigers, gumbo-limbos, satin leaves, ironwoods, and various other tropical trees are common.

The major components of the marine vegetation found in Biscayne Bay are *Thalassia testudinum* (turtle grass), *Halodule wrightii* (Cuban shoal grass), and *Syringodium filiforme* (manatee grass) (Zieman, 1982; Cantillo et al., 2000). These plants
function as a food source, provide shelter and protection, stabilize sediments and act as a chemical sink (Cantillo et al., 2000).

There is a zonation of these sea grasses with distance from shore in non-disturbed areas of Biscayne Bay. Intertidally, there is a band of *Halodule*. From sub-littoral depths, there is a band of *Thalassia* interspersed with *Halodule* and *Syringodium* (Cantillo et al., 2000). Sediment is generated by *Thalassia* communities and major disruptions to the sea grass beds result in modifications to the sediment types and distributions (Cantillo et al., 2000). Environmental stress caused by long-term temperature or salinity changes may make the *Thalassia* more susceptible to disease. This is particularly important to note due to the proximity to the Turkey Point Nuclear Power Plant located just south of Biscayne

Figure 2.3 *Thalassia testudinum*
National Park’s Headquarters in Homestead (Figure 3.1). Another perennial threat to the sea grass is bottom scarring, caused by a boat’s propeller tearing and cutting up the roots, stems, and leaves, leaving a noticeable, semi-permanent scar in the sea grass bed.

Since Hurricane Andrew (1992), the NPS has continually monitored the seagrass beds surrounding BISC-UW-20. Seagrass plays a key role in stabilizing the dynamic Fowey site. Where seagrasses take hold, they tend to reduce the velocity of currents and waves over the sediment surface as well as, trap the sediment and raise the level of the sand bottom (Tedesco & Wanless, 1995: 08). The thicker the sediment cover, the more the site and in situ artifacts will be protected from damage, erosion and vandalism. Thus, as
the seagrasses on the *Fowey* site have eroded over time, the site has become increasingly vulnerable. Lawson and Marano (2013) note that by all accounts, the site has substantially fewer in situ artifacts than what was originally documented on it in 1983.
Chapter 2 - Biscayne National Park

It is a park “without a gate,” open locally to access by foot and by water, yet it is literally within the “gateway” to Latin America; it is little wonder that visitors – or refugees – entering BISC might easily be unaware that they have come into a national park. It is a natural resource park of open waters and islets, yet it is surrounded by the sprawling, burgeoning metropolis of greater Miami... It is a park situated in what had become one of the most culturally diverse and dynamic regions of the country at the end of the twentieth century.

NPS (October, 2006)

Biscayne National Park (or BISC according to National Park Service terminology) encompasses much of Biscayne Bay (Figure 3.1). The northern boundary of the Park is near the southern extent of Key Biscayne; twenty-two miles south, its southern boundary is located near the northern end of Key Largo. Biscayne National Park has several islands (keys) within its expansive boundaries including: Adams Key, Boca Chita Key, Elliot Key, Old Rhodes Key, Porgy Key, Reid Key, Rubicon Keys, Sands Key, and Swan Key. These keys are all eroded remnants of the extensive late Pleistocene fossil coral reef system inshore of the modern reef tract in Biscayne Bay.

Biscayne National Park consists mostly (approximately 95%) of submerged bottom lands, including coral reefs, sandy shoals, 4,825 acres of largely undeveloped mangrove shoreline, plus forty-two emergent keys or islands. Emergent land represents only five percent of the Park’s total area.
Figure 3.1 Map of Biscayne National Park (Courtesy of the National Park Service/Biscayne National Park)
Biscayne National Park is recognized for its natural resources: a combination of terrestrial, marine, and amphibious life in a subtropical setting. Mangrove forests, seagrass beds, and coral reefs provided diverse terrestrial and marine habitats for a large variety of animals and plant species, many of which are endangered or threatened (Wolfert-Lohmann et al., 2007: 03). It is a natural habitat for more than one thousand species of animals including: more than five hundred species of fish, such as the silver perch, hogfish, red grouper, and yellow-fin tuna; more than eight hundred invertebrate species including one hundred and fifty species of crabs, shrimp, lobsters, and sponges; sea turtles, such as, the Atlantic Green turtle, leatherback, and loggerhead; mammals, such as the endangered West Indian manatee; and at least fifty different species of coral (Wolfert-Lohmann et al., 2007: 03). The park also contains many cultural resources, both historic and prehistoric including traces of Spanish exploration, marine salvage, and shipwrecks. The extensive submerged cultural resource base is scattered throughout Biscayne National Park and dates to at least to the 18th century. HMS Fowey and the Spanish vessel, *Nuestra Señora del Pópulo* (1733) are some of the more notable submerged cultural resources in BISC.

**Cultural Resources of Biscayne National Park**

The physical remains of these archaeological resources are indicative of the rich cultural history of southern Florida and the Florida Keys. Since the creation of Biscayne National Park, the National Park Service has worked diligently to preserve and protect
our nation’s cultural heritage. Cullison and Brown-Leynes (1997) developed the following historical themes to organize the Park’s long and diverse cultural history:

- Prehistoric Occupation, 1000 BC – 1550 AD.
- Aboriginal Populations and European Exploration in Biscayne Bay, 1513-1859.
- The Wrecking Industry in the Florida Keys, 1513-1921.
- American Settlement on the Keys, 1822-1865.
- Agriculture on the Keys, 1860-1926.
- Recreational Development of Miami and Biscayne Bay, 1896-1945.

The keys of Biscayne National Park include a number of prehistoric archaeological sites as well. Historic structures are located on Boca Chita Key and historic ruins are present on most of the other islands. Boca Chita Key Historic District, a National Register listing, consist of ten historic structures as well as the ruins of several others; they represent typical resort architecture for the Miami area in the 1930s (Adams, 1998: 19). Elliot Key includes an archaeological district, the Sweeting Homestead, representing the archaeological remains of the first pioneering homestead on these keys during the end of the 19th century. Porgy Key and Soldier Key contain architectural ruins. The earliest known upland archaeological site within the Park is located on, Sands Key, a midden site displaying intensive settlement by A.D. 1000 (Glades IIB-IIIB Period) (Adams, 1998: 08). Immediately west of Biscayne National Park on the mainland is the Cutler Fossil site (8DA2001; Emslie & Morgan, 1995), which implies that the lands and waters of Biscayne National Park possibly may contain sites dating even earlier. If earlier sites
were found, it would have implications for furthering archaeologists’ understanding of human occupation of the Southeast at the end of the last Ice Age.

**Submerged Cultural Resources of Biscayne National Park**

The National Park Service is steward to thousands of maritime cultural resources throughout the country including lighthouses, lifesaving stations, floating ships, shipwrecks, sunken aircraft, and inundated terrestrial prehistoric and historic sites (Aubry, 2001: 25). Through the efforts of the National Park Service Initiative, established in 1987, as well as the Submerged Resource Center, terrestrial and submerged maritime cultural resources have been identified and evaluated in at least sixty-four parks (Aubry, 2001: 25). Submerged archaeological sites include an array of shipwrecks and other representations of maritime casualties that demonstrate the international maritime heritage of Biscayne National Park.

Biscayne National Park is exceedingly rich in historic shipwrecks and shipwreck materials. Approximately seventy-five of the one hundred and twenty total archaeological sites recorded in Biscayne National Park are submerged. Many of these submerged sites are shipwrecks, while the remainders are either artifact scatters or isolated artifacts. The majority of the sites are believed to date after the mid-nineteenth century; a few pre-date that period (Fischer, 1975: 25).

Europeans first explored the Florida coasts in the sixteenth century. Since then, Biscayne Bay became part of a major trade route for ships from Europe, and the North American continent, to the Caribbean Sea, Central and South America, and the Gulf of
Mexico. Biscayne National Park’s Maritime Heritage Trail provides the public access to the remains of some of the Park’s submerged and maritime related sites. All of the sites are very shallow and can be snorkeled, however a few of the sites, such as Alicia, Erl King, and Lugano are better suited to SCUBA divers. In addition to the continued work on known documented sites, Biscayne National Parks continues efforts to locate and document unrecorded sites (the Submerged Resource Center has been tremendously helpful in this endeavor). Due to rising sea-level, there is a great possibility that terrestrial sites close to the shore line may now be underwater, especially in regards to prehistoric archaeological sites within the Park. Cultural resource management at Biscayne National Park is no longer viewed as an ancillary issue but as a primary one. In recent years, Park admiration has encouraged the expansion of the cultural resource management program both within the Park and outside the Park as well.

Cultural resource management within the National Park System benefits greatly from the support of Park administration as well as programs including Systemwide Archaeological Inventory Program, Archaeological Site Management Information System, Geographic Information Systems, and Management Plans. In the future, these programs should continue to make cultural resource management more effective and more efficient.
Enabling Legislation

The National Park Service was established to protect the nation’s natural and cultural resources and to provide places for recreation. The Park Service manages four hundred and one national parks and more than 57,092 national monuments, historic sites, memorials, seashores, and battlefields. It oversees 84,000,000 acres of land. Biscayne National Park is one of several federally managed properties in the state; others include Everglades National Park (and National Wilderness Area), which was authorized in 1934. Other federal lands managed by the National Park Service in Florida include: Canaveral and Gulf Islands national seashores, Big Cypress National Preserve, Dry Tortugas National Park, Fort Matanzas National Monument, Castillo de San Marcos National Monument, De Soto and Fort Caroline National Memorial, and Timucuan Ecological and Historical Preserve.

Biscayne National Park was established by Congress passing 16 U.S.C. 450 QQ, as a National Monument in 1968, when Congress approved Public Law 90-606 on October 18, 1968. Expansion of Biscayne National Monument occurred in 1974 (Figure 3.2). On June 28, 1980, Biscayne National Monument was redesignated as Biscayne National Park. Biscayne National Park now encompasses 69,980 ha (172,924 acres), only 1,799 ha (4,446 acres) of which is land area, making it the largest marine park in the National Park System. After Biscayne National Park was established, the state of Florida gave title to its sovereign submerged lands within the Park’s boundary to the National Park Service.

3 <http://www.nps.gov/aboutus/index.htm> October 2013. N.B. numbers are cumulative through the end of FY 2008
Figure 3.2 Map of Biscayne National Monument and Park Boundaries (Courtesy of the National Park Service/Biscayne National Park)
In its enabling legislation, Public Law 90-606, the United States Congress charged the National Park Service to *preserve and protect for the education, inspiration, recreation, and enjoyment of present and future generations a rare combination of terrestrial, marine, and amphibious life in a tropical setting of great natural beauty* (Adams, 1998: 1-2). The National Park Service manages its submerged cultural resources in the same manner it manages other cultural resources, applying the same policies and procedures for identifying, evaluating, documenting, monitoring, protecting and interpreting resources; whether they are above ground, floating; buried; or submerged (Aubry, 2001: 25). Biscayne National Park is, pursuant to 16 U.S.C. 1, under the jurisdiction of the Secretary of the Interior. In the case of Biscayne National Park, the National Park Service has an obligation under 16 U.S.C §410gg⁵, to manage and preserve federally-owned submerged cultural resources within the boundaries of Biscayne National Park. National Park Service archaeologists, architects, curators, historians, and other cultural resource professionals work in America’s over four hundred national parks to preserve, protect, and share this history of this land and its people. This includes: 27,000 significant structures in national parks; 66,000 archaeological sites in national parks; and 115 million objects in park museum collections.

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Chapter 3 - Environmental Context

If one of the principal defining characteristics of maritime archaeology lies in its reliance on fieldwork underwater, if follows that many of its special features, both strengths and weaknesses, will be determined by the constraints of that environment.

(Muckelroy, 1978: 24)

The environment is important because it affects the conditions under which the ship sank, the survival of artifacts left behind and an archaeologist’s ability to properly research the site. Many variables contribute to the formation of a shipwreck site; thus an initial step before any project can begin is to assess and understand the environmental conditions. Furthermore, conservation and restoration of underwater cultural heritage calls for comprehensive knowledge of the environment in which a shipwreck or other submerged archaeological object is found. Once wrecked, the ship falls to the sea floor where it is instantly exposed to both mechanical and biological degradation processes. The surrounding environment in which an object or shipwreck is found has a direct effect on the materials from which the object is fabricated and important implications about the degradation processes it has undergone.

Geology

As previously mentioned, the upper Florida Keys (from Soldier to Big Pine Key) are the remains of a reef that thrived about 120,000 years ago, during the Pleistocene
Epoch (Lidz & Shinn, 1991). World sea levels subsided during the following (last) glacial period, exposing coral to die in the air and sunlight. The coral was transformed into a stone which is often called coral rock but more aptly called Key Largo Limestone (Lidz & Shinn, 1991). It is a white to light grey, moderately- to- well- cemented, fossiliferous coralline limestone composed of coral heads encased in a calcarenite matrix with a significant components of lime mud infilling (Hoffmeister & Multer, 1968; Stanley, 1966). The south Florida Peninsula contains other soft limestones with bases; but all are related to the Key Largo limestone for example, the Miami Oolite limestone (~ 125-130 Ka) was formed by the precipitation of calcium carbonate from seawater as millimeter-size spheroidal particles (oolites), while father north along the Florida Atlantic coast the coquina of the Anastasia Formation represents the shells of small Pleistocene nearshore molluscs (Leynes & Cullison, 1998: 06). Overlying the Miami and Key Largo limestone are Holocene surficial units of sands and carbonate muds, coral rubble and reefs, as well as local peat and organic materials on the neighboring islands.

**Climate and Weather of South Florida**

Annual rainfall in south Florida ranges from about forty to sixty-five inches (McPherson & Halley, 1996). The south east coast of Florida, where Biscayne National Park is located, usually receives the greatest amount whereas the Florida Keys and the areas near Lake Okeechobee and Charlotte Harbor usually receive the least. There are two main seasons in south Florida: a wet season begins in May and lasts through October, and a dry season that begins in November and runs through April. The former typically
brings tropical temperatures with highs in the upper-90s and lows in the 80s. The humidity is usually high this time of year and scattered thundershowers in the afternoon are quite common. More than half of the rain falls in the wet season from June through September. Which is also associated with squalls and tropical cyclones. The wet season often has a bimodal rainfall pattern with two maxima, one in early and one in late summer (Wolfert-Lohmann, et al., 2007). Rainfall that occurs during the rest of the year, is usually the result of large frontal systems and its broadly distributed rather than localized (Wolfert-Lohmann, et al., 2007). The dry season brings cooler, crisper temperatures with highs in the 80s and lows in the 60s. The dry season also brings strong winds associated with cool or cold fronts, which can result in choppy seas and decreased visibility in the water.

Florida’s extensive ocean shoreline stretches over 1,300 miles and in the United States is only second to Alaska’s in length (Barnes, 2007). Fronting both the Atlantic Ocean and the Gulf of Mexico, its irregular coast is made up of barrier islands, sandy cusps, and keys broken and segmented by inlets, estuaries, rives and bays (Barnes, 2007). It’s low-lying terrain, in most of the Peninsula south of Lake Okeechobee only a few feet above sea level, extends miles inland from the coast making its many rivers, and vast lakes, particularly prone to flooding from heavy rains; these physical features contribute greatly to Florida’s vulnerability to the recurring effects of hurricanes and tropical storms (Barnes, 2007).
Hurricanes

Florida has experienced some great storms throughout history. Most of the land in Florida is within seventy miles of the ocean, making it and everything built on it extremely vulnerable to the ravages of hurricane winds (Barnes, 2007). Gusting winds coming from the ocean do not get much of chance to slow down over Florida’s flat, smooth, swampy landscape before impacting residents and their property (Barnes, 2007). Hurricanes are tropical cyclones with wind speeds of 119 kilometers per hour or higher that occur over the Atlantic Ocean, Caribbean Sea and the Gulf of Mexico during the summer and fall months (Cantillo et al., 2000). These storms originate in warm waters, in areas of low pressure with wind circulation counterclockwise around the center (Cantillo et al., 2000). Hurricanes in Florida have long been a significant factor in the natural and cultural history of the state. At times, hurricanes have literally changed the course of Florida’s history and development (Barnes, 2007).

Hurricanes are created each year from the heat of the Tropics. Throughout the summer months the sun gradually warms the ocean’s surface temperature, which results in large amount of heat and moisture in the atmosphere through the process of evaporation and condensation. As the warm vapors rises, cools and condenses, it forms clouds, scattered rain showers and thunderstorms. As the newly formed thunderstorms grow and multiply, many produce tropical waves – low-pressure troughs that drift westward through equatorial waters (Barnes, 2007: 261). Some waves become tropical depressions as thunderheads build, pressures drop, and low-level circulation develops. The earth’s spin produces the Coriolis effect, which causes winds within a tropical
depression to spiral around the central low pressure. These winds encounter surface friction that causes them to spiral inward, helping to intensify the storm by bringing warm, moist air to recharge the growing thunderstorms. If conditions are favorable, a tropical depression can intensify until sustained winds reach thirty-nine miles per hour, at which time it is considered a tropical storm. Once a tropical storm’s rotation becomes well organized, its central pressure falls, sustained winds may reach seventy-four miles per hour and a hurricane is born. At this stage in its evolution, it may cover thousands of square miles as it track across the ocean’s surface (Barnes, 2007).

The annual number of hurricanes is greater in South Florida than in any other place in the United States (Cantillo et al., 2000). The annual numbers of hurricanes in the Atlantic was below average from 1894 through 1930, particularly low from 1911 through 1921. During the 1930s, numbers increased above average and remained so through 1982, with the exception of a few years around 1940 (Cantillo et al., 2000). In Florida, annual hurricane frequency was above average from 1933-1938, 1945-1952 and 1964-1966. Frequencies were below average until the onset of El Niño (Cantillo et al., 2000). The El Niño/Southern Oscillation (ENSO) is the largest single source of interannual climatic variability on a global scale and its effects are wide ranging (Cantillo et al., 2000). The Southern Oscillation is a hemispheric sea level pressure ‘seesaw’ across the tropical Pacific Ocean. The anomalous ocean and atmospheric conditions that occur periodically along the upwelling zone of the Eastern Equatorial Pacific along the coast of Ecuador and Peru are known as El Niño and are a manifestation of coupled ocean-

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6 Meteorological information about tropical cyclones from 1921 to 2013 can be found in the NOAA National Hurricane Center internet website (<http://www.nhc.noaa.gov/pastall.html>) and information about tropical cyclones from 1886 to 1998 can be found at Unisys internet website (<http://weather.unisys.com/hurricane/atlantic/index.html>).
atmosphere processes. The warm phase of this coupling is known as El Niño and the cold phase is known as La Niña (Cantillo et al., 2000).

Accounts of hurricanes are scattered throughout the history of Florida, beginning with the first known report of a great storm in 1559 (Barnes, 2007). The storm occurred in September 1559, wrecking the Spanish explorer Tristán de Luna as he attempted to establish a settlement at Ochusa, known today as Pensacola, Florida. For the next few hundred years, the many tropical storms that affected Florida were scarcely documented due to the small number of European settlements and vast segments of uninhabited coastline in the Southern United States (Barnes, 2007). Storm accounts were sometimes recorded in the journals of sailors at sea, but complete records of pre-18th Century storms in the Florida region are rare (Barnes, 2007). Although England and Spain were essentially at war during the 1740s, documentary records suggest that more ships were lost to hurricanes during this period than to the peril of battle (Barnes, 2007). Despite the lack of complete written records, it is abundantly clear that centuries of settlement and numerous battles among the Spanish, British, French and Seminoles in Florida; hurricanes played an important role in shaping its geography and development.

**Hurricane Andrew**

Hurricane Andrew hit southeast Florida in late August 1992, as the most destructive storm in United States history. It remains a milestone in our national hurricane experience (Barnes, 2007). Hurricane Andrew began as a strong tropical wave near the Cape Verde Islands (Barnes, 2007). The 1992 hurricane season had been particularly
quiet through mid-August, until finally the first named storm, Andrew, formed from a strong tropical wave over the open ocean west of the Cape Verde Islands on the seventeenth (Barnes, 2007: 261). Tropical storm Andrew tracked toward the northwest for five days with little strengthening, passing well north of Puerto Rico on August 21st. Then approximately 800 miles east of Miami, the storm moved over warm Bahamian waters and began a period of rapid intensification. By August 22nd, Hurricane Andrew’s winds were 75 miles per hour and its pressure was 29.35 inches. By 11 o’clock that evening, winds were 110 miles per hour and the pressure was 28.32. By noon the following day, winds surpassed 155 miles per hour and its central pressure dropped to 27.46 inches.

<table>
<thead>
<tr>
<th>Category</th>
<th>Central Pressure (mb)</th>
<th>Wind Speed (mph)</th>
<th>Storm Surge (ft)</th>
<th>Damage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&gt;980</td>
<td>&gt;28.94</td>
<td>4-5</td>
<td>Minimal</td>
</tr>
<tr>
<td>2</td>
<td>965-979</td>
<td>28.50-28.91</td>
<td>6-8</td>
<td>Moderate</td>
</tr>
<tr>
<td>3</td>
<td>945-964</td>
<td>27.91-28.47</td>
<td>9-12</td>
<td>Extensive</td>
</tr>
<tr>
<td>4</td>
<td>92-944</td>
<td>27.17-27.88</td>
<td>13-18</td>
<td>Extreme</td>
</tr>
<tr>
<td>5</td>
<td>&gt;920</td>
<td>&gt;27.17</td>
<td>&gt;18</td>
<td>Catastrophic</td>
</tr>
</tbody>
</table>

Note. Tropical Storm (TS) – A tropical cyclone in which the maximum sustained surface wind speed from 39 mph (63 kph) to 73 mph (118 kph). Tropical Depression (TD) – A tropical cyclone in which the maximum sustained surface wind speed 38 mph (62 kph) or less.

Hurricane Andrew had gone from a ‘minimal’ hurricane a Category 5 storm (Table 4.1) in just thirty hours (Barnes, 2007: 261). Later, on August 23rd, Hurricane Andrew reached its peak intensity with 175 miles per hour winds and a minimum central pressure of 27.23 inches. At the time the storm reached its peak, it was moving nearly due west at approximately 15 miles per hour on a course that would carry it straight though the
Bahama Islands toward Florida. Warnings were broadcast and largely heeded before a twenty-three-foot storm surge pounded the Bahamian shores. On August 24, 1992 at about 4:30 A.M. the west eye-wall of Hurricane Andrew passed directly over Biscayne Bay and moved rapidly west in the direction of Cutler Ridge, Homestead and other areas of South Dade County, Florida (Barnes, 2007: 263). Hurricane Andrew was a relatively dry hurricane with maximum sustained winds around 165 miles per hour, and gusts that likely exceeded 190 miles per hour (Barnes, 2007; Cantillo et al., 2000).

Hurricane Andrew’s winds were unquestionably among the most intense to ever blast across American soil (Barnes, 2007: 265). The effects Hurricane Andrew had on Biscayne Bay and the northern Florida Keys have been well documented (Cantillo et al., 2000). Its effects have been described as that of a 25-mile wide tornado (Cantillo et al., 2000). The peak surge crested at the edge of Biscayne Bay at 16.9 feet, the highest storm tide ever recorded in southeastern Florida. The most evident impact of Hurricane Andrew on South Florida’s coastal ecosystem was uprooted and defoliated mangroves, flattening over 70,000 acres of mangrove forest on the east and west coasts of Florida (Cantillo et al., 2000). Bottoms were redistributed and organic material from coastal areas entered Biscayne Bay resulting in discolored waters and low oxygen conditions (Cantillo et al., 2000). FEMA’s Interagency Hazard Mitigation Team Report for Hurricane Andrew stated that: “Artificial reefs, which stretch thirty-six nautical miles from the Broward-Dade county line to south of Homestead were severely damaged, making diving hazardous and ruining habitat for various species of commercially imported fish. Approximately seventy-five percent of the lobster traps in the area were demolished. Hurricane Andrew
damaged thousands of acres of productive mangrove forest, destroyed forests and parks, encouraged invasion of natural areas by alien species and caused tons of marine debris to be deposited along pristine shorelines. These damages affected the area’s economy and quality of life, which are largely dependent on pristine beaches, clear waters and abundant natural resources” (Barnes, 2007: 276).

The Sunshine State remains vulnerable to future deadly and destructive hurricanes. Due to Florida’s large coastal population, continuing growth, heavily developed barrier beaches, and limited arteries for evacuating traffic, large number of residents and tourists could find themselves trapped within the core of the next great hurricane (Barnes, 2007: 283). Since Hurricane Andrew, we have entered a new era in hurricane disaster management – the organized effort to prepare for and recover from major hurricanes (Barnes, 2007).

**Hurricane Sandy**

Hurricane Sandy (AL182012) began as a classic late-season hurricane in the southwest Caribbean Sea, originating from a tropical wave that left the coast of Africa on October 11, 2012. The wave encountered a large upper-level trough over the eastern Atlantic Ocean on the 12-13 of October and produced an extensive area of showers and thunderstorms, but the shear was too strong for development. Little convection occurred near the wave axis for the next several days, likely due to upper-level convergence over the tropical Atlantic Ocean to the east of Hurricane Rafael. During that time, the wave passed near a weak pre-existing disturbance in the Inter-tropical Convergence Zone, and
the two systems became difficult to distinguish by October 17. The wave entered the
eastern Caribbean Sea early on October 18, with only a weak wind shift and some
showers noted in the Windward Islands (Dominica, Grenada, Guadeloupe, Martinique,
Mustique, Saint Lucia and Saint Vincent and the Grenadines. Hurricane Sandy first made
landfall as a Category 1 hurricane (Table 4.1) in Jamaica on October 24, 2012, the first
hurricane landfall there since Gilbert in 1998 and as a 100-kt Category 3 hurricane in
eastern Cuba before quickly weakening to a Category 1 hurricane while moving through
the central and northwestern Bahamas. Hurricane Sandy underwent a complex evolution
and grew considerably in size while over the Bahamas, and continued to grow despite
weakening into a tropical storm north of those islands. The system regained strength and
turned back into a hurricane while moving northeastward, parallel to the Southeastern
coast of the continental Untied States, and reached its second peak intensity of 85-kt
while it turned northwestward toward the mid-Atlantic states. Hurricane Sandy weakened
somewhat and then made landfall as a post-tropical cyclone near Brigantine, New Jersey
with 70-kt maximum sustained winds. Because of its tremendous size, Hurricane Sandy
caused extensive damage all along the east coast of the United States, affecting major
metropolitan cities; cities which ordinarily do not experience such forms of natural
disasters (i.e., New York City, New Jersey). Preliminary damage in the United States
estimates are near $50 billion, making Hurricane Sandy the second-costliest cyclone to
hit the Untied States since to hit the Untied States since 19007 (Blake et al., 2013: 01).
There were at least 147 direct deaths recorded across the Atlantic basin as a result of

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7 When not adjusted for inflation, population and wealth normalization. Sandy ranks sixth, when accounting for those factors (records of costliest cyclones began in 1900) (Blake et al., 2013: 01).
Hurricane Sandy (Blake et al., 2013: 01). This was the greatest number of United States direct fatalities related to a tropical cyclone outside of the southern states since Hurricane Agnes in 1972 (Blake et al., 2013: 01).

The Disaster Relief Appropriations Act of 2013, appropriated $829.2 million ($786.7 million post-sequester) for the department of the Interior to address its funding needs relating to response, recovery, and mitigation of damages caused by Hurricane Sandy. The appropriation includes:

- Bureau of Safety and Environmental Enforcement/Oil Spill Research: $3 million ($2.85 million post-sequester) was appropriated for response, and recovery, primarily for cleanup of storm debris and repairs to the Ohmesett facility located in New Jersey.
- Fish and Wildlife Service/Construction: $68.2 million ($64.6 million post-sequester) was appropriated for response and recovery for cleanup of storm debris and repairs to refuges, fish hatcheries and other FWS facilities, lands and habitats along the eastern seaboard.
- National Park Service/Construction: $348 million ($329.8 million post-sequester) was appropriated for response and recovery for cleanup of storm debris and repairs to national park units along the eastern seaboard.
- National Park Service/Historic Preservation: $50 million ($47.5 million post-sequester) for historic preservation grants to States.

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Departmental Management/Salaries and Expenses: $360 million ($341.9 million post-sequester) to be allocated to Interior bureaus and offices for mitigation.

The National Park Service will utilize $348 million (pre-sequester) for immediate needs related to Hurricane Sandy Response and Recovery. National Park Service assessments revealed the need for response, cleanup, and facility restoration.

Much of the damage impacts critical infrastructure systems and park facilities that are key to park operations. Damages occurred in the Northeast, Southeast, and National Capital National Park Service Regions. Projects will consider the need to make more resilient and strengthened facilities to withstand future storms. In some cases buildings and infrastructures will be relocated and/or eliminated in order to mitigate future damages. Three National Park Service regions and twenty-three National Park Service units sustained damage as a result of Hurricane Sandy that will be addressed by the Emergency Supplemental appropriation:

- Northeast Region (NER): includes the bulk of the storm damage to New York and New Jersey park units, such as: Statue of Liberty and Ellis Island, Gateway NRA, Fire Island National Seashore, Morristown National Historical Park, and Assateague Island National Seashores.
- Southeast Region (SER): includes Cape Hatteras and Cape Lookout National Seashores and Biscayne National Park.
- National Capital Region (NCR): includes Rock Creek Park, Monocacy and Antietam Battlefields and Chesapeake and Ohio Canal National Historical Park.
During Hurricane Sandy, the National Park Service closed or cordoned off sixty-nine parks. Up and down the East Coast and farther inland, heavy winds, tidal surge, rain, and snow caused significant damage to national parks, particularly in the Northeast Region. The National Park Service deployed an Incident Management Team of nearly seven hundred employees to respond promptly to Hurricane Sandy. The Incident Management team worked around the clock to ensure the safety of the park employees prior to and during the storm and to respond as quickly as possible to protect park resources following the storm, including quantifying the damage sustained so that the National Park Service could accurately assess its needs in the wake of the largest storm to hit the mid-Atlantic in centuries.

The National Park Service’s first priority moving forward is to gain operation of facilities and infrastructure and ensure that the parks will support visitation and to restore visitor services and open parks to visitors. Where possible, the National Park Service will pursue temporary solutions that hasten the return of visitors to parks. However, the National Park Service will seek permanent, sustainable solutions that will allow park resources to withstand future natural disasters.

**Project Examples by Type:**

- **Storm Preparation:** Project work includes purchasing and installing sand bags, boarding windows, stabilizing equipment, and moving cultural resources to higher grounds.

- **Immediate Response and Cleanup:** Project work includes debris cleanup – removal of debris, trash, silt, trees, limbs, and leaves; developing recovery plans
and conducting damage assessments; containments and disposal of hazardous materials and vehicles and gasoline; restoring emergency services and utilities; securing park assets; health and safety response calls; and operation of an Incident Command team.

_Stabilization_: Projects to secure and maintain assets, structures, and natural and cultural resources to prevent additional damage and to prevent future resource/facility damage or efforts to mitigate a safety hazard; sand dune and beach restoration; mold remediation; facility weatherization; and minor repairs and restorations.

_Recovery_: The majority of the projects fall in this category and are projects that repair and rehabilitate a resource or facility damaged by the storm.

Biscayne National Park (part of the Southeast Region) has five construction projects as a result of Hurricane Sandy.

- Project No. 194814: Repair Storm Damaged Elliot Key Piers, ($0.4 million)
- Project No. 201498: Repair Storm Damaged Boardwalks at Elliot Key and Convoy Point, ($0.1 million).
- Project No. 195871: Conduct Site Assessments at Storm Damaged Archeological Site Totten Key, ($0.1 million).
- Project No. 195875: Perform Site Assessment and Recover Artifacts at Storm Impacted “HMS Fowey” Shipwreck, ($0.4 million).
- Project No. 195882: Repair Storm Damage to Black Point Jetty, ($0.1 million).
Hurricanes and HMS Fowey

Tropical cyclones are the most serious coastal hazards affecting south Florida (Powell & McAdie, 1996). These weather events cause widespread damage to many of the underwater resources in the south Florida region (Powell & McAdie, 1996). Over the past thirty years, HMS Fowey has been seriously affected by storm events. Specifically, the integrity of the site has storm surge events associated with Hurricanes Andrew and Sandy. In the years since Hurricane Andrew, BISC and SRC archaeologists have monitored the Fowey site, visiting the site several times annually as well as after major storm events (Lawson & Morano, 2013: 09). Following Hurricane Andrew, site assessments revealed that HMS Fowey is susceptible to sediment movement caused by episodic weather events (Lawson & Morano, 2013: 09). After the initial damage assessment was conducted, another assessment of the site and excavation took place in 1993. However, even after the 1993 project, the NPS was still undecided on a future management plan for the Fowey site. After Hurricane Sandy, Charles Lawson, Cultural Resources Manager at BISC visited the site to assess the storm damage. In a November 2, 2012 memo to the BISC Park Superintendent, Lawson wrote:

My visit to the site yesterday revealed that a substantial amount of sand had been moved off of the shipwreck site and pushed to the west, along with an innumerable number of historic artifacts. This material could be seen scattered on the seafloor at distances of over 60 meters from the site’s center. The ship’s timbers, which are usually covered with approximately 10 centimeters of sand, were fully exposed and showed some evidence of breakage associated with the storm surge. A number of significant artifacts that had been previously buried in an undisturbed context were unearthed during the storm and redeposited in the blown-out field to the west of the wreck.
When artifacts and timbers are re-introduced into the dynamic marine environment they are subjected to accelerated decomposition. The sword along with all of the other exposed artifacts, will deteriorate if it is not recovered or conserved quickly. As material culture is transported further and further away from the main site it is becoming increasingly if not impossible, to record the context of the artifacts associated with the site. As a result, the site becomes increasingly disassociated and important artifacts may be lost forever. With each passing tropical storm HMS *Fowey* becomes more degraded, if another Category 5 hurricane passes through Biscayne Bay before the site can be properly stabilized, unique contextual information about HMS *Fowey* might not survive. After Hurricane Sandy, it was clear to the NPS that the Fowey site needed to be protected from an future storm events. Biscayne National Park was given $0.4 million, as listed above, to carry out a full damage assessment (to include, re-mapping, collection, conservation of exposed/threatened artifacts and documenting the loss of site integrity and fabric since the last full site documentation in 1994. Most importantly, BISC will be able to restabilize the Fowey site. (Lawson, 2012: 02). These storm events demonstrate just how unstable the site actually is.

Only two British 18\textsuperscript{th} century warships have been archaeologically excavated; HMS *Ronson* and HMS *Pandora* (Stewart, 2000: 03). There are no other surviving representations of 18\textsuperscript{th} century British warships in this region of the world (South Florida, Florida Key and the Caribbean) (Stewart, 2000: 04). All the others, have been destroyed with virtually no data collection (Stewart, 2000: 04). HMS *Looe* and HMS *Winchester*, were two British shipwreck sites in the Florida Keys, however, they were both
improperly excavated by treasure hunters before archaeologists had a chance to research
the wrecks and properly excavate them for academic purposes (Stewart, 2000: 04). HMS
*Fowey* being relatively well preserved from an archaeological standpoint, makes it that
much more significant but being that the site lies in such a dynamic environment on the
seaward edge of the distribution of seagrass meadows, the HMS *Fowey* is in severe
danger of being destroyed forever.

**Human and Natural Impacts on Submerged Cultural Resources**

Underwater and maritime cultural resources are vulnerable to a wide variety of
natural and manmade threats (U.S. Congress, Office of Technology Assessment, 1987:
03). One of the most challenging problems confronting the future of all archaeology is
the accelerating pace at which sites are being destroyed (Marx, 1975: 05). Common
threats to underwater archaeological and maritime resources include:

- **Natural Threats:** corrosion/concretion materials; earthquakes; erosion of
coastline, river, and stream banks; floods; storms; subsidence; wave
action; wood-borers; volcanoes.

- **Human Threats:** anchoring (particularly of freighters); federal projects such
as naval base development, dam and reservoir construction, channelization,
etc.; looting; lack of maintenance (maritime resources); neglect; non-
conservation of materials recovered from underwater; oil, gas, mineral
extraction; pipelines; pollution; salvaging, treasure hunting; shell fishing;
shore facility expansion (ports, marinas, recreational areas, airports); sport diving (recreational Scuba diving); and vandalism.

The human threats to submerged material culture far outweigh those of nature.

The public is often unaware of the difference between treasure hunters and archaeologists. Treasure hunters focus on historic objects of high intrinsic cultural or economic value, while archaeologists focus on the scientific understanding of the entire archaeological site within the context of its surroundings (U.S. Congress, Office of Technology Assessment, 1987: 06). The havoc wreaked by souvenir collectors and treasure hunters is similar. The weekend diver who picks up an artifact from a site and brings it home to decorate her living room perhaps does not realize that she has removed something valuable that could potentially contribute to the identification of an archaeological site (Marx, 1975: 05). Treasure hunters often inflict damage of a much greater magnitude, often destroying the site and the surrounding marine life entirely (Marx, 1975: 05). In their attempts to recover artifacts quickly, treasure hunters destroy much of the contextual information that is essential for advancing scientific knowledge of archaeological sites (U.S. Congress, Office of Technology Assessment, 1987: 06). Some treasure salvors employ archaeologists to oversee or carry out tasks that can minimize damage to sites. However, many archaeologists believe that the basic goals and interests of archaeological research and treasure salvaging are inherently antithetical, and that when profit is a motive for exploitation of shipwrecks, scientific research and the shipwreck themselves must inevitably suffer (U.S. Congress, Office of Technology Assessment, 1987: 31). Looters and commercial treasure salvors constitute the most
serious artificial threats to shipwrecks. In the process of searching out and extracting commercially promising contents they may destroy significant archaeological information (U.S. Congress, Office of Technology Assessment, 1987: 03). Improved education of the general public, and those whose activities might adversely affect significant sites, could result in a higher degree of protection. Specifically, it will be important to educate sport divers, fisherman, salvors, the oil and gas industry, and other consumers of underwater resources, as well as Federal and State agencies and local communities about the historic value of such sites (U.S. Congress, Office of Technology Assessment, 1987: 06).

One of the most important issues that a cultural resource management program must address is the need to effect change in the existing attitudes of looters and those who are not interested in preserving the archaeological site and associated artifacts. At the same time, the program must promote the positive attitudes of people who want to preserve the site. The Florida Bureau of Archaeological Research launched an intensive public campaign to teach recreational diving visitors the importance of shipwreck preservation for research and for enjoyment (Scott-Ireton, 2008: 09). By promoting historic shipwrecks as attractions for heritage tourism, archaeologists and submerged cultural resource managers can tap into a culture of stewardship and reverence for the ancient to help preserve the sites for the future (Scott-Ireton, 2008: 09). In the future, the historical and cultural importance of shipwrecks should be emphasized rather than the monetary value of the wreck as a source of artifacts. (Scott-Ireton, 2008: 11).
Chapter 4 - HMS Fowey

Between the 16\textsuperscript{th} and 19\textsuperscript{th} centuries, Florida’s geographic position made the peninsula strategically important to European nations looking to expand their New World influence by controlling Atlantic entrances to the Gulf of Mexico and the Caribbean Sea (Scott-Ireton, 2008: 01). Thus for centuries Florida was directly in the pathway of centuries of continuous military and commercial seaborne traffic. The first notable appearance of the English in Florida was in 1586, when Sir Francis Drake raided the Spanish colony of St. Augustine. Tropical fevers, difficult terrain, conflicts with American Indians and limited economic opportunity hindered the development of major English colonies. The Spanish would remain the predominant European influence in Florida until, after the Seven Years’ War ended in 1763, when they relinquished control of Florida to the English (Adams 1998).

His Majesty’s Ship (HMS) Fowey\textsuperscript{9} (BISC-UW-20, 8Da11948) is the most significant known submerged archaeological site in Biscayne National Park. Its importance is not only limited to actual archaeological significance, which is substantial, but, is also its high public profile in popular media as a result of very public legal proceedings over the past several decades. HMS Fowey is familiar to a wide audience with little or no prior understanding or awareness of maritime archaeology in general or cultural resource management in particular.

\textsuperscript{9} Pronounced fō-wē (Skowronek, 1981: 01).
HMS *Fowey* was laid down at the Blaydes Shipyard in Kingston-on-Hull, England and was launched on 14 August 1744 in Hull, England. She was named after the town of Fowey in Cornwall, and was the fourth vessel to bear this name since 1696 (Skowronek & Fischer, 2009: 04). HMS *Fowey* was part of the proposed naval establishment of 1741; it was one of eight fifth-rate 44-gun warships of the Royal Navy built at the beginning of the decade. Her sister ships were: *Looe, Torrington, Lark, Angle-sea, Roebuck, Pearl, Mary Galley, Ludlow Castle*, and *South Sea Castle* (Skowronek & Fischer, 2009: 04). Each ship was built at a different shipyard but with similar dimensions.

She was 127 feet long, with a 36-foot beam, a draft of 15 and a half feet, and a displacement of 709 builder’s old measurement (tons b.m.) (Skowronek, 1981: 01). Her normal crew was two hundred and fifty men. She was initially built to carry twenty guns, but was rearmed to carry forty-four guns in 1745. Twenty guns on the lower deck were 18-pounder cannons, twenty-two on the upper deck were 9-pounder cannons, and two 6-pounder bow-chasers were mounted in the forecastle.

The first commander of HMS *Fowey* was Post Captain Policarpus Taylor. During the three years of his command, HMS *Fowey* had captured a French ship, *Mentor*, in 1745 and in 1746 was credited with sinking *Griffin*, a twenty-six-gun ship in the Bay of Feschampe in Normandy, France (Skowronek & Fischer, 2009: 04). In the early part of her life, 1746, she was sailing with the vessels *Devon* and *Torrington*, and she was responsible for escorting troop transports from Gibraltar to Fort Louisburg in New France. She remained in Louisburg for eight days before being dispatched “to protect the
trade colony of Virginia” (Skowronek & Fischer, 1984: 52). HMS Fowey was part of the Royal Navy’s Jamaica Squadron, which operated in the Caribbean and along the North American coastline during the war between Spain and Great Britain, known as “The War of Jenkins Ear”, from 1739 to 1748. During the winter of 1746, it is noted that HMS Fowey left the Caribbean region, but the reasons for her departure are unknown. In the Fall of 1747, she sailed along the eastern coast of North America, from Massachusetts to Virginia. In January 1748, HMS Fowey had once again retuned to the Caribbean. On June 03, 1748, she captured St. Judea (Judah), a 20-gun, 108-man Spanish ship in the Gulf of Mexico. St. Judea was reportedly carrying cocoa, indigo, and between 50,000 and 190,000 dollars in treasure on her journey from from Caracas, Venezuela heading toward Havana, Cuba.

HMS Fowey set sail on her final voyage on June 26, 1748 under the command of twenty-four year old Captain, Francis William Drake in a convoy en route to her summer duty station off Virginia, with three other ships; the snow10 merchant vessel, Jane, from New York, under the command of Captain Abraham Kittletash; a brig, Mermaid, from Rhode Island, under the command of Captain John Collins; and St. Judea under the command of Lieutenant Robert Middleton, forming a convoy for the sail to North America through the hostile waters around Spanish Cuba and Florida (Skowronek & Fischer, 1983: 53).

On the morning of June 27, Mermaid ran aground off the northern Florida Keys just after the 02:30 AM sounding. HMS Fowey tried to free the brig but ended up running

---

10 Snows, were the largest type of two-masted sailing vessels to carry square sails on both masts. Immediately behind the mainmast was a trysail mast used for setting fore-and-aft trysails.
aground herself; at 06:00 AM, *Mermaid* freed herself while HMS *Fowey* remained aground on the reef. In an attempt to free her, Captain Drake ordered two-six pounder bow-chasers thrown overboard. When that did not help her refloat, the heavy barrels of drinking water were also thrown overboard. Several hours later, the crew jettisoned five more guns (two six-pounders, two-nine pounders, and an eighteen-pounder).

At 17:00 HMS *Fowey* broke free only for her crew to discover a significant hole in the ship’s hull. They, along with eighty Spanish prisoners and fourteen men from *Jane*, worked tirelessly to save the ship. At 04:00 AM the following morning, Captain Drake called his officers together for a meeting; all agreed it would be better to run the ship back up onto the reef where it could later be salvaged than to allow her to sink completely in deep water. However, in their attempt to reground the ship, she ran up the reef and back down the other side, enlarging the preexisting hole in the hull and tearing off the rudder. At this point, HMS *Fowey* was lost. Captain Drake ordered the sheet anchor to be dropped and she sank into approximately three and a half fathoms of water. HMS *Fowey* was last seen afloat on the morning of June 28, 1748. The ship now lies in an area known today as the Legare Anchorage.

**Identifying BISC-UW-20**

Underwater archaeologists, like their land counterparts, rely heavily upon absolute dating methods as well as quantitative laboratory methods for studying ancient diet, technology, and ecology (Gould, 2000: 07). One of the major questions confronting underwater archaeologists today, however, is the extent to which archaeology should also
be viewed as a social science. To what extent should underwater archaeologists apply and
test ideas about the human past based on concepts of culture and society more commonly
associated with social sciences than with history? This question is especially significant
in the case of historic shipwrecks that are products of documented situations in the past
(Gould, 2000: 07-08). Reliable written documents only go back a relatively short time in
our past (Bowens, 2009: 26). The archaeological study of shipwrecks requires approaches
common to the natural, social and historical sciences (Gould, 2000: 02).

While there are still many historians who do not view archaeology in general and
underwater archaeology specifically as a legitimate source of evidence about the human
past (acknowledging that both underwater archaeology and written documentary
evidence are not free from bias and neither can be held as absolute); the successful
identification of HMS *Fowey* is a perfect example of how underwater archaeology only
increases and enhances our knowledge of human past activity. Material culture studies
utilize physical remains to support or refute the historical written record. Both material
cultural studies and the historical written record were necessary to properly identify and
interpret the Legare Anchorage shipwreck site.

**Techniques of Marine Archaeological Survey and Recording**

While many ancient shipwrecks were found accidentally by sponge divers in the
Mediterranean or by recreational scuba divers, others are found through intentional,
methodical search and survey. There are many different types of geophysical and remote-
sensing methods used in underwater archaeological surveys. These include acoustic
systems, bathymetry, echo-sounders, multi-beam sonar, bottom-classification systems, side-scan sonar, sub-bottom profiling, magnetometry, and submersibles such as remotely operated vehicles (ROVs) and autonomous underwater vehicles (AUVs) (Bowens, 2009). Research and development is crucial to the transfer of technologies developed for other scientific and engineering purposes to the disciplines of underwater archaeology and maritime preservation (U.S. Congress, Office of Technology Assessment, 1987: 32).

Properly recording data during an archaeological excavation is extremely important because once the site has been excavated, it is destroyed and if any research were to be conducted in the future, only the record from that excavation could be used. There are many different types of recording systems used in underwater archaeology and it is important to use the appropriate system for the specific site being excavated. However, the excavated remains and data collected mean absolutely nothing if there is no information about the location of the archaeological site and the artifacts within that site, relative to one another and to the world.

**Preliminary Survey, 1980**

Following the a legal case, *Klein vs. The Unidentified Sailing Vessel within the Legare Anchorage*, which will be discussed in detail later in this thesis, the United States District Court, Southern District of Florida asked the National Park Service to officially locate the wreck of HMS Fowey. In June and July of 1980, a two-week, intensive survey of the Legare Anchorage was conducted, was conducted with cooperation from the National Park Service’s Submerged Cultural Resource Unit (SCRU) in Santa Fe, New
Mexico and assisted by the Florida State University Department of Anthropology and Academic Diving Program. Initially, the National Park Service attempted to relocate the site using the longitude and latitude points provided by Mr. Gerald Klein, an approximately one square nautical mile grid (6,000 feet) had been projected around the center point provided by Mr. Gerald Klein by the Navigational Aids Office of the United States Coast Guard in Miami. They also provided precise locations of several points which could be used as stations for the two shore-based microwave transmitters required by the positioning system, but they were unsuccessful. Later, the National Park Service obtained a small magnetometer, a Vrian M-50, and a Loran C positioning systems, which were used in attempts to relocate the site, again without any results. It was subsequently decided to conduct a highly accurate survey utilizing equipment with greater sensitivity and accuracy.

The equipment being used was a Geometrics Model G-806 marine proton precession magnetometer and a Decca Autocarta microwave position system interfaced with a distance-measuring unit (Fischer, 1983). Boat position was obtained by an x-y plotter. These systems were in turn interfaced with a Hewlett Packard® micro-processor/computer and computer console. The magnetometer provided real-time digital readout and the data were continuously recorded on paper tape on a strip chart recorder. These and the positioning data were recorded on paper tape each minute and magnetic tape each second by the computer, providing a relatively constant record of the boat’s position and the surroundings magnetic field. Magnetic data were obtained within an accuracy of one
gamma (Y) and positioning data were accurate within one meter (Fischer, 1983). These data were incorporated into a computer program developed by Decca Survey Systems, supplier of the positioning system. After that the entire grid was surveyed where two anomalies were encountered, one of which was the unidentified wreck (Fischer, 1983).

A preliminary reconnaissance of the site was made over a period of three days following the discovery of the shipwreck. Diver teams then conducted a reconnaissance of the entire area to determine its extent and the nature of visible features and materials. Their observations included cannon, cannon shot, wooden ship members and other features (Fischer, 1983). Divers reported obvious site disturbance through excavation, a modern sling on one cannon (apparently used in an unsuccessful attempt to raise and remove it), and a rebar grid system. It was apparent that the site had probably been partially salvaged and thus seemed likely to be the site in litigation (Fischer, 1983). Since their initial survey, the National park Service felt it was necessary to conduct excavations with the goal of maximizing data recovery, because of the looting and site deterioration (Skowronek et al. 1987: 315). Following the preliminary reconnaissance the divers commenced a thorough investigation of the entire site. They immediately mapped it, conducted a surface survey and collection. They also created a thirty-minute videotape documenting the site’s physical condition and for the purpose of providing non-divers with a perspective on the nature of the site. Controlled stereo photographs were made to provide a detailed map and systemically record the appearance and features of the site. From this, a scaled photomosaic, with overlay key was produced. A limited controlled surface collection of artifacts with potential diagnostic value was made. Twenty-one items were collected for analysis.
<table>
<thead>
<tr>
<th>Catalog Number</th>
<th>SEAC FS Number</th>
<th>Object</th>
</tr>
</thead>
<tbody>
<tr>
<td>362-01</td>
<td>14500</td>
<td>Chinese Export Underglazed Porcelain Rim fragment (blue and white); fate range 1660-1800; usually found on Spanish shipwreck sites (Deagan)</td>
</tr>
<tr>
<td>362-02</td>
<td>14501</td>
<td>English delft large jar rim fragment; date range 1650-1800 (Deagan)</td>
</tr>
<tr>
<td>362-03</td>
<td>14502</td>
<td>Rhenish grey stoneware ceramic mug fragment; cipher of English monarch GR dating it between 1714-1760 (Hume)</td>
</tr>
<tr>
<td>362-04</td>
<td>14503</td>
<td>Brown faience ceramic fragment with blue tin enamel interior glaze and brown lead exterior glaze; similar to FS # 9945 date range 1730-1760 (Deagan)</td>
</tr>
<tr>
<td>362-05</td>
<td>14504</td>
<td>Red-brown low-fired earthenware rim fragment (aboriginal) often the Spanish would have natives make utility wares from them.</td>
</tr>
<tr>
<td>362-06</td>
<td>14505</td>
<td>Green glass bottleneck with “V” shaped applied string rim; identical to bottlenecks in Klein collection</td>
</tr>
<tr>
<td>362-07</td>
<td>14506</td>
<td>Green glass bottle base fragment with kick-up base; identical to bottle bases in Klein collection</td>
</tr>
<tr>
<td>362-08</td>
<td>14507</td>
<td>Small glass bottle base (pale green tint) pronounced kick-up with conical base – dates before 1750 when clear glass becomes fashionable; pronounced kick implies much earlier date (Hume)</td>
</tr>
<tr>
<td>362-09</td>
<td>14508</td>
<td>Clear glass base (wine or tavern glass) probably heavy stemmed, heavy base; dates prior to 1745 and after 1725 (Hume)</td>
</tr>
<tr>
<td>362-10</td>
<td>14509</td>
<td>Green glass bottle base with kick-up; identical to bottle bases in Klein collection</td>
</tr>
<tr>
<td>362-11</td>
<td>14510</td>
<td>Pewter spoon bowl fragment; egg shaped bowl similar to those in Klein collection</td>
</tr>
<tr>
<td>362-12</td>
<td>14511</td>
<td>Brass buckle fragment similar to those in Klein collection</td>
</tr>
<tr>
<td>362-13</td>
<td>14512</td>
<td>Unidentified metal fragment</td>
</tr>
<tr>
<td>362-14</td>
<td>14513</td>
<td>Brass candlestick holder; similar to one found on San Jose (1733); hold in holder implies Dutch or Flemish origin; Ross Morrell, Florida Department of Archives, says it may be Spanish in origin.</td>
</tr>
<tr>
<td>362-15</td>
<td>14514</td>
<td>Cannonball concretion</td>
</tr>
<tr>
<td>362-16</td>
<td>14515</td>
<td>Red/brown title; probably manufactured in Spain and used on ship for shipboard oven (Lister and Lister)</td>
</tr>
<tr>
<td>362-17</td>
<td>14516</td>
<td>Encrusted eyebolt; portion of rigging</td>
</tr>
<tr>
<td>362-18</td>
<td>14517</td>
<td>Cannonball concretion</td>
</tr>
<tr>
<td>362-19</td>
<td>14518</td>
<td>Unidentified ferrous metal fragment</td>
</tr>
<tr>
<td>362-20</td>
<td>14519</td>
<td>Spanish egg shaped ballast</td>
</tr>
<tr>
<td>362-21</td>
<td>14520</td>
<td>Spanish egg shaped ballast</td>
</tr>
</tbody>
</table>
**September, 1980**

After the preliminary survey was conducted and the site was analyzed, a second research effort was made at the site in September of 1980. The purpose of this research effort was to acquire certain specific data suggested as valuable by research resulting from the initial observations, particularly relating to the cannon, and to inspect for changes in the site (Fischer, 1983: 03). The exposed portion of the site occupies an area approximately forty feet by one hundred free (twelve meters by thirty meters) (Fischer, 1983: 03). Artifact scatter and magnetic data indicate the total area may be as large as two hundred feet by five hundred feet (sixty meters by one hundred and fifty meters). Within the exposed area of the site, considerable architecture is evident, including planked frames and ceiling, which probably represents one side or the bottom of the vessel (Fischer, 1983: 03).

Other exposed features include four cannons (three 12-pounders and one 32-pounder) three of which have maker’s mark or founder’s mark on the right trunnion; pig iron and stone ballasts; a pile of cannon shot which probably represents the shot locker; scattered metal objects which probably represents rigging elements and accouterments; and miscellaneous artifacts of glass, ceramic, metal and other materials (Fischer, 1983: 03).

**Summer Survey, 1983**

During the summer of 1983, minimally invasive archaeological excavations were conducted. As a result of on going looting and site degradation due to erosion, the
National Park Service felt it was necessary to conduct minimal targeted excavation with the goal to recover as much data as possible. A total of ninety three by three meter square units were examined, some of which were excavated and supplemented by an additional 1104 test probes.

The units were only excavated to the base of the mobile carbonate sediment and the probes were excavated to a maximum depth of one meter to search for deeper deposits. The majority of the artifacts were left in-situ due to a lack of funds for complete excavation and conservation (Skowronek et al. 1987:316). HMS Fowey was not fully excavated. As with the 1980 survey, only “diagnostic” artifacts were recovered with the intention of discovering the shipwreck’s identity. All of the artifacts recovered were analyzed and conserved at the Southeastern Archaeological Center (SEAC) in

Figure 5.1 Site Plan of BISC-UW-20 (HMS Fowey) produced in 1983 (Courtesy of the National Park Service)
Tallahassee, Florida (Skowronek & Fisher 1984; Skowronek et al. 1987). A site plan for the site was also produced (Figure 5.1).

The project was coming to an end around the same time that the court awarded custody of the site to the NPS; as a result, vandals dragged anchors through the site which caused significant damage to the wreck as well as the surrounding seagrass which protected much of the unexcavated site. Following the incident, the NPS made several attempts to repair the damage and restabilize the site, but none of their efforts proved successful for the long-term.

**Analysis and Results**

In general, since the rediscovery of BISC-UW-20, it was difficult to obtain documentary information on the site, other than consulting general and secondary published sources readily available. A few primary source documents were recovered which were ultimately enough to support the archaeological record. The initial identification of the vessel was based on the artifact analysis; indication of a 1730 to 1745 data range and mixture of Spanish and British artifactual materials. Prior to the preliminary survey in 1980, a result of a court ordered injunction, the National Park Service was able to analyze a small sample of artifacts recovered from the shipwreck by the salvor. Initially, the artifacts indicated a mix of English and Spanish cultural material “fairly accurately dated between about 1730 and 1745” (Fischer, 1980). Documentary evidence suggested that the only vessel which could be expected to fit this description and other evidence was *Nuestra Señora del Populo, El Pinque* of the 1733 Spanish
treasure fleet, which was largely destroyed in this area of the Florida Coast (Fischer, 1983). In 1981, further examination of the artifact assemblage and historic record suggested another possible identification for the wreck, HMS *Fowey*.

Upon further historical research, Russell Skowronek (1987) found this identification to be most plausible. The National Park Service analyzed the guns and iron ballasts, as well as both the salvor’s and the Southeastern Archaeological Center’s extensive artifact collection to determine the data and cultural affiliation (Smith, 2009: 67). The analysis suggested that wreck site dated to ca. 1730 to 1750. Because of its close proximity to documented remains of the 1733 Spanish Flotilla and the given time frame, this site was initially assigned a Spanish affiliation and was believed to be the *Nuestra Señora del Populo* or *El Consulado*. However, upon further examination of the artifact assemblage and historical documentation suggested a second possible identification for the wreck, the British warship, HMS *Fowey*, HMS *Wolf*, or another unidentified British privateer. It was known that HMS *Fowey* had a Spanish vessel in its convoy; this historically documented association with this Spanish ship offered an explanation for the curious mixture of Spanish and British materials. Historical research in Great Britain in September 1981 yielded data on HMS *Fowey* from court martial proceedings, muster rolls, letters, logs, and newspaper articles which shed more light on the demise of HMS *Fowey* (Fischer, 1983: 03). Russell Skowronek found HMS *Fowey* to be the most probable identification based on his analysis of the material culture and the historical written record (Skowronek et al., 1987: 315).
In 1976, the late maritime archaeologist, Keith Muckelroy wrote about nine classes of indicator artifacts: pottery; glass; clay pipes/bowls; navigational instruments; culinary utensils; rigging fittings; footwear; personal possessions; and lead patches. Quantitative statistical analysis of the spatial locations of these artifacts over the entire site allowed Muckelroy to make inferences about the details the wrecking events as well as subsequent modifications of the remains on this ‘discontinuous’ wreck site, which previously had been dismissed as having no useful historical data. Similarly, preliminary identification of BISC-UW-20 was based on artifacts such as wine and case bottle bases, pharmaceutical glass; kitchen-related tile, brick and stone, general-high status

Figure 5.2 & 5.3 British Pig Iron Ballast Blocks (side and end views). Each six-inch square by three-foot-long block of iron weighs approximately 320 pounds. The incuse-cast Broad Arrow marked ownership by the British Crown. (Courtesy of the National Park Service / Southeast Archeological Center)(Skowronek and Fischer, 2009: 113).
artifacts; ceramics; barrel hoops and military artifacts (Skowronek et al., 1987: 316).

The age of the ship is placed in the second quarter of the 18th century. One indication of this time frame is the presence of 320 pound 3’x6’x3’ pig iron ballast blocks (Figure 5.2 & 5.3) a rare commodity in the late 17th century and early 18th century (Peterson, 1973: 128; Skowronek et al., 1987: 317). Initially identified in the 1980 project (Lenihan, 2002: 101; Skowronek & Fischer, 2009: 112), the ballast pile covered six square meters, rising one and a half meters above the wooden architectural remains. The ballast pile and shot locker was estimated to weigh about 26,880 pounds or 13.44 tons (Skowronek & Fischer, 2009: 112).

Survey, 1992

In September of 1992 the National Park Service revisited the site, following Hurricane Andrew, to assess the damage. Larry Murphy recalls that the team was “fairly astonished”. There was a lot of sand that had been moved off the site during Hurricane Andrew. The site was stripped of sediment and much of the hull was exposed, which they never had a chance to really see before; a large number of isolated features that had broken up from the site were exposed around the perimeter. Furthermore, a surprising quantity of iron concretions were exposed. These new conditions initiated a second assessment and documentation of the site, which would be carried out by the NPS Submerged Resource Center in 1993.
**Survey, 1993**

The 1993 fieldwork is difficult to evaluate, due to the lack of a final report. What little information Biscayne National Park has available on the project exists as poorly transcribed meeting tapes, miscellaneous memos and a few xerox copies of field notes in indecipherable handwriting. While there is a scarcity of information from this survey, this project did yield a highly useful and rather complete site plan for BISC-UW-20.

The original objective of the July 1993 field project was only to document what was exposed at that time and not to excavate any further. The NPS wanted to gain better insight into what was occurring at the site and to determine the next logical step for preserving the historic shipwreck. There were two phases: first was documentation and the second was long-term stabilization. The NPS wanted to document the site to the level of exposure of 1992 project as well as assess what is occurring at the site and how it might be optimally preserved. The site was covered with approximately four inches of sediment, which they removed to clear the hull timbers down to the level that was exposed by Hurricane Andrew.

The NPS tagged and mapped all of the structural remains of the vessels and the majority of the adjacent features before reburying the wreck. In response to the general fear of looting and vandalism at the site, the NPS placed many of the mapped features and artifacts in a large pit, located into between the two cannons that appear on the site plan. Recently, numerous artifacts have been reported visible in close proximity to the grass margins, indicating grass erosion has exposed material that was buried and unobserved in 1993.” (Tedesco & Wanless, 1995: 08).
They did not deplete the sediment around the structure. It was very effective and very fast, using a method based on trilateration. They developed and refined a sensitive tool for high accuracy and high-resolution mapping. They started by trying to figure out what the initial effects of the storm were. The team tagged the artifacts and then they went around to each feature, after which, they dug a hole in the sand bottom and buried the objects in an area where they knew they could be relocated easily. The reburial pit was approximately two meters deep and about four meters wide. In the pit included a large amount of iron artifacts, some wood artifacts as well as some glass and ceramics. A few selected artifacts were brought back to Biscayne National Park for testing. About half of the artifacts recovered for were beyond repair and could not be brought back. The artifacts that were brought back for testing were eventually conserved by the State of Florida Conservation Lab. Of the 200 artifacts, approximately 75 – 80 items were conserved and placed in storage.

They attempted many scientific studies during the period following Hurricane Andrew, including various seagrass studies, mapping sediment accretion/depletion, sea bottom dynamics, and sediment and substrate analysis for example. Unfortunately, most of the information that came from all of these studies, did not contribute very much in the end. These studies culminated in a panel of specialists who met to identify a management strategy for the site (Lawson & Morano 2013, 15). They concluded that the site could not be stabilized and that the wreck should be complete excavated, which is in conflict with the NPS mission of protection and preservation (Lawson & Morano, 2013: 15). Other proposed solutions were building an artificial barrier, using either limestone or...
sand, or the development of an anoxic environment surround the wreck. While these proposals were initially dismissed at the time; today, creating an anoxic environment has proven to be best the solution for preserving the Fowey site. This process would slow down the corrosion rates and help to achieve a minimal rate of deterioration with the added benefit of camouflaging the site, which would deter vandalism.

The 1993 project resulted in an updated site plan (Figure 5.4) as well as prompting several studies regarding the possibility of reestablishing sea grass at the site. An extraordinary amount of research has been conducted on HMS Fowey, since her rediscovery more than thirty years ago. The 1983 project was extremely successful. From this project, the NPS service was able to collect valuable data to strengthen the Offshore Reefs Archeological District nomination for the National Register of Historic Places while also, more importantly, collecting data that would eventually lead to the identification of BISC-UW-20. In 1993, the primary reason for this project was to conduct a full damage assessment from Hurricane Andrew. This project yielded a much improved and more detailed site plan compared to the one from 1983. The 1993 site plan provides more detail on the ship's architecture and on the timber arrangement of the most intact portion of the ship’s hull (Lawson & Morano, 2013: 09). This project was also important, because the immediate need to restabilize the Fowey site became extremely apparent.

The years following the 1993 survey were filled with numerous studies from various scientists and National Park Service employees. While the majority of the information did not end up being useful for the Fowey site, it was useful to the
Figure 5.4. Site Plan of BISC-UW-20 (HMS Fowey) from 1993 excavation. Includes Shot locker and more detailed timbers than the previous site plan. (Site Plan courtesy of National Park Service/Biscayne National Park.)
archaeological and scientific communities. While seagrass restabilization, for example, did not prove to be a viable solution for HMS *Fowey*, there are many other archaeologists around the world who might find that information very useful and applicable to their submerged cultural resources. Now, ten years later, post-hurricane Sandy, the NPS is once again attempting to restabilize the Fowey site. This time, however, BISC has been given a sizable grant from FEMA to complete this substantial endeavor.
Chapter 5 - Legal

In the United States of America, the form of government was created by the Constitution. The Constitution forms the basis of all other laws and is an organic law. The federal Constitution set up three branches of government still in place today. Furthermore, the Constitution specified the powers of each branch, while guaranteeing rights to individual citizens. The framers of the Constitution wrote the Constitution to provide for a separation of powers or three separate branches of government ensuring that one person or group of people would not have more authority or control over another. The three branches of government power and function are: legislative, judicial, and executive. Each branch of the government creates a different type of law. Article 1 of the United States Constitution defines the legislative branch and vests power to legislate in the Congress of the United States. The executive powers of the President are defined in Article 2. Article 3 places judicial power in the hands of one Supreme Court and inferior courts as Congress sees necessary to establish. Courts in the United States, whether state, federal, or local, hear cases or disputes that arise from three general sources: constitutions, common law, and statutory law. Statutes are bills passed by the legislature, signed into law by the executive branch, enforced by the executive, and interpreted by the judiciary.

Admiralty Law

Contemporary law in the United States stems from principles developed into two major systems of jurisprudence: civil law and common law. The civil law was greatly
influenced by the Mediterranean Sea, which served as an important avenue of commerce and navigation during the Roman Empire. Early Roman law proclaimed that the sea and the seashore were res communes or “common to all” and not subject to private ownership\(^\text{12}\) (Graber, 1980: 15). The English Common Law in the most basic sense is that the crown owns the tide and submerged lands\(^\text{13}\) (Graber, 1980: 15).

Common law is deeply rooted in English history. It emphasizes the centrality of the judge in the gradual development of law and the idea that law is found in the distillation and continual restatement of legal doctrine through the decision of the courts. Most law is generated from the state and federal legislatures and common law is subjugated to federal and state legislative enactments. The development of English common law was not just the institutionalization of traditional English customs. The rules of law established by the king’s courts were often unprecedented. Thus, the common law of England was the by-product of an administrative triumph in the way in which the government of England came to be centralized and specialized during centuries after the Norman Conquest (1066). By seeking to eliminate variations in settlements arising from differences in local customs, common law gave rise to a concept of justice that emphasized the uniform application of standardized laws and procedures. This concept was embodied in the doctrine of stare decisis\(^\text{14}\), which emphasized the importance of legal precedent established in cases that had previously settled. English common law was primarily oriented not toward protection of the individual but toward maintaining the

\(^{12}\) Justinian. *Institutes*, 1, 2.2, 2.3, 2.10


\(^{14}\) Latin for "let the decision stand," a doctrine requiring that judges apply the same reasoning to lawsuits as has been used in prior similar cases. [www.law.cornell.edu](http://www.law.cornell.edu) (June, 2013).
societal peace by regulating the economic arrangements characteristic of feudal land tenure and consolidating royal power under one system.

Admiralty, or maritime law, is the body of law governing contracts, torts, and workplace injuries occurring in the course of maritime commerce and other maritime activities (Maraist, Galligan, Jr., & Maraist, 2003: 01). While the terms ‘admiralty’ and ‘maritime’ are commonly used interchangeably; ‘maritime’ is slightly more general) It is one of the world’s oldest legal subjects (Maraist, Galligan, Jr., & Maraist, 2003: 01), law dating back to the island of Rhodes in the eastern Mediterranean (ca. 300 B.C.) (Robertson, Friedell, & Sturley, 2008: 03). In ancient times, the importance of transporting goods by sea, coupled with the necessity for resolving disputes arising out of that transportation, led to the creation of special courts in coastal towns to deal with maritime controversies, and the formulation of special substantive rules to govern these controversies (Maraist, Galligan, Jr., & Maraist, 2003: 01). Over time, the decisions of the courts were codified; these codes and rules served as the basis for the development of an international body of maritime law that is remarkably similar from nation to nation (Maraist, Galligan, Jr., & Maraist, 2003: 01).

As maritime commerce and maritime law spread north and west, it reached England, where local maritime courts were replaced by courts under the jurisdiction of the Lord of Admiralty – admiralty courts (Maraist, Galligan, Jr., & Maraist, 2003: 01). These courts often looked to the civil maritime law in deciding cases. The English experience later proved particularly important in England’s American colonies where, absent developed inland roads, maritime commerce was critical to economic well-being
(Maraist, Galligan, Jr., & Maraist, 2003: 01). The British crown established vice-admiralty courts in the American colonies to resolve maritime disputes. After the Revolution, during the latter half of the 18th century, the Articles of Confederation gave Congress the power to regulate prizes and piracies and to establish an admiralty appeals court. However, original jurisdiction over maritime cases was vested in state courts. With the inconsistent decisions and procedures and a lack of uniformity in enforcement of the decrees of the admiralty appellate courts, the situation proved to be quite problematic (Maraist, Galligan, Jr., & Maraist, 2003: 01). Consequently, this experience impelled the inclusion in the United States Constitution of federal power over “admiralty and maritime” matters and the subsequent establishment of special federal courts and substantive rules to resolve maritime disputes (Maraist, Galligan, Jr., & Maraist, 2003: 01-02). Admiralty or maritime law is not to be confused with ‘the Law of the Sea’, which focuses on the territorial, economic and commercial rights of nation’s to the ocean and its resources. The Law of the Sea also provides controls on marine pollution, transit rights of ships and aircrafts, and provides a dispute resolution mechanism for states.

The Constitution of the United States provides the foundation for the federal Government’s role in maritime law. In the United States, admiralty jurisdiction has expanded from only American tidal waters to any waters navigable within the United States for interstate or foreign commerce. Congress regulates admiralty under the Commerce Clause of the United States Constitution and federal courts have original jurisdiction over maritime matters. This power stems from the Judiciary Act of 1789 and from Article III, §2 of the United States Constitution. The Constitution empowers
Congress to “regulate Commerce with foreign Nations, and among the several States, and with the Indian tribes”.\textsuperscript{15}

The central focus of admiralty law in the United States is Article III of the United States Constitution, which provides:

Section 1. The Judicial power of the United States, shall be vested in one supreme court, and in such inferior courts as the Congress may from time to time ordain and establish…

Section 2. The judicial power shall extend to all cases, in law and equality, arising under this constitution, the laws of the United States, and treaties made, or which shall be made, under their authority; to all cases of admiralty and maritime jurisdiction; to controversies to which the United States shall be a party; to controversies between two or more States, between a state and citizens of different States, between citizens of the same state claiming lands under grants of different States, and between a state, or the citizens therefor, and foreign States, citizens or subjects.

The above provisions not only grants the sovereign the power to establish courts, the Supreme Court has interpreted the provision as granting the federal sovereign the power to prescribe the substantive law in maritime cases pending federal court (Maraist, Galligan, Jr., & Maraist, 2003: 02).

In the Judiciary Act of 1789, the first Congress saw fit to “ordain and establish” a system of inferior federal courts, consisting at that time of thirteen district courts and

\textsuperscript{15} U.S. Const., art. 1§8,cl.3.
three circuit courts. Congress enacted a maritime “jurisdiction” statute. The current
version, 28 U.S.C. § 1333, provides that:

The district courts shall have original jurisdiction exclusive of the court of the State, of:

Any civil case of admiralty or maritime jurisdiction, saving to suitors in all
cases all other remedies to which they are otherwise entitled.

Any prize\textsuperscript{16} brought into the United States and all proceedings for the
condemnation of property taken as prize.

Specifically, Section 9 of that Act proved that the district courts “shall…have exclusive
original cognizance of all civil causes of admiralty and maritime jurisdiction,…saving to
suitors, in all cases, the right of a common law remedy where the common law is
competent to give it” (Robertson, Friedell, & Sturley, 2008: 03). The Constitution and
the Judiciary act of 1789 left the courts with the task of working out answers to three

\textsuperscript{16} Prize cases are actions \textit{in rem} brought by the United States against vessels and cargoes of enemy nations in time of
war. See e.g., The Prize Cases, 67 U.S. (2 Black) 635, 17 L.Ed. 459 (1863). Today, these cases are primarily of historic
interest (Maraist \textit{et al.} 2003:02-03).
large questions: (1) the scope and limits of the federal admiralty jurisdiction; (2) the scope and limits of the concurrent jurisdiction of common law courts over admiralty and maritime cases; and (3) the sources, nature, and ultimately the content of the substantive law applicable in admiralty and maritime cases (Robertson, Friedell, & Sturley, 2008:03).

Salvage is a unique maritime doctrine that provides a reward to a person who saves maritime property from marine peril (Maraist, Galligan, Jr., & Maraist, 2003: 774). Although, the salvage doctrine came from maritime jurisprudence, it was partially codified in American law by the Salvage Act of 1912 ((Maraist, Galligan, Jr., & Maraist, 2003: 775). There are two types of salvage: contract salvage and quasi contract (sometimes called pure or voluntary) salvage. Contract salvage is mainly a matter of contract law. The elements of pure salvage are a voluntary act which contributes to the rescue of property that is subject to marine peril (Maraist, Galligan, Jr., & Maraist, 2003: 774).

The Law of the Sea, UNCLOS and UNESCO

Governments have divided the world’s oceans into many zones, based on both international and domestic laws. The zones are often complex with overlapping legal authorities and agency responsibilities. Intentionally, the closer one gets to the shore, the more the authority a coastal nation has. Domestically, in the United States, the closer one gets to the shore, the more control an individual state has.

Several jurisdictional zones exist off the coast of the United States for purposes of international and domestic law (Figure 6.1). Within these zones, the United States asserts
varying degrees of authority over offshore activities, including living and non living resource management, shipping, maritime transportation, and national security. A nation’s jurisdictional authority is greatest near the coast (U.S. Commission on Ocean Policy, 2004: 71).

The Baseline (0 nautical miles\(^\text{17}\)).

Both international and domestic law consider the baseline to be the boundary line diving the land from the ocean. The baseline is determined according to principles described in the 1958 United Nations Convention on the Territorial Sea and the Contiguous Zone and the 1982 Untied Nations Convention on the Law of the Sea (LOS Convention and is normally the low water line along the coast, as marked on charts officially recognized by the coastal nation. In the United States, the definition has been further refined based on federal court decisions; the United States baseline is the mean low water line along the coast, as shown on official United States nautical charts. The baseline is drawn across river mouths, the opening of bays, and along the outer points of complex coastlines. Water bodies inland of the baseline – such as bays, estuaries, rivers, and lakes – are considered internal waters and are subject to national sovereignty (U.S. Commission on Ocean Policy, 2004).

State Waters Boundaries in the United States (0-3 nautical miles\(^\text{18}\)).

In the 1940s, several states claimed jurisdiction over minerals and other resources off their coasts. This was overturned in 1947, when the Supreme Court determined that states had no title, or property interest in, these resources. As a result, the Submerged

\(^{17}\) 1 nautical mile is approximately 6,076 feet.

\(^{18}\) Three nautical miles is the jurisdictional limit for the U.S. states and some territories under domestic law, with the exception of Texas, Florida’s west coast, and Puerto Rico, whose jurisdictions extend to 9 nautical miles offshore.
Lands Act was enacted in 1953, giving coastal states jurisdiction over the region extending three nautical miles seaward from the baseline, commonly referred to as *state waters* (U.S. Commission on Ocean Policy, 2004: 71). For historical reasons, Texas and the Gulf Coast of Florida are an exception with state waters extending to nine nautical miles offshore. Subsequent legislation granted to United States Virgin Islands, Guam, and American Samoa jurisdiction out to three geographical miles, while the commonwealth of Puerto Rico has a nine-mile jurisdicitional boundary.

The seaward boundary of each original coastal State is approved and confirmed as a line of three geographical miles distant from its coastline or, in the case of the Great Lakes, to the international boundary. Any State admitted subsequent to the formation of the Union which has not already done so may extend its seaward boundaries to a line three geographical miles distant from its coast line, or to the international boundaries of the United States in the Great Lakes or any other body of water traversed by such boundaries. Any claim heretofore or hereafter asserted either by constitutional provision, statute, or otherwise, indicating the intent of a State so to extend its boundaries is approved and confirmed without prejudice to its claim, if any it has, that its boundaries extend beyond that line. Nothing in this section is to be construed as questioning or in any manner prejudicing the existence of any State’s seaward boundary beyond three geographical miles if it was so provided by its constitutional laws prior to or at the time such State became a member of the Union, or if it has been heretofore approved by Congress. [Title 43 – Public Lands §1312. Seaward boundaries of States. May 22, 1953, ch. 65, title II, §4, 67 Stat. 31.]

The federal government retains the power to regulate commerce, navigation, power generation, national defense, and international affairs throughout state waters. States are given the authority to manage, develop, and lease resources through the water column and on and under the seafloor. States must exercise their authority for the benefit of the people, consistent with the public trust doctrine (PTD). Under the public trust doctrine,
which has evolved from ancient Roman law and English common law, governments have an obligation to protect the interests of the general public in tidelands and in the water column and submerged lands below navigable waters. Public interest has traditionally including navigation, fishing, and commerce. In recent times, the public has also looked to the government to protect their interests in recreation, environmental protection, research, and preservation of scenic beauty and cultural heritage.

*Territorial Sea* (0 to 12 nautical miles).

Under international law, every coastal nation has sovereignty over the air space, water column, seabed, and subsoil of its territorial sea, subject to certain rights of passage for foreign vessels and, in more limited circumstances, foreign aircraft (U.S. Commission on Ocean Policy, 2004). For almost two hundred years, beginning with an assertion by Secretary of State Thomas Jefferson in 1793, the United States claimed a territorial sea out to three miles. Thomas Jefferson in a note to the British prime minister in 1793 pointed to the nebulous character of a nation’s assertion of territorial rights in the marginal belt, and put forward the first claim for a three-mile zone, which has since won general acceptance. In 1988, President Ronald Reagan proclaimed a twelve-mile territorial sea for the United States, consistent with provisions in the Law of the Sea Convention. The Presidential proclamation extended the territorial sea only for the purposes of international law, explicitly stating that there was no intention to alter domestic law (U.S. Commission on Ocean Policy, 2004).

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19 (reprinted in H. Ex. Doc. No, 324, 42d Cong., 2d Sess. (1872) 553-554. See also Secretary Jefferson’s note to the French Minister, Genet, reprinted American State Papers, I Foreign Relations (1833), 183, 154; Act of June 05, 1749, 1 Stat. 3S1; 1 Kent, Commentaries, 14th Ed., 33-40.)
Contiguous Zone (12 to 24 nautical miles).

International law recognizes a contiguous zone outside the territorial sea of each coastal nation. Within its contiguous zone, a nation can assert limited authority related to customs, fiscal, immigration, and sanitary laws. In 1999, President Clinton proclaimed a United States contiguous zone from twelve miles to twenty-four miles offshore enhancing the United States Coast Guard’s authority to take enforcement actions against foreign flag vessels throughout this larger area (U.S. Commission on Ocean Policy, 2004).

Exclusive Economic Zone (EEZ) (12 to 200 nautical miles).

The Law of the Sea Convention allows each coastal nation to establish an exclusive economic zone adjacent to its territorial sea, extending a maximum of two hundred miles seaward from the baseline. Within the exclusive economic zone, the coastal nation has sovereign rights for the purpose of exploring, exploiting, conserving, and managing living and nonliving resources, whether found in ocean waters, the seabed, or subsoil. It also has jurisdiction over artificial islands or other structures with economic purposes (U.S. Commission on Ocean Policy, 2004).

The Continental Shelf (20 (12 to 200 Nautical Miles or Outer Edge of Continental Margin).

The legal concept of the continental shelf has evolved over the last sixty years. A 1945 proclamation by President Harry S. Truman first asserted a United States claim to resources of its continental shelf. This proclamation set a precedent for other coastal nations to assert similar claims over resources far from their shores. The need to establish

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20 The outer edge of the continental margin is a principle basis for determining a coastal nation’s jurisdiction over seabed resources beyond 200 nautical miles from the baseline.
greater uniformity was one of the driving forces behind the 1958 United Nations Convention on the Continental Shelf. However, the 1958 Convention showed limited vision, defining the continental shelf based on a nation’s ability to recover resources from the seabed. As technological capabilities improved, uncertainty began anew about the boundary of a nation’s exclusive rights to continental shelf resources (U.S. Commission on Ocean Policy, 2004). The Law of the Sea Convention defines the continental shelf in general terms for purposes of international law as the seafloor and subsoil that extend beyond the territorial sea throughout the natural prolongation of a coastal nation’s land mass to the outer edge of the continental margin or to two hundred miles from the baseline if the continental margin does not extend that far. The legal definition of the continental shelf overlaps geographically with the exclusive economic zone (U.S. Commission on Ocean Policy, 2004).

*The High Seas (Areas beyond National Jurisdictions).*

International law has long considered areas of the ocean beyond national jurisdiction to be the high seas. On the high seas, all nations have certain traditional freedoms, including the freedom of surface and submerged navigation, the freedom to fly over the water, harvest fish, lay submarine cables and pipelines, conduct scientific research, and construct artificial island and certain other installations. These freedoms are subject to certain qualifications, such as the duty to conserve living resources and to cooperate with other nations toward this end. In addition, a nation exercising its high seas freedoms must give due regard to the interest of other nations (U.S. Commission on Ocean Policy, 2004).
The Conventions of the Law of the Sea is a culminating document of the third United Nations Conference on the Law of the Sea (UNCLOS III). On April 30, 1982, at the eleventh session of UNCLOS III, after eight years of negotiations, one hundred and thirty States were in favor of adopting the Convention on the Law of the Sea however, the United States voted against its approval.

Table 6.1. Voting Record of States of Western Hemisphere on Adoption of the Law of the Sea Convention

<table>
<thead>
<tr>
<th>Decision</th>
<th>States</th>
<th>No. of States</th>
</tr>
</thead>
<tbody>
<tr>
<td>In Favor</td>
<td>Argentina, Bahamas, Barbados, Bolivia, Brazil, Canada, Chile, Columbia, Costa Rica, Cuba, Dominican Republic, El Salvador, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Saint Lucia, Saint Vincent, Suriname, Trinidad and Tobago, Uruguay.</td>
<td>28</td>
</tr>
<tr>
<td>Against</td>
<td>The United States of America, Venezuela.</td>
<td>02</td>
</tr>
<tr>
<td>Absent</td>
<td>Antigua and Barbuda, Belize, Dominica.</td>
<td>03</td>
</tr>
</tbody>
</table>


Sixty of the signatory States eventually must ratify or accede to the Treaty of the Law of the Sea for it to enter into force.

UNCLOS I and UNCLOS II, were held in Geneva in 1958 and 1960, respectively. They examined myriad of topics about the ocean, seabed, water column, and their resources and uses. Competition and conflicting views were quite common and difficult to resolve. For example, geographically disadvantaged states (i.e., landlocked states) were at odds with coastal States or when developing nations disputed with developed ones (Watters, 1983). Among the major principles debated: the common heritage of mankind, freedom of the high seas, conservation of living resources, and the right of innocent passage for ships. The three hundred and twenty articles in the Law of the Sea Convention address everything from piracy to artificial islands to marine mammals and
fishes to deep-sea mining and to marine sciences (Watters, 1983). The Law of the Sea Convention addresses archaeological and historic objects found underwater, not on land (i.e., shipwrecks) (Articles 149 and 303). However, its contents are important to archaeological in general because it may set precedent for future international negotiations involving other cultural resources (i.e., historic remains in Antarctica, inundated prehistoric sites on continental and insular shelves and land bridges) (Watters, 1983). On November 02, 2001, the General Conference of the United Nations Educational, Scientific, and Cultural Organization (UNESCO) approved a comprehensive international convention to protect and preserve underwater antiquities. Unlike, the third Untied Nations Convention on the Law of the Sea, the UNESCO Convention on the Protection of the Underwater Cultural Heritage sets out explicit procedures to protect underwater sites and extends a state’s responsibility for protecting such sites to the continental shelf or to the edge of a state’s exclusive economic zone (Phelan & Forsyth, 2004: 120). The UNESCO Convention on the Protection of the Underwater Cultural Heritage rejects the law of salvage and the law of finds unless competent authorities authorize the application of such laws and the application of such laws is in “full conformity” with the Convention (Phelan & Forsyth, 2004: 141).

**Heritage Resources Law**

Heritage resources (also known as cultural resources) is a general term frequently used to refer to a wide range of archaeological sites, historic structures, museum objects, historic shipwrecks and traditional cultural places (Hutt, Blanco & Varmer, 1999: 01).
Heritage resources define our culture in space and time (Hutt, Blanco, & Varmer, 1999: 02). The two most reoccurring issues concerning archaeology and the law are state jurisdiction and title to wrecks. State jurisdiction refers to the ability of the state to control activities and title to wreck is concerned with who owns the shipwreck and other materials on the seafloor (O’Keefe, 1996: 455). These issues are distinctly separate. Ownership is a relative concept and is not absolute (O’Keefe, 1996: 456). Ownership differs among legal systems, over time and according to the object or even concept to which it relates. When considering ownership, the particular legal system concerned must be examined. It is possible for control to be exerted by one state but ownership to reside in another state or private persons as the case may be. In the Untied States, the term “cultural resources” is seen in professional literature by the early 1970s, when it began being used by archaeologists and historians in the National Park Service to signify a wide range of resource types (McManamon, 2001: 247).

*The Abandoned Shipwreck Act. (43 USC 2101-2106)*

The Abandoned Shipwreck Act is a preservation measure, designed to protect historic shipwrecks from destruction. Congress recognized that recreation and private salvage were legitimate interests that must be accommodated within State programs to protect historic wrecks, as long as they are consistent with the protection of historic values. Thus, implementation of the Abandoned Shipwreck Act attempted to achieve a delicate balance between preservation and other interests that often collide, in much the same way that the national historic preservation program has done for the past two decades. In 1988, the Abandoned Shipwreck Act was enacted, giving the states title to
most abandoned shipwrecks within their jurisdictional waters. The United States asserts title to any abandoned shipwreck that is: (1) embedded in submerged lands of a State; (2) embedded in coralline formations protected by a State on submerged lands of a State; and (3) on submerged lands of a State and is included in or determined eligible for inclusion in the National Register of Historic Places. The Abandoned Shipwreck Act further transfers title of shipwrecks from the United States to the State in or whose submerged lands the shipwreck is located in, except when the shipwreck is in or on the public lands of the United States Government, which includes lands administered by the National Park System, including Biscayne National Park. The Abandoned Shipwreck Act in conjunction with other Acts such as the Historic Sites Act, the National Historic Preservation Act, the Antiquities Act, the Archaeological Resource Protection Act, and the Archaeological and Historical Preservation Act, gives National Parks, like Biscayne National Park, more control over its submerged cultural resources. Affirmation of this control over the submerged bottomlands are the numerous court cases where Biscayne National Park has taken legal action and received just compensation for damages to the submerged bottomlands and for submerged cultural resource, like HMS Fowey, that lie within the Park’s confines (bay, inner patch reef, outer reef) (Adams, 1998).

*The Antiquities Act.* (34 State. 225, 16 USC 431-433)

On June 8, 1906, the 26th President of the United States, President Theodore Roosevelt, signed the Antiquities Act into law. The legislative and political history of the Antiquities Act shows that Massachusetts State Senator George F. Hoar first raised the issue of protecting and managing archaeological resources in the United States Senate in
1882 (Hutt, Blanco, & Varmer, 1999, 04). However, due to debates between advocates of preservation and advocates of commercial use of public lands the process was deterred considerably. Opposition interestingly enough grew from a fear that the government could not protect all of the resources (Hutt, Blanco, & Varmer, 1999, 04). The American Antiquities Act was the first major federal legislation for archaeological protection. This Act sets out three provisions: (1) that the damage, destruction, or excavation of historic or prehistoric ruins or monuments on Federal land without permission would be prohibited; (2) that the President of the United States would have the authority to establish national landmarks and associated reserves on Federal land; and (3) that permits could be granted for the excavation or collection of archaeological materials on Federal lands to qualified institutions that pursued such excavations for the purpose of increasing knowledge of the past and preserving the materials. The Antiquities Act provides a mandate for federal agencies that administer public lands to preserve archaeological sites on those lands. The archaeological record is irreplaceable. It is easily disturbed or destroyed, and frequently hidden from site.

_Historic Sites Act._

The first national policy statement about the value of this country’s historic heritage appeared in statute over seventy-five years ago in the Historic Sites Act of 1935. This Act, which became a law on August 21, 1935 (49 Stat. 666; 16 U.S.C. 461-467) and has been amended three times. This law, which institutionalized within the National Park Service many of the New Deal programs pertaining to history and archaeology, begins:
It is hereby declared that it is a national policy to preserve for public use historic sites, buildings, and objects of national significance for the inspiration and benefit of the people of the United States.

Every historic preservation law enacted since then begins with the same premise: preservation of the national heritage in the public interest (Sebastian & Lipe (eds.), 2009: 07).

*Historic and Archaeological Data Preservation Act.*

This Act became a law on June 27, 1960 (Public Law 86-523, 16 U.S.C. 469-469c-2) and has been amended six times. The purpose of this Act is to provide for the preservation of historic American sites, buildings, objects, and antiquities of national significance, and for other purposes by specifically providing for the preservation of historical and archaeological data (including relics and specimens) which might otherwise be irreparably lost or destroyed.

*The National Register of Historic Places.*

The National Historic Preservation Act created the National Register of Historic Places to serve as the nation’s inventory of historic properties. The Secretary of the Interior, acting through the National Park Service, maintains the National Register. The Register lists buildings, sites, districts, structures, and objects of significance in American history, architecture, archaeology, engineering and culture. The National Park Service has published criteria for evaluating the eligibility of properties (36 C.F.R. Sec. 60.4). It has also detailed procedures for entering them on the National Register (36 C.F.R. Part 60). The National Register today comprises more than 50,000 listings.

*National Historic Preservation Act.*
The NHPA provides a framework to identify and evaluate the properties that comprise the national patrimony. It provides a range of protective measures and financial incentives to promote the preservation of significant resources. It creates a system to develop professional standards covering all aspects of historic preservation. It integrates federal, state and local governments in a tiered administrative structure. Finally, the NHPA has established mechanisms to involve the organizations and individuals directly interested in the preservation of historic properties throughout the nation. The National Historic Preservation Act of 1966 defines the basic structure of the current national program. It accomplished five major tasks, in establishing: (1) the guiding policies for historic preservation; (2) a basic inventory of properties recognized as historically significant; (3) the federal protective process in place today; (4) financial incentives; and (5) administrative mechanisms to carry out the program. Each of these elements is based on the implementation of shipwreck management programs at the state level. The policy foundations of both the National Historic Preservation Act and the Abandoned Shipwreck Act are useful to compare, and their similarity is noteworthy. Each articulates important concepts that guide the implementation of the substantive provisions of the two acts. The National Historic Preservation Act emphasizes the importance of maintaining historic resources as a "living part of our community life and development," encouraging harmony between historic resource and modern society. It acknowledges that preservation activities must occur in a framework of meeting overall needs of contemporary society. To do so requires a balance between competing demands on resources. The Abandoned Shipwreck Act mirrors this policy.
The Section 106 Process.

The National Historic Preservation Act created a mechanism to provide recognized historic properties some degree of federal protection: Section 106 of the Act. Section 106 sets forth the legal protection and gives its name to the ensuing review process. Essentially, Section 106 requires that a federal agency proposing to carry out, assist or license an undertaking that affects a listed or eligible-for-listing property take into account the effects of the undertaking. The rules for the Section 106 process can be found in 36 C.F.R. Part 800.

HMS Fowey and the Law

You have undertaken to cheat me. I won’t sue you, for the law is too slow. I will ruin you.

Cornelius Vanderbilt

This renowned quote uttered by one of America’s wealthiest 19th century industrialists addresses a valid point, the law is slow. This is particularly true when dealing with the rights and protection of submerged cultural resources, where the law can be vague or even non-existent. The Fowey site has been an ‘open case’ in the United States legal system since 1978; pending the approval of final agreement between the United States and the government of the United Kingdom of Great Britain and Northern Ireland. From an archaeological standpoint however, HMS Fowey is deemed ‘closed’. Unfortunately for HMS Fowey, over the years, documentation has been misplaced, and
poorly made Xerox copies now serve as the original documents. This chapter discusses the legal history of HMS *Fowey*.

In 1970, an amendment to the National Park Service Act clarified that Congress intended the National Park system to include both land and water. In 1973, the United States obtained title in *fee simple* from the State of Florida to the submerged lands known originally as Biscayne National Monument. In February 1975, (three years prior to Gerald Klein’s discovery), George R. Fischer, prepared a preliminary archaeological site assessment of Biscayne National Monument. The National Park Service took steps in 1976 to have all of the submerged wrecks within Biscayne National Monument, as listed in George R. Fischer’s 1975 archaeological assessment, placed on the National Register of Historic Places.\(^{21}\)

**Klein versus the Unidentified Sailing Vessel within the Legare Anchorage**

In late summer of 1978, Mr. Gerald Joseph Klein, of Homestead, Florida, found a wreck while sport diving within the waters of Biscayne National Park. Over the next sixteen months, he removed artifacts from the site. He neither applied for nor received a permit from the federal government or the state of Florida to excavate or remove artifacts (Skowronek & Fischer, 1983: 08). Mr. Klein illegally conducted salvage operations on the site that caused the natural protection to become unstable. The Court found that the government was in constructive possession of the wreck at the time the plaintiff

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\(^{21}\) The National Register of Historic Places, usually referred to as simply the National Register, is a comprehensive list of districts, sites, buildings, structures, and objects of national, regional, state and local significance in American history, architecture, archaeology, engineering, and culture kept by the National Park Service under the authority of the National Historic Preservation Act of 1966 (§106 Technical Assistance Manual, pp. 105).
discovered it. The Law of Salvage provides that “so long as the owner, or his agent, remains in possession, he is entitled to refuse unwelcome offers of salvage”. In 1979, Gerald Klein first brought artifacts, which he had removed from the unidentified wreck lying in the Legare Anchorage\textsuperscript{22} to the attention and custody of the Court on October 04, 1979. The items, while of archeological interest, had only nominal commercial value. They consisted of ship’s rigging, glass, pottery, and miscellaneous small equipment. Because Mr. Klein had not taken measures to preserve the artifacts, they were in deteriorated condition. On January 10, 1980, a memorandum was sent by Attorney-Advisor, James R. Mills, to the Regional Solicitor; it detailed the United States District for Southern District of Florida decision to impose a preliminary injunction on Gerald Klein at the request of the National Park Service. Biscayne National Park closed the area around the wreck site to diving activity, swimming, snorkeling, floating and other water activity, use of underwater viewing devices to search the bottom and anchorage. The purpose was to halt the looting and vandalism of wrecked historic vessels. Under federal law and National Park Service regulations removal of artifacts from historic sites is a criminal offense. Historic artifacts form a part of the cultural heritage of the United States and federal law protects such artifacts found on federal property.

Gerald Joseph Klein (plaintiff) filed an \textit{in rem} complaint in Admiralty against an unidentified, wrecked and abandoned sailing vessel within the Legare Anchorage, Florida (defendant) on July 28, 1983 in the United States District Court, Southern District of Florida. Admiralty law in the United States developed from the British admiralty courts

\textsuperscript{22} The Legare Anchorage was named after the United States Navy survey ship that was made the first modern chart of the area in 1855 (Skowronek 1987:315).
present in most of the American colonies. These courts functioned separately from courts of law and equity. With the Judiciary Act, though, Congress placed admiralty under the jurisdiction of the federal district courts. Although admiralty shares much in common with the civil law, it is separate from it. Common law does not act as binding precedent on admiralty courts, but it and other law may be used when no law on point is available. This case was precedent setting and helped to define and clarify the standards and merits of federal and state protection of submerged cultural artifacts. According to Michael W. Reed, an attorney with the United States Department of Justice, Environmental and Natural Resources, who was involved with several court cases relating to shipwreck legislation, George Fischer’s testimony established the fact that the removal of artifacts by individuals without proper understanding of scientific methods from underwater cultural sites resulted in the loss of their true value. The Klein case essentially overturned a previously long-accepted legal fiction that sunken property was “in peril”.

Klein believed the wreck was a gold-laden Spanish galleon. It was not, but his claim led to a precedent-setting federal court battle that would help define and clarify the standards and merits of Federal and State protection of submerged cultural resources (Binkley, 2007). This case, *Klein versus Unidentified Wreck of Abandoned Sailing Vessel* (No. 79-4627-Civ-CA; 568 F.Supp.1562) was heard in the US District Court for the Southern District of Florida without a jury to confirm title in and possession of an ‘unidentified, wrecked and abandoned sailing vessel’ discovered by the original plaintiff, Gerald Joseph Klein, in the summer of 1978. The deceased plaintiff sought in the alternative, a full and liberal salvage award (Binkley, 2007:118; Fischer, 2002). The
United States intervened as a claimant to the wreck when an examination of the coordinates revealed that the abandoned vessel lay not only within the three mile territorial limit but was also resting in submerged government property within the national park system known as Biscayne National Monument. The government sought and the Court granted a preliminary injunction prohibiting further salvage efforts by the plaintiff. Judge Clyde Atkins found that the abandoned vessel to be the property of the United States. The plaintiff was therefore permanently enjoined from conducting salvage activities at the site of the subject wreck. Furthermore, Judge Atkins determined that the plaintiff was not entitled to a salvage award basing his decision on the following findings of fact and issues and conclusion of law:

**Findings of Fact:**

- Gerald Klein found the defendant wreck in the summer of 1978 while sport diving with some friends.

- Gerald Klein first brought artifacts removed from the wreck to the attention and custody of the Court on 04 October 1979.

- The remains of the vessel claimed by the plaintiff in this action lie entirely within the confines of Biscayne National Park and entirely within the submerged lands of the territorial sea of the United States of America.

- The remains of the vessel claimed by plaintiff lie entirely within lands owned and administered by the United States as part of the National Park system.

- All of the artifacts removed from the remains of the vessel claimed by plaintiff, which are listed on an inventory of custodianship dated 26 October 1979, were
removed from within the confines of Biscayne National Park and were found by Gerald Klein within the territorial sea of the United States.

- The United States owns in *fee simple* the land in which the remains of the vessel claimed by plaintiff lie.

- The United States has known of the existence and approximate location of the subject of 18th century shipwreck located within Legare Anchorage in Biscayne National Park since at least 1975 and probably as early as 1970.

- Although the government was aware of the existence of the defendant wreck and had documented its approximate location as early as February 1975\(^{23}\), it did not physically locate the wreck until 04 July 1980.

- The remains of the vessel claimed by plaintiff are objects of antiquity being over 200 years old.

- The remains of the vessel claimed by plaintiff are historic ruins revealing the remains of past human life and activities, which are of archeological interest.

- Before the filing of this action the United States did not know that Gerald Klein had removed artifacts from the wreck.

- It is in the public interest that if artifacts are to be removed from the wreck that such removal be conducted with scrupulous care.

- The historic value of each artifact is enhanced by careful monitoring of archeology provenience, the exact location at which each item is found in terms of horizontal

\(^{23}\) Fischer, 1975.
and vertical coordinates, the extent of the burial, water depth and its spatial relationship to other items found.

- Archeological provenience is not only important for the historical information that it provides, but it also adds to the value of the artifacts for donation or sale to interested buyers.
- Gerald Klein neither applied for nor received a permit from the federal government or the State of Florida to excavate or remove artifacts or objects from the defendant wreck.
- Prior to the filing of this action Gerald Klein did not notify the United States that he had removed artifacts from the wreck site nor did he return those artifacts to the United States or its agents.
- The United States had never initiated salvage activities on the defendant vessel prior to the initiation of this action.
- The United States removed artifacts from the wreck after it was appointed custodian.
- The State of Florida has voluntarily withdrawn from this action and has no right or title in the submerged lands upon which the defendant wreck lies.
- The artifacts removed from the wreck site by the United States are presently being stored at the Southeast Archeological Survey Offices in Tallahassee, Florida.

Jurisdiction:
“The Court has subject matter jurisdiction based on 28 U.S.C. §1331, 1333. The Court also has *in personam* jurisdiction over the parties and *in rem* jurisdiction to determine the rights of the parties in the vessel and its artifacts which are situated wholly within the Legare Anchorage, Dade County, Florida, within the territorial district of this Court.”

**Issue and Conclusions of Law:**

“…This case is unlike any of its predecessors in that it concerns a wreck embedded in land owned in fee simple by the United States and administered and controlled by the National Park System.

**Claim of Title:**

In determining title to property abandoned at sea, the courts have rejected the traditional salvage law theory that the owner retains title and have instead applied the law of finds under the doctrine of ‘*animus revertendi,*’ the owner has no intention of returning. Under the common law of finds, title is acquired to lost or abandoned...
property by the finder who takes possession of the property and exercised dominion and control over it. The plaintiff has claimed title to the abandoned wreck as a first finder who has reduced his find to possession. Under this theory, it would be the plaintiff’s burden to demonstrate, as indicated above, that he had the power and intention to exercise exclusive dominion and control over the vessel and its artifacts. However, [Judge Atkins] believes that the evidence is insufficient to support the plaintiff’s claim of exclusive possession; it will not be necessary to reach this issue. The wreck that the plaintiff ‘found’ in the late summer of 1978 was neither lost nor abandoned at that time.

The general rule in the law of finds is that the determination of the finder’s right to abandoned property is unaffected by the ownership of the land on which the property is found. There are, however, two relevant exceptions (1) where the property is embedded in the soil and (2) where the owner of the land has constructive possession of the property such that the property is not considered legally lost. Under each of these exceptions the United States was the rightful owner of the vessel at the time the plaintiff discovered it.

**Property Embedded in the Soil:**

It is undisputed that in 1973 the United States obtained title in fee simple from the State of Florida to the submerged lands known originally as Biscayne National Monument and later as Biscayne National Park. This land, owned by the United States,

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32 Treasure Salvors v. Unidentified Wrecked and Abandoned Sailing vessel, 640 F.2d 560, 571 (5th Cir. 1981) (Treasure Salvors III); Treasure Salvors I at 337.

33 Years of jurisdictional conflict ensued until the Abandoned Shipwreck Act of 1987 specifically entrusted states with authority to manage shipwrecks in their jurisdictional boundaries, although they must do so in accordance with standards maintained by the secretary of the Interior as delegated to the National Park Service. Most important, the Act established government ownership over historic shipwrecks in state waters and declared that such shipwrecks are not subject to the law of finds and admiralty courts (Binkley 2007:107).

34 36A C.J.S. Finding lost Goods §5c; 1 AM JUR 2d Abandoned, Lost Property §3,4,22

35 Biscayne National Monument was established by statute in 1968. 16 U.S.C. § 450qq. In 1980 the Monument was abolished and all the property and interests were incorporated into Biscayne National Park. 16 U.S.C. §410gg
is managed as part of the National Park System. The vessel that is the subject of this litigation lies in Legare Anchorage within Biscayne National Park.

The law of finds provides that “a person, who finds property which is embedded in the soil, but which is not treasure trove, acquires no title thereto, for the presumption is that the owner of the land on which the object is found has possession.” The Court heard contradicting testimony and saw film indicating that the wreck was substantially buried in and firmly affixed to the bottomland. Therefore, when the United States acquired title to the land in 1973, it also became owner of all wrecked vessels embedded in its soil.

**Constructive Possession:**

It is clear from the evidence that even though the United States did not have actual physical possession of the wreck, it had constructive possession such that the property could not be considered legally lost and subject to a finder’s claim.

[When an object] is found in a place such that the owner of the premises is considered in constructive possession or custody of it, even though he had no knowledge of it, and it is, therefore, not a lost article in the legal sense…., the owner of the premises where the [object] is found has the right to the possession of the article as against the finder.

Constructive possession is generally defined as “knowingly having both the power and intention at a given time to exercises dominion or control over the property.”

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36 A 1970 Amendment to the National Park Service Act clarified that Congress intended the national park system to include both land and water areas. 16 U.S.C. § 1c(a).
37 The term “embedded” means firmly affixed in the submerged lands or in coralline formations such that the use of tools of excavation is required in order to move the bottom sediments to gain access to the shipwreck, its cargo, and any part thereof (ABANDONED SHIPWRECK ACT OF 1987 § 3(a)).
38 Treasure trove is defined as gold, silver, or its paper representative. There is no evidence before the Court that indicates either gold or silver has been found at the wreck site.
39 1 AM. JUR. 2d Abandoned, Lost Property §22
40 36A C.J.S. §5c(1)
41 United States v. Cousins, 427 F.2d 382, 384 (9th Cir. 1970).
“Knowingly”:

In February 1975, three years before Gerald Klein’s discovery, George R. Fischer, an underwater archaeologist, prepared a Preliminary Archeological Assessment of Biscayne National Monument for the National Park Service. The assessment listed forty-six locations of historic shipwrecks within the park with specific reference to an 18th century wreck within the waters of the Legare Anchorage. This ship was tentatively identified as Nuestra Señora del Pópulo, a vessel of the 1733 Spanish fleet. The true identification of the wreck, however, is irrelevant to the Court’s finding that the United States knew an 18th century ship existed in Legare Anchorage as early as 1975, documented this fact in the Assessment and, far from abandoning the wreck, took steps in 1976 to have all wrecks within Biscayne National Monument, as listed in the Assessment, placed in the National Register of Historic Places.

‘Power’ and ‘Intention’:

The United States clearly has the power to exercise dominion and control over the wreck pursuant to the Property Clause of the United States Constitution. The Property Clause has been construed in Kleppe v. New Mexico to give Congress complete power over public property.

[T]he Clause in broad terms, gives Congress the power to determine what are ‘needful’ rules ‘respecting’ the public lands. And while the furthest reaches of the power granted by the Property Clause have not yet been

42 United States Exhibit 1
43 United States Exhibit 4; the term ‘National Register’ means the National Register of Historic Places maintained by the Secretary of the Interior under section 101 of the Historic Preservation Act of 1966 [16 U.S.C. 470aa - 470ll]
44 U.S. CONST. art.IV,§3,c1.2.
definitively resolved, we have repeatedly observed that ‘[t]he power over the public land entrusted to Congress is without limitations.’

Such an expansive reading of the Property Clause enables the Court in *Kleppe v. New Mexico* to uphold legislation regulating and protecting wildlife found on public lands. This plainly demonstrates that the power of the Property Clause will reach objects without title found on government land. The intention of the government to exercise dominion and control over the vessel is revealed by the following federal statutes and regulations protecting objects found within national parks and objects found on public lands.

One of the stated purposes of the National Park Service Act is the conservation of historic objects for the enjoyment of future generations. Toward that goal, the Secretary of the Interior promulgated the following regulation apply to “all persons… within the boundaries of any federally owned or controlled areas administered by the National Park Service”.

The possession, destruction, injury, defacement, removal or disturbance in any manner of any artifact, relic, historic or prehistoric feature, or of any other public property of any kind is prohibited.

The Antiquities Act of 1906 makes Federal officials responsible for protecting archeological sites on public lands. It designated these archeological sites as public

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46 *Id.* At 539.
47 16 U.S.C. §1; 16 U.S.C.1452 § 303(1); 16 U.S.C. 470h-2(a) – [Federal agencies’ responsibility to preserve and use historic properties]
48 36 C.F.R. §1.1(a)
49 36 C.F.R. §2.20(a)(1)
resources and prohibits looting and vandalism. The Antiquities Act also requires that persons going on public lands to examine or excavate archeological sites obtain permits. The Antiquities Act of 1906 further requires that all objects gathered at the sites be permanently preserved in museums for the benefit of the public. Failure to obtain such permission will result in a fine, imprisonment or both. Since this enforcement provision of the Act was declared unconstitutionally vague by the Ninth Circuit in *United States v. Diaz*, the plaintiff argues that the Act cannot be used to support the government’s claim to the wreck. The vagueness issue, however, is irrelevant since we are not here to determine whether penalties can be enforced against the plaintiff. The Court is concerned only with deciding whether the United States had the intent to exercise dominion and control over the wreck. The Antiquities Act unmistakably registers such intent as does its successor legislation, the Archeological Resources Protection Act of 1979. The enactment of the Archeological Resources Protection Act indicates a continuing interest by the government in protecting its archeological resources from commercial excavation or retrieved from public lands pursuant to an authorized

53 16 U.S.C. §433  
54 *id.*  
55 T16 U.S.C. §433  
56 449 F.2d.113 (9th Cir. 1974)  
57 The Court Notes, however, that in *United States v. Smyer*, 596 F.2d.939,941 (10th Cir. 1979) the Tenth Circuit found no constitutional infirmity in the Act.  
58 This Act became a law on October 31, 1979 (public law 96-95; 16 U.S.C. 470aa-mm), and has been amended four times. Archeological Resource Protection Act of 1979 § 2(b) the purpose of this Act is to secure, for present and future benefit of the American people, the protection of archeological resources and sites which are on public lands and Indian lands, and to foster increased cooperation and exchange of information between governmental authorities, the professional archeological community, and private individuals having collections of archeological resources and data which were obtained before October 31, 1979 [the date of the enactment of this Act]  
59 The term ‘public lands’ means lands which are owned and administered by the United States as part of the national park system, the national wildlife refuge system, or the national forest system; and all other lands the fee title to which is held by the United States, other than lands on the Outer Continental Shelf and lands which are under the jurisdiction of the Smithsonian Institution (Archeological Resources Protection Act of 1979 §3(3)(Al-iii)(B))
permit are to remain the property of the United States.\textsuperscript{60} It also requires that any objects taken from archeological sites be preserved in a museum or other suitable institution for the public benefit.\textsuperscript{61}

It is without question that Congress had the power to exercise dominion and control over the wreck, and the statutory evidence is overwhelming that it had the intent. It is clear that the United States was in constructive possession of the wreck at the time the plaintiff discovered it embedded in public lands.

**Salvage Claim:**

Having determined under the common law of finds that the Plaintiff has no right or title to the subject vessel, Judge Atkin turns to plaintiff’s alternative claim for liberal salvage award. A valid salvage claim must show the following elements:

- There must be maritime peril from which the ship or other property could not have been rescued without the salvor’s assistance.
- The salvor’s act must be voluntary – that is, he must be under no official or legal duty to render the assistance. The act must be successful in saving, or in helping to save, at least a part of the property at risk.\textsuperscript{62}

The Court has already found that the government was in constructive possession of the wreck at the time the plaintiff discovered it. The law of salvage provides that “so long as the owner, or his agent, remains in possession, he is entitled to refuse unwelcome offers

\textsuperscript{60} 16 U.S.C. §470cc(b)(3)

\textsuperscript{61} Id.; 16 U.S.C. 432 §3 – permits for the excavation of the ruins, the excavation of archeological sites, and the gathering of objects of antiquity upon the lands under their respective jurisdictions may be granted…to institutions which they may deem properly qualified to conduct such examinations, excavation or gathering…provided that the examinations, excavations, and gatherings are undertaken for the benefit of reputable museums, universities, colleges or other recognized scientific or educational institutions, with a view to increasing the knowledge of such objects, and that the gatherings shall be made for permanent preservation in public museums.

of salvage.”63 Further, it has been stated in a case originating in this District that “there can be no suggestion that federal admiralty procedures sanction salvaging methods which fail to safeguard items and the invaluable archeological information associated with the artifacts salved.”64

The Preliminary Archeological Assessment and the Nomination Form for the National Register of Historic Places contemplated the examination and observation of the site in its natural environment, in situ, and the recovery of surface items by archeologically approved procedures. Plaintiff was not a trained, qualified archaeologist, and his salvage efforts employed no procedures to protect the archeological and historical significance of the artifacts he removed from the site. Unfortunately, the plaintiff’s unauthorized disturbance of one of the oldest shipwrecks in Biscayne National Park and his unscientific removal of the artifacts did more to create a marine peril than to prevent one. It is Judge Atkins’ opinion that the plaintiff satisfied only one element of a valid salvage claim in that his actions were voluntary. Therefore, Judge Atkins rejected the plaintiff’s request for a salvage award. Judge Atkins’ concludes that all the relief sought by the plaintiff is denied and the Clerk will enter the judgment under F.R.CIV.P. 58. This decision was done and ordered at Miami, Florida, on the 28th day of July, 1983. In 1985 the site required protection and thus a restricted closure zone was placed around the site and is currently still enforced. Active law enforcement measures are taken to protect this resource.

63 Id. At 536.
Mr. Trelewicz versus Biscayne National Park

In February 1999, Mr. Daniel Trelewicz, a volunteer at the adjacent Florida Keys National Marine Sanctuary (FKNMS), managed by NOAA, made numerous requests through members of Congress, the United States Department of the Interior and the Inspector General, in order to obtain copies of reports and information on HMS *Fowey*. His motivation to obtain documentation pertaining to HMS *Fowey* has never been entirely clear. Mr. Trelewicz did not make these requests directly through the National Park Service, Biscayne National Park or the Southeast Archeological Center. Congressman Peter Deutsch also sent a request to Biscayne National Park inquiring about the restrictions that had been placed on the Legare Anchorage and he sent a reply to Mr. Trelewicz. Due to a history of site looting, (currently ongoing), some sensitive information regarding the site was withheld under the provision National Historic Preservation Act, Archeological Resources Protection Act and the Freedom of Information Act exemption 365. Once the initial investigation was completed, a complete listing of the artifacts found on HMS *Fowey* which were stored at the Southeast Archeological Center would be provided to Mr. Trelewicz. The original Freedom of Information Act decision that withheld some information was appealed by Mr. Trelewicz.

65 Under the Freedom of Information Act [FOIA, 5 U.S.C. 552], members of the public have a right to access federal agency records, except to the extent that such records (or portions thereof) are protected from public disclosure by exceptions found under the Act. The third such exception under FOIA provides that an agency may withhold records “specifically exempted from disclosure by statute” [5 U.S.C. 552(b)(3)]. One of these statutes that specifically restrict disclosure is Section 304 of the National Historic Preservation Act [16 U.S.C. 470w-3]. Section 304 requires federal agencies, or other public officials receiving grant assistance under the NHPA, to “withhold from disclosure to the public, information about the location, character, or ownership of a historic resource…” if the agency and the Secretary of the Interior agree that its release may (1) cause a significant invasion of privacy, (2) risk harm to the historic resource, or (3) impede the use of a traditional religious site by practitioners. Once a determination to withhold from the public has been made, the Secretary of the Interior, in consultation with the relevant agency, will determine who (if anyone) may have access to the information for NHPA purposes. If the information was developed as part of a Section 106 undertaking or under Section 110(f) of NHPA, the Secretary of the Interior must consult with the ACHP in making the above determinations regarding withholding and access. For purposes of Section 304 of the NHPA, the Secretary of the Interior acts through the National Park Service.
The United States Department of the Interior Office of the Solicitor denied the appeal on
March 12, 2001. On the 24th of February 2000, Mr. Trelewicz sent a request to Senator
Connie Mack. This request complained about the National Park Service’s restrictions on
the Legare Anchorage and the management of it. He also requested reports on the site, to
view the artifacts and to be allowed to dive the site. By the 19th of April 2000, Biscayne
National Park responded to Senator Mack’s request. Biscayne National Park provided
Senator Mack with the history of HMS *Fowey* and an explanation of why the National
Park Service felt the need for such site security and protection and referenced the
authority of the National Historic Preservation Act and the Archeological Resources
Protection Act. The letter also provided Senator Mack with examples and sources of
public information on HMS *Fowey* and a project history. Furthermore, Biscayne National
Park provided him with copies of journals and articles and videos that were available at
the time on HMS *Fowey* and even invited Mr. Trelewicz to contact Biscayne National
Park directly for further assistance. On May 2, 2000, Mr. Trelewicz sent another request
to Senator Connie Mack with further complaints about the National Park Service and his
dissatisfaction with response provided by Biscayne National Park. Additionally, he
repeated the same requests from a previous request dated February 24, 2000.

While his motives were never clear, it is not unfair to assume that Mr. Trelewicz
was really after the exact GPS coordinates for HMS *Fowey*. In spite of the numerous
documents the National Park Service provided him with he continued to request more
information. The great lengths that Mr. Trelewicz went through to obtain records on HMS

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66 36 C.F.R. 800; §211 of the National Historic Preservation Act (1966)
*Fowey* illustrates just how far some individuals are willing to go for the possibility of buried treasure. Furthermore, it stresses just how important it is for the National Park Service to implement an effective management plan protect HMS *Fowey* from future situations like this one; where individuals are clearly interested the site for reasons other than archaeological interest.

### The United States of America and the United Kingdom

The government of the United States of America and the government of the United Kingdom of Great Britain and Northern Ireland have entered into an agreement regarding the shipwreck, HMS *Fowey*. As expressed in the legal documentation, the purpose of this agreement is to legally state that while the USA has fee-simple title to the submerged bottomlands of Biscayne National Park, the USA recognizes that HMS *Fowey* was lost during military service ergo, remains the sovereign property of the United Kingdom. Furthermore, this agreement stipulates that the wreck, which is an important part of our shared maritime history, will be preserved and maintained in perpetuity barring any conditions beyond the National Park Service’s control (i.e., natural disasters and accidental groundings). If any action concerning the wreck or any of the associated artifacts is necessary, the National Park Service agrees to first consult the United Kingdom prior to the respective undertaking.

#### Title and Custody

At the time of its sinking in 1748, HMS *Fowey* was a vessel of the British Royal Navy. The United Kingdom has not abandoned or transferred title of the wreck of HMS
Fowey and continues to retain title to the wreck of HMS Fowey. The United Kingdom shall retain title to HMS Fowey and the United States shall have custody of HMS Fowey in perpetuity. Artifacts from HMS Fowey collection may be placed on temporary loan for public exhibition as agreed between the parties as per the administrative agreement referred to in Subject V. Artifacts in the custody of the United State shall not be subject to seizure.

Standards for Archeological Investigation and Curation

Archeological investigations of HMS Fowey shall be conducted in accordance with the Secretary of the Interior’s Standards and Guidelines for Archaeology and Historic Preservation, 48 Fed. Reg. 44716 (September 29, 1983) and the Annex to the 2001 United Nations Educational, Scientific and Cultural Organization Convention on the Protection of Underwater Cultural Heritage (appended), which have been determined consistent with the Federal Archeological Program. The National Park Service shall continue to restrict release of the coordinates of HMS Fowey’s location, as appropriate for protecting the site, but shall not restrict access to HMS Fowey by representatives of federal law enforcement officials or other agents of the United States of America or restrict access to representatives or other agents of the United Kingdom.

Museum Collections

All artifacts removed from HMS Fowey will be managed by the National Park Service as an incoming loan from the United Kingdom. Legal title for the artifacts rests with the United Kingdom. The National Park Service will provide separate, appropriate loan documentation for the United Kingdom representatives. The loan agreements will be
in renewable increments of 25 year time periods. Furthermore, the National Park Service is authorized to provide conservation treatments to artifacts from HMS *Fowey*, as appropriate, consistent with the highest professional standards to ensure the preservation of the collection. This agreement has become effective as of Fall 2013, when the final document was signed in Washington, D.C..
Chapter 6 -
Cultural Resources Management

Cultural Resource Management (CRM) is a combination of laws, regulations and professional practices designed to manage historic buildings and sites, cultural landscapes, and other cultural and historic places. Laws such as the National Historic Preservation Act, Antiquities Act, Archaeological Resource Protection Act, Historic Site Act and the Archaeological and Historic Preservation Act serve as the legal basis for cultural resource management in the United States. The role of State Historic Preservation Officer (SHPO) was created in each state of the United States, to coordinate the respective state’s cultural resources, cultural resource management activities and to keep files on historic and prehistoric sites, structures, buildings, districts and landscapes (Renfew & Bahn, 2010: 314-315). Conserving the archaeological record is a fundamental principle of cultural resources management (Renfew & Bahn, 2010: 311).

British shipwrecks in Florida’s waters are rare and significant relics of the state’s and the nation’s colonial and early history. They are also important historical documentation of England’s imperial endeavors in the region. To date, British shipwrecks have been managed by the State of Florida’s administrators based on state law and regulations that govern all historic shipwrecks located on Florida’s sovereign submerged lands. These laws provide protections while allowing legitimate scientific research, and much information has resulted from proper archaeological excavations. Any proper
archaeological excavation must have a logical and natural order: survey, conservation and mitigation (Renfew & Bahn, 2010: 309).

**CRM at BISC**

The basic principles of cultural resource management at Biscayne National Park are to:

- discover the significance or meaning of each resource.
- to slow the rate at which their essential material qualities are lost
- to support the use and enjoyment of cultural resources while minimizing negative effects on them.

Prior to 1996, cultural resource management responsibilities were a collateral duty of the Park’s Chief Science coordinator, a marine chemist. For more demanding projects, agencies and organizations from outside the park were enlisted. However, this was uncommon due to budget constraints. If the budget would allow for outside aide, the Southeast Archeological Center and the Submerged Resource Center would typically conduct the majority of the work. This approach allowed the park to have a group of well-trained and properly equipped specialists to respond when needed, without the burden of permanent maintenance costs. However, over time deficiencies with this approach became noticeably apparent. The availability and quality of the work produced became an issues of concern. Once deployed on a project, the research, the fieldwork and the write-up, would essentially prevent the teams from responding to needs at other parks or locations. There were also discrepancies in the quality and format of the data being generated. With the growing public awareness and sensitivity being given to cultural
resources within the National Park Service, Biscayne National Park began looking for a solution.

In 1996, a full-time position was created to identify and manage resources within Biscayne National Park. Over time the scope of the position has grown, in response to Cultural Resource Management issues within the Park. One of the central responsibilities of the Cultural Resource manager is the creation of cultural management plans, documents that present the policies, goals and objectives of the Cultural Resource Management program. Additionally, Biscayne National Park has implemented the Systemwide Archaeological Inventory Program (SAIP). This program is similar to Section 109 compliance requirements, seeking to inventory and document resources located within the National Park System. This encourages park managers to actively seek out unknown resources and evaluate them. The final stage of this process is to input site descriptions and site assessments into the Archeological Sites Management Information System (ASMIS).

A place where the public is encouraged to visit and experience a submerged cultural resource is not a preserve, reserve, nor a sanctuary; it is a park. (Spirek & Scott-Ireton, 2003: 05). The preservation of Biscayne National Park’s cultural resources provides a tangible connection to our human history. Through the preservation and protection of these invaluable resources allows the public an opportunity to appreciate the cultural heritage of this great nation and its multifarious and unique culture.
Conservation and Mitigation

Conservation is the documentation, analysis, cleaning, and stabilization of an object...to protect the artifactual, faunal, and other archaeological material and prevent their reacting adversely with the environment after recovery (Hamilton, 1981). Conservation archaeology recognizes that historic shipwreck sites are a non-renewable resource, the number of which can only decrease over time. Valid reasons for preservation include: scientific research that expands our knowledge of the past; important interpretative projects for public benefit; and mitigation of site damage or destruction due to identified threats. Well-preserved shipwrecks are likely to produce the greatest quality and diversity of new information (Gibbins & Adams, 2001: 285).

The preservation of submerged and maritime historical and cultural resources depends heavily on advanced and often costly specialized technologies. Technologies for scientifically analyzing and stabilizing the growing numbers of artifacts recovered from the ocean require highly skilled conservators who are knowledgeable about a variety of different materials (i.e., brass, different species of wood and iron) and how the chemical compounds that make up these materials change over time as they are exposed to saline water. Concreted metal, waterlogged wood, and other organic materials such as leather or fabric begin almost immediately to deteriorate when exposed to the open air after having been submerged or buried under sediments (U.S. Congress, Office of Technology Assessment, 1987: 44). Needless to say, these specialists are in short supply.

Management of submerged cultural resources may also include inventory of sites, protection in place, public interpretation in the form of educational programs, excavations
and display in museums, or the decision to take no action (Lenihan, 1997). Other forms of management include complete recovery, analysis, conservation and display of the wreck (which is enormously expensive), in-situ preservation (encapsulation), or reburial; to preserve it by slowing down (but not eliminating) its rate of degradation. If a shipwreck cannot be stabilized, do archaeologists still decide to take no action despite the fact that the wreck and its artifacts may no long be there in decades to come?

**Site Stabilization**

Submerged cultural resources are under great threat in general. Shipwrecks face many different environmental factors compared to artifacts recovered through terrestrial archaeology. This assemblage, when complete, can be regarded as a system, defined by the necessary characteristics of a ship, which has undergone a series of transformations through time, emerging as a result of archaeological excavation (Muckelroy, 1987: 158-9). Additionally, the vulnerability of shipwrecks is amplified by easy access for the public that wish to enjoy the shipwrecks, as well as those who do not respect the wreck’s public value (Adams, 1998: 34).

**Bottom Stability**

Numerous studies conducted on the Fowey site indicate that the erosion process may be accelerating. The annual monitoring reports, as well as those conducted after a major storm events such as, Hurricane Andrew or Sandy, state that seagrass beds
surrounding the main hull sections are eroding. As the seagrass beds erode, more of the ship and in situ artifacts are exposed.

In 1996, Harold R. Wanless and J. Andrew Risi of the University of Miami conducted a site assessment of the Fowey site in order to better understand the sediment dynamics and substrate dynamic of the site. In their 1996 findings, Wanless and Risi reported that there are two types of sediment profiles identified at the Fowey site: the first contains medium to coarse calcareous skeletal fragments with fine grained calcareous material making up the remainder. The fine-grained material varies in size from fine sand, silt, and clay. Larger shell and coral is also present in the matrix. The resulting matrix is cohesive, and represents primary deposition (Wanless & Risi, 1996). The second type of sediment profile identified at the Fowey site by Wanless and Risi (1996) is a skeletal grainstone to well-washed packstone. There is abundant coarse sand and medium sand fractions, minor grains finer than 176 microns and only a trace amount of grains finer than 40 microns in the settling texture. Grain sized shell and coral are absent from this sediment profile. Wanless and Risi also reported that the sand has no cohesiveness.

The Fowey site is near the boundary between the inner shelf zone of widespread seagrass cover and the outer shelf one of barren sand bottom. Wanless and Risi (1996) found that the rippled mobile sand bottom moves during minor wind events and currents as large ripples with a 5-13 cm amplitude; which, reworks the sand in the upper 5-15 cm but ultimately produces little erosion. However, this energy environment does move some sand from the seagrass beds to the mobile sand areas, and also moves some sand to the
flanks of seagrass beds covering the erosional scarps. They also found that the larger winter storm events have a tendency to cause temporary disruptions and erosion of the barren sand bottoms through wave burst resuspension of the normally bedload sands (Wanless & Risi, 1996: 08). However, there is indication that lesser storm events would move the sand from the flanks of the seagrass beds back to the sparsely covered bottom areas (Wanless & Risi, 1996: 08).

The morphology of the seagrass beds at the Fowey site indicates that they are dynamic features with erosional and depositional flanks. Winter storms and hurricanes provide enough frequent bottom energy that exceeds that for seagrass survival, so that a continuous seagrass cover has not been attained. This is true of the areas both north and south of the Fowey site. Hurricanes will cause significant erosion of the loose sand bottom. Furthermore, they note that hurricanes with transport from the southwest, west or northwest could result in overall long-term erosion because the landward seagrass cover will release little sand to replace the sand eroded from the Fowey site (Wanless & Risi, 1996: 08).

**Substrate Stabilization**

Increasing the bottom stability of the Fowey site is a difficult undertaking (Wanless & Risi, 1996: 08). Increasing the substrate cohesiveness is one possible solution, however, if the covering sand is removed too quickly by a hurricane or storm event, the mud used to increase the cohesion of the substrate will be exposed to erosion and increase the turbidity of the waters. Another possible method looked at by Wanless
and Risi (1996) is seagrass recolonization. They found that the large amplitude of the ripples on the bottom and the winter storm resuspension of the normal bedload materials would make successful replanting of seagrass difficult, as well as extremely costly (Wanless & Risi, 1996: 10). They also would not recommend the use of sandbags or gravel as a means of substrate stabilization at the Fowey site.

Another report was conducted by Joseph C. Zieman in October 2000. His report explored the possibility of using native seagrasses as a means of stabilizing the sediments at the Fowey site. In his report he explains that seagrasses stabilize the sediment in two ways: the seagrass leaves slow current flow to reduce water velocity near the sediment-water interface, which promotes sedimentation of particles as well as inhibiting resuspension of both organic and inorganic materials. Secondly, the seagrass roots and rhizomes form a complex, interlocking matrix which binds the sediments and retards erosion (Zieman, 2000: 05). Both characteristics makes seagrass an excellent tool for site stabilization. However, due to the highly dynamic nature and location of the site, Zieman (2000) found that the use of seagrass recolonization as a means of stabilization for the Fowey site has a very low probability of success. Zieman (2000) concludes that the site cannot be stabilized for more than a short period of time using common methods of site stabilization (Zieman, 2000: 13).

In the past, Biscayne National Park has attempted to increase the bottom stability of the Fowey site with no success. It must be understood that there is no method currently available to stop erosion in such a high-energy environment, but there are methods of
protecting the site from continuous exposure. A possible course of action for HMS *Fowey* may found in our neighbors to the north, the Canadian Parks Service.

**Red Bay Shipwreck Site Reburial**

The Marine Archaeology Section of the Canadian Parks Service has been involved in the survey and excavation of underwater sites across Canada since the mid-1960s (Waddell, *n.d.*). In recent years, the Canadian Park Service (Parks Canada) has focused their attention on many methods of resource management including direct recording and testing on shipwrecks, sediments and flow studies, as well as reburial and storage of shipwreck timbers (Waddell; Murdock & Stewart, 1994; and Waddell, 1991; Murdock & Stewart, 1995). The Canadian Park Service’s work with timber reburial, specifically, their work with the Red Bay Shipwreck, could provide a great deal of valuable insight that could assist the National Park Service with the long-term management and protection of HMS *Fowey*.

From 1978 through 1985, Parks Canada, under the direction of Robert Gernier, was involved in surveys and excavations of 16th century Basque whaling sites in southern Labrador. Parks Canada has reburied several shipwrecks including two other 16th century galleons in the Red Bay harbor. Red Bay reburial was done as a practical approach to a long range waterlogged wood storage problem. It was not based on an involved, systematically developed model but rather on some science based on common sense and subjective site experience gained from some 14,000 diving hours on the site (Waddell, *n.d.*). The reburial management option should not be viewed as a cheaper alternative to
complete excavation but as an appropriate form of preservation, which will assure the continued survival of the timbers and associated artifacts, hopefully, for years to come. This method of conservation will also allow the shipwreck to remain protected so that in the future, when conservation methods may be improved or new information becomes available, the shipwreck can be recovered, and studied.

Like the *Fowey* site, the sites in Red Bay were at depths of 7 to 9 meters (~ 23 to 29 feet) however, unlike HMS *Fowey*, these sites do not have any significant currents or storm surges. Tidal currents were not formally measured but they are typically less than a knot, however, there are occasions when site currents are around two knots (Waddell, *n.d.*). Throughout history, wood has been the material most used for shipbuilding. War, and disasters at sea, have left numerous shipwrecks on the sea floor throughout the world’s ocean. Ships sink more or less intact or as fragments, depending on the cause of the wreck.

A similar study is also being conducted in Australia. This project began in April 2010, through Flinders University in South Australia. The project has two phases; the first phase began in April 2010 at *Clarence* in Victoria, Australia, and the second phase began in April 2011 at *Solway* in South Australia (Staniforth & Shefi, 2010: 1550). Both sites are approximately in 4-5 meters (~ 13-16 feet) of water, they both are 19th century wooden shipwrecks and both wrecks lie in similar particle-sized cacareous sediment (Staniforth & Shefi, 2010: 1550).

As soon as a structure or an object becomes part of the archaeological record, the environment begins to play a key role in determining what evidence survives; in what
form it survives and in what position it survives. In general, the more robust materials 
(stone, pottery, iron) survive better than materials such as, wood, textiles or leather. The 
more dynamic the environment, the less well the more delicate materials will survive. 
Studying the nature and the impact of the environment of a site is essential to 
understanding the evidence that will be recovered. The deterioration of organic and 
inorganic materials is dependent on physical, chemical, and biological factors. Factors 
such as currents, oxygen content, salinity and sediments are key factors that affect the 
rate of biological decay (Björdal & Nilsson, 2007: 862; Florian et al., 1977). In more 
saline waters, shipworms are known to destroy wood rapidly. Only parts that are 
embedded in sediment are protected against marine borers.

Wood makes up the majority of historic shipwrecks so it is important that 
scientific experiments for testing long-term preservation methods for shipwrecks and 
other historic artifacts in a waterlogged environment to focus on wood degradation. 
Wood exposed to seawater is rapidly colonized by a variety of biological agents (rather 
than chemical agents), including seaweed, barnacles, wood-boring molluscs (ship worm) 
and crustacea (gribble), fungi, and bacteria (Bowens, 2009: 30). Thus, the goal of 
shipwreck reburial is to create a sealed and anaerobic environment surrounding the 
shipwreck site.
Suggestions for HMS Fowey Reburial

1. Full Damage Assessment.

2. Determine, as far as reasonably possible, the extent of the site.
   - Determining the extent of the site is essential for management purposes. A proposed effort would consist of visual and remote sensing of areas suspected to contain cultural material associated with HMS Fowey.
   - Areas displaying signs of erosion should be a priority.
   - The survey should include locations of magnetic anomalies that are within proximity to the path Fowey took as she sank. Previous site documentation focused on an area of only forty meters by forty meters in size.
   - Additional site locations may be more than seventy meters from the center of the site. Based on a non-systematic visual inspection, park researchers have located site features more than 250 meters from the original site in all directions.
   - Systematic high-resolution survey and investigation is necessary to determine Fowey’s first grounding location (based on historical documentation, it is supposed to be southeast of where the wreck currently lies) and the route of jettisoned materials to the point of final sinking. Along this track, which is believed to be around 5000 meters long, undiscovered materials from HMS Fowey are likely to be found during site delineation (Adams, 1998).

3. Re-mapping the site
• An estimate of total size of site/sites to be reburied

• A comprehensive survey to determine site boundaries, the types and quantities of materials and artifacts and their current state.

• Updated photomosaic using high resolution cameras and computer programs to correct for underwater optical distortion

• Updated photomosaic key overlay

• An updated site plan.


5. Collection and conservation of disrupted archaeological artifacts that are now exposed and threatened with complete loss

  • Apply initial conservation treatment to artifacts

  • complete field catalog records

  • coordinate shipment of artifacts to conservation laboratory

  • enter all new data into cultural resources GIS database

  • formal reports which document current state of wreck, artifact distribution, and locations of structural remains, as well as current state of sea grass.

6. Stabilization

7. Long-term budget planning is needed for annual site assessment and laboratory testing of water, chemical, biological and wood samples from the Fowey site.
“A Fowey Trust” should be implemented so ensure future monitoring continues at BISC.

Reburial

After the site’s maximum dimensions as have been assessed and the necessary materials have been gathered. The Key Largo limestone rock is locally mined, readily available and is believed to be heavy enough to stay in place during storm events. Using limestone will also encourage coral growth, which will further conceal the site from potential looters and vandalism while providing a natural reinforced layer, which would encourage additional site stabilization. A complete map should be drawn to show the location of the artifacts and ship structure and their location. Following the verification of the map, the sand covering operation can commence. This can be done using specifically designed dump buckets, which are then lowered into position over the desired area of the wreck. Gaps between the timbers and artifacts should be filled as well. The overall height of the structure at this point should be recorded. In order to prevent erosion of the sand, large fractions of limestone rock should be carefully placed on top of the buried site. Total weight of the material placed on top of the site should be noted at this time. Final photographs, site sketches, and records should be taken at this time. To ensure that the site has a method of determining the effectiveness of the technique, an ongoing monitoring program should be initiated.

On-going Monitoring Program

1. Visual and photographic inspection
Conduct a thorough visual and video (if possible) examination of the site, looking for signs of disturbance or damage

- Damage to limestone
- Any excessive organic growth
- Aging or break down of any materials

2. Analysis

   - Chemical Analysis
   - Signs of decomposition of wood/artifacts
   - Water Temperature
   - Depth (in feet)

Long-range protection and preservation of underwater sites is one of the greatest challenges facing the management of submerged cultural resources. If site reburial of HMS *Fowey* proves successful, it will help form the basis for managing future submerged sites. Quite possibly this preservation project could encourage other cultural resource managers around the world to take action with regards to their own submerged material culture that might be facing the same perilous fate as HMS *Fowey*. 
Conclusion

In a summary for the National Park Service, entitled *Investigations of the Legare Anchorage Shipwreck Site* George R. Fischer wrote:

This entire exercise, from October of 1979 to present, seems to have lasted a great deal longer than that, and is not yet over... At present we have won our case in court, but problems with preservation of the HMS *Fowey*, now that it is ours, remain. To protect the site, the Superintendent of Biscayne [National Park], under authorities available to him, closed the immediate area to all water conduct activity in 1980. That closure prevails at present. Its efficacy is questionable. From the last days of our 1983 investigations through the fall of the year, three known efforts have been made to conduct further illicit salvage of the site. This involved considerable depredation and damage, and obviously entailed the use of excavating equipment rarely available to the casual sport diver. We see two cultural resource management messages as having evolved from this case. First, we are lucky in having fortuitously done some homework, a point, which Judge Adkins mentioned in his decision. The [National Park] Service had an ongoing problem of cultural resource management, was generally aware of their historical shipwreck resources, and was making efforts to research and manage them for the present and in the future. Whether we were in the process of actively excavating the site was of lesser importance than the fact that we had long term plans for preservation and use in the public interest, of it and similar shipwrecks in the park. The second message is that although inventory and evaluation is necessary in order to provide adequate information for management, it does not obviate the need for continued aggressive law enforcement. We can only inform protective personnel of what and where their problems are, and recommend solutions. Protection of shipwrecks from vandalism and illicit salvage is ultimately a law enforcement problem, however, and National Park Service rangers are eagerly awaiting the opportunity to apprehend whomever it is who steals in the dark of the night, and tears a few more holes in our patrimony. Attractive though the solution of excavation and removal of such resources may be, it is a near impossibility technologically, enormously expensive if done properly, and runs counter to the ethics of professional archaeology. Our plan is to extract what data we can at this time, to provide for use of that data by scientists and through programs, which disseminate information to the public, and to preserve what remains of the *Fowey* itself. Hopefully, in the year 2000 or
whenever, the site data and materials from it will be available for scientific research and public interpretation using technology we may not be able to conceive of existing at this time.

The ship is the greatest possible cultural expression. British lawyer and geologist, Sir Charles Lyell, believed the most exceptional museum of the human past would not be found on the surface of the globe but beneath the surface of the ocean, because the earliest form of human transport, beyond walking, involved waterborne craft (Murphy, 1988). HMS *Fowey*, a well-preserved site on the National Register, is one of the few remaining warships that can provide opportunities to study and understand the Royal Navy of the pre-Revolutionary War era. Furthermore, she is the only shipwreck of this era known to exist in the Northern Hemisphere, to still contain archaeological material. Other examples of similar vessels wrecked in Florida have been destroyed through commercial salvage operations and treasure hunting. For example, HMS *Winchester* and HMS *Looe*, both of which were lost in the Florida Keys and have since been stripped of all of their archaeologically significant artifacts. Globally, few examples of eighteenth century British warships, like HMS *Fowey* have been archaeologically excavated. Two eighteenth century British men-of-war have been found and are being excavated: HMS *Pandora* in Australia and HMS *Swift* in Argentina. These shipwrecks, which are being excavated properly under professional archaeologist supervision, reveal the great information potential a British shipwreck can yield when handled properly. Moreover, the existence of these two shipwrecks in addition to the potential shipwrecks still undiscovered only strengthens the need to protect HMS *Fowey* from further destruction.
HMS *Fowey* represents an important piece of international maritime heritage that Biscayne National Park has the responsibility of preserving and protecting.

Biscayne National Park’s cultural resources are extremely rich with examples of the international maritime heritage that has shaped the culture of southeast Florida, the Caribbean region and our nation as a whole. The submerged cultural resource, shipwrecks, and other archaeological remains pertaining to maritime activities, is not exceeded. The number of known shipwrecks is high, and new wrecks are still being discovered. The cost of complete or even partial excavation, conservation and exhibition are extremely high. Only shipwrecks of the utmost historical and cultural importance are considered for preservation in a museum. Reburial and preservation in situ, using readily available materials, offers archaeologists a relatively inexpensive alternative for preserving and protecting submerged cultural resources. Reburial and in situ preservation of shipwrecks is a simple, useful, and effective method for decreasing wood degradation in marine environments, and management of immovable and mobile cultural heritage (Björdal & Nilsson, 2007: 871).
# APPENDIX 1A

## A Timeline

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>1739 – 1748</td>
<td>The War of Jenkins’ Ear</td>
</tr>
<tr>
<td>1743</td>
<td>The keel is laid for a fifth-rate warship to be named <em>Fowey</em> in the Blaydes Shipyard in Kingston-on-Hull, Yorkshire, England.</td>
</tr>
<tr>
<td>Aug 14, 1744</td>
<td>HMS <em>Fowey</em> is launched in Hull, Yorkshire, England.</td>
</tr>
<tr>
<td>[NB. Conflicting Date, September 6, 1744]</td>
<td>HMS <em>Fowey</em> is commissioned in Hull, Yorkshire, England (Skowronek and Fischer, 2009: 203)</td>
</tr>
<tr>
<td>June 28, 1748</td>
<td>HMS <em>Fowey</em> is lost off the Cape of Florida, USA.</td>
</tr>
<tr>
<td>Dec 5, 1748</td>
<td>Captain Drake and his crew are exonerated for the loss of HMS <em>Fowey</em> in Portsmouth, England.</td>
</tr>
<tr>
<td>1930s-1950s</td>
<td>Stiltsville Construction (Cantillo et al., 2000: 11; Semple, 1997; Williams, 1990)</td>
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<tr>
<td>1935</td>
<td>The Historic Sites Act</td>
</tr>
<tr>
<td>1964 (August 10 – September 05)</td>
<td>Hurricane Cleo (Storm 5) moved up from Cuba at hits South Florida. Hurricane Cleo hits Stiltsville, causing property damage. Hurricane Cleo was the first hurricane to strike South Florida since 1950 (Cantillo et al., 2000: 11; Williams, 1990).</td>
</tr>
<tr>
<td>1965 (August 27 – September 13)</td>
<td>Hurricane Betsy (Storm 3) hits Stiltsville causing property damage – destroying all but two-dozen houses in Stiltsville (Cantillo et al., 2000: 11; Williams, 1990).</td>
</tr>
<tr>
<td>1968</td>
<td><em>Prospectus for Underwater Archaeology</em> (in the National Park Service) is written by George Fischer and Marion Riggs: the program is initiated.</td>
</tr>
<tr>
<td>Oct 16, 1968</td>
<td>Biscayne National Monument is established.</td>
</tr>
<tr>
<td>Oct 18, 1968</td>
<td>Public Law 90-606 authorized the establishment of Biscayne National Monument “to preserve and protect for the education, inspiration, recreation, and enjoyment of present and future generations a rare combination of great and natural beauty.”</td>
</tr>
<tr>
<td>May 20, 1969</td>
<td>The trustees of the Florida Internal Improvement Trust Fund did “reaffirm their support of the Biscayne national Monument and [did], accordingly, agree to the valuation of the said State lands [within the monument] at the sum of $1.00.” In accordance with this resolution, the trustees executed an Offer to Sell Real Property stipulating that “the United States of America will acquire the State-owned lands within the designated boundary of Biscayne National Monument...[and] the purpose of this agreement is to formally agree to the value to be paid for said land at the sum of $1.00.”</td>
</tr>
</tbody>
</table>
1970 George Fischer and George Sites begin compiling a base map of underwater sites in Biscayne National Monument.

Jun 1, 1970 A bill was passed by the Florida State Legislature to amend state laws to authorize the trustees to convey lands to the United States for the establishment of Biscayne National Monument and the right of the federal government to immediate possession of state-owned lands within the monument. The bill became state law July 1st, 1970.

May 2, 1973 U.S. District Judge Charles B. Fulton condemns 95,064 acres of land in south Dade County and turns it over to the federal government for Biscayne National Monument (Case No. 70-477-Civ-CF).

1974 Historical and Archaeological data Preservation Act

1975 Shipwreck site of HMS Fowey originally identified by Southeastern Archaeological Center (George Fischer). George Fischer writes an archaeological assessment and compiles a preliminary archaeological base map of Biscayne identifying forty-six known and potential shipwreck sites.

1975 George Fischer and Martin Meylach conduct a magnetometer survey to "ground-truth" many submerged sites in Biscayne National Monument.

Oct 1, 1978 Gerald Joseph Klein, while spear fishing with his son south of Miami, finds a shipwreck in Legare Anchorage and begins collecting artifacts from the site.

Oct 4, 1979 Gerald Klein files a "Complaint in Admiralty" in the U.S. District Court for the Southern District of Florida, Miami Division, in admiralty claiming "The Unidentified, Wrecked and Abandoned Sailing Vessel (Believed to have sunk in 1740)" in Legare Anchorage.

Oct 22, 1979 The court of U.S. District Judge C. Clyde Akins states that it will not issue a warrant appointing Klein the substitute custodian of "an ancient sailing vessel, sunk in 1715" until Klein contacts federal and state officials. He sets a hearing for October 26th, 1979 (Case No. 79-4627-Civ-CA).

Oct 26, 1979 Judge Atkins orders that Gerald Klein be made the "Substitute Custodian" of the wreck, giving him the right to continue salvaging it. The court will decide later how the finds will be divided among Klein, the State of Florida, and the federal government. This is reported the next day in the Miami Herald and on October 29th in the South Dade News Leader. The wreck is described as an "almost intact Spanish treasure galleon."

Oct 26, 1979 Curtiss Peterson, conservator for the Florida Bureau of Historic Sites and Properties, informs George Fischer of the Southeast Archeological Center that the court has noted both the state and federal governments might be interested in this case.

Oct 29, 1979 Gerald Klein turns in his salvaged collections to the United States marshals and is required to catalogue and turn over all subsequent finds. George Fischer reports in an internal SEAC memo his suspicions that the wreck could be either the Consulado or the Pópulo, both members of the 1733 Flota. He also notes that William J. Gladwin, Jr., will be the counsel representing the State of Florida.

Oct 31, 1979 Archaeological Resources Protection Act (Public Law 96-95; 16 U.S.C. 470aa-mm) became a law.

Nov 1, 1979 The Regional Solicitor's office for the United States Department of the Interior in Atlanta, Georgia is informed by the Southeast Archeological Center of a "possible treasure salvage effort in Biscayne National Monument."

Nov 21, 1979  Rebecca A. Donnellan, attorney for the United States Department of Justice, Land and Natural Resources Division, asks Gerald Klein’s counsel, David Paul Horan, if Klein has conducted any salvage on the wreck and has either “sought or obtained” permission from Biscayne National Monument. Horan confirms that salvage has occurred and that only the court has given permission to conduct salvage.

November 27, 1979  Rebecca A. Donnellan requests a temporary restraining order and preliminary injunction and asks that all artifacts be turned over to the National Park Service.

November 28, 1979  United States District Judge Alcee L. Hastings permits the United States to “intervene as defendant” for the wreck against Klein’s claim. Donnellan requests a restraining order because the wreck lies “within the boundaries of Biscayne National Monument.” She notes that the Antiquities Act of 1906 and the Archaeological Resources Protection Act of 1979 (October 31, 1979) are applicable and that Klein did not have a permit for any activities within the monument that were damaging the wreck and the ecosystem. Judge Hastings places a temporary restraining order on Klein and all salvage activities.

Dec 1, 1979  Russell Skowronek works with George Fischer and Bill Gladwin and prepares a paper on the protection of cultural resources on the outer continental shelf.

December 12, 1979  In the Miami Chamber of Chief United States District Judge C. Clyde Atkins, Bill Gladwin, attorney for the State of Florida, and David Paul Horan, counsel for Gerald Klein, agree that a representative of the State of Florida will be present during all salvage and that proper conservation methods will be followed (Case No. 79-4227-Civ-ALH).

December 19, 1979  David F. McIntosh, an attorney with Corlett, Merritt, Killian & Sikes representing Gerald Klein, submits a “Memorandum of Law” that states: “The NPS is completely unable to preserve the wreck site from unauthorized salvors (pirates) who would not respect the Court’s Order.” The memorandum further argues for “the predominance of Admiralty and Maritime law over the regulations of the NPS.”

January 02, 1980  In a conversation with George Fischer, Dr. Barbara Purdy, archaeologist with the Florida State Museum, states that she has been asked to provide professional oversight of excavations by representatives of Gerald Klein.

January 8 and 10, 1980  Rebecca Donnellan argues the motion for a preliminary injunction. One of the witnesses for Gerald Klein is Mel Fisher. Nonetheless, the court grants the motion, names the Secretary of the Interior the substitute custodian, orders Klein to turn over all salvaged materials to the National Park Service, and directs the United States to locate and protect the wreck.

January 12, 1980  The Tallahassee Democrat prints an article titled “Federal Agency is Proud Owner of Spanish Galleon It Can’t Find.”

January, February, March 1980  Staff members of the Southeast Archaeological Center try to clarify exactly what the court wants done and how they are supposed to do it. Additionally, they have to find the necessary funding.

Feb 3, 1980  The Southeast Archeological Center (SEAC) discovers that the staff members of Biscayne National Monument have been acting independently and were ready to being their search before the judge issued his written opinion.

Mar 1, 1980  Preliminary Reconnaissance of Site – Confirms site location

March 19, 1980  George Fischer of the Southeast Archeology Center travels to Miami, Florida and receives the collections from the site made by Gerald Klein.
<table>
<thead>
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<th>Date</th>
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</tr>
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<tbody>
<tr>
<td>Apr 1, 1980</td>
<td>The chief of the Southeast Archeological Center asks the Mobile, Alabama, and Savannah, Georgia, offices of the United States Army Corps of Engineers for the loan of a magnetometer and requests that archaeologist Larry Murphy be temporarily assigned to the Southeast Region to operate the magnetometer.</td>
</tr>
<tr>
<td>June 26-July 06, 1980</td>
<td>George Fischer directs an eleven-day project to find the “Unidentified, Wrecked and Abandoned Sailing Vessel” claimed by Gerald Klein.</td>
</tr>
<tr>
<td>(June/July) 1980</td>
<td>Location of BISC-UW-20 has been confirmed</td>
</tr>
<tr>
<td>July 04, 1980</td>
<td>The Legare Anchorage Wreck is located by the National Park Service. Twenty-one artifacts are collected</td>
</tr>
<tr>
<td>August 28, 1980</td>
<td>Memorandum sent to Associate Director, Management and Operations, WASO Attention: Assistant Director, Cultural Resources – enclosing a trip report from the Submerged Cultural Resources Unit from their work over the summer (June 22 – July 7, 1980) at Biscayne National Monument.</td>
</tr>
<tr>
<td>Fall 1980</td>
<td>Mendel Peterson of the Smithsonian Institution (SI) visits Tallahassee, Florida, and states that there is a 95 percent probability that the Legare Anchorage wreck is the <em>Pópulo</em>.</td>
</tr>
<tr>
<td>Sep 1, 1980</td>
<td>Second Research Effort</td>
</tr>
<tr>
<td>September 29, 1980</td>
<td>A photomosaic of the Legare Anchorage wreck is provided to Rebecca Donnellan.</td>
</tr>
<tr>
<td>Oct 1, 1980</td>
<td>The Southeast Archaeological Center learns that a “Treasure Hunt Special” is offered with dinner at Klein’s restaurant Joan’s Galley, including a “Free treasure map of authentic sunken galleon with cannons, artifacts, etc.”</td>
</tr>
<tr>
<td>October 01, 1980</td>
<td>Attorneys for Gerald Klein request detailed information on the summer 1980 archaeological project, including the participants, the discoveries, and the number of dives made.</td>
</tr>
<tr>
<td>November 19, 1980</td>
<td>The United States provides the answers to the interrogatories requested on October 01, 1980. Five fragments of ceramic have been recovered, none of Spanish or Spanish-colonial origin.</td>
</tr>
<tr>
<td>December 12, 1980</td>
<td>Richard Johnson of the Southeast Archaeological Center writes a memo regarding the possibility that the Legare Anchorage is British.</td>
</tr>
<tr>
<td>December 15, 1980</td>
<td>A hearing is held in Key West, Florida, to determine if the Southern District Court has admiralty jurisdiction that would include wrecks within Biscayne National Park. No decision is made, but the presiding judge takes it under advisement.</td>
</tr>
<tr>
<td>Jan 1, 1981</td>
<td>Richard Johnson returns for the annual Society for Historical Archaeological conference on Underwater Archaeology meeting in New Orleans, Louisiana, with information suggesting that the wreck could be HMS <em>Fowey</em>.</td>
</tr>
<tr>
<td>1981</td>
<td>George Fischer and Richard Johnson complete a draft of the 1980 survey report, which is rejected, because Fischer has not come up with an acceptable solution to for the problem</td>
</tr>
<tr>
<td>June 09, 1981</td>
<td>George Fischer reports to chief Richard Faust of the Southeast Archeological Center that research staff members from Biscayne National Park have recovered a shoe buckle and one fragment each of bone and wood from the Legare Anchorage site. He notes that Rebecca Donnellan reports that no actions are forthcoming.</td>
</tr>
<tr>
<td>July 07, 1981</td>
<td>The court restrains “any and all salvage operations.”</td>
</tr>
</tbody>
</table>
August 10, 1981 A hearing is held in Key West, Florida, regarding the interrogatories and the information contained therein.

October 1, 1981 Russell Skowronek travels to Great Britain to work in the National Archives (Public Records Office) and compiles a paper for the Southeast Archeological Center on historic resources pertaining to the Legare Anchorage site.

October 24, 1981 Attorneys for Gerald Klein file a motion to produce the artifacts collected in 1980 in court.

January 1, 1982 Gerald J. Klein murdered in Miami, Florida

December 12, 1982 The case (H2219) is transferred from Judge King back to Judge Hastings, who is considered more sympathetic to the National Park Service but is not hearing cases because of bribery accusations against him.

February 04, 1983 Judge Hastings resigns and moves on to senior judge status and only has to hear the cases he wants to hear. Seven witnesses come forward saying that they drove with Gerald Klein. He said that there were only five.

February 25, 1983 Color slides taken of the Legare Anchorage wreck are provided for the legal proceedings by the Southeast Archeological Center.

Spring 1983 Plans are formulated at the Southeast Archeological Center for a testing and evaluation project to determine the “age, formation, and cultural affiliation” of the Legare Anchorage wreck.

Spring 1983 A trial is held in Miami, Florida, United States District Judge C. Clyde Atkins presiding.

May-June 1983 George Fischer of the Southeast Archeological Center serves as the principal investigator for the testing and evaluation of the Legare Anchorage wreck. Russell Skowronek of the Southeast Archeological Center is the field director.

May 04, 1983 Rebecca Donnellan asks the United States District Court to modify its restraining order of July 07, 1981, for archaeological testing and evaluation of the site.

May 13, 1983 Judge Atkins orders that the United States may conduct “salvage” on the Legare Anchorage wreck.

July 28th, 1983 Gerald Klein vs. HMS Fowey seeking an alternative a full & liberal salvage award. Judge Atkins submits his opinion on the ownership of the Legare Anchorage wreck. In the Findings of Fact and Conclusions of Law he rejects Gerald Klein’s claim and finds that the wreck is the property of the United States. He notes that the wreck is embedded in the seabed within the confines of Biscayne National Park and that Klein did not apply for a permit for exploration as laid out in the Antiquities Act of 1906. He also rejects the claim for a liberal salvage award. Atkins is reported to have said: “Unfortunately, the plaintiff’s unauthorized disturbance of one of the oldest shipwrecks in the park and his unscientific removal of the artifacts did more to create a marine peril than to prevent one.”

1984 The Report on the findings of the 1983 Southeast Archeological Center project is completed (Skowronek 1984a).

1984 David Brewer and Kenneth Wild of the Southeast Archeological Center visit the site as part of another project.

January 5-8, 1984 A symposium titled “Investigation of the Legare Anchorage Shipwreck Site Biscayne National Park” is held at the Society for Historical Archaeology and Conference on Underwater Archaeology annual meeting in Williamsburg, Virginia. George Fischer chairs the session, with paper delivered by Fischer, Rebecca Donnellan (in absentia), Richard Johnson, Russell Skowronek, Richard Vernon, and Kenneth Wild.
Aug 1, 1984  An Appeal of the findings of Judge Atkins findings is argued in United States Court of Appeals, Eleventh Circuit.

1985  An article on the wreck by Russell Skowronek appears in Archaeology Magazine.

April 29, 1985  The United States Court of Appeals, Eleventh Circuit, affirms the United States District Court decision in favor of the United States.


1987  
- An article on the wreck by Skowronek, Johnson, Vernon, and Fischer is published in the International Journal of Nautical Archaeology.
- The National Park Service established the National Maritime Initiative.

1988  The Abandoned Shipwreck Act (ASA) of 1987 (Public Law 100-298, 102 Stat. 432) was passed into law.

1988  Dr. Roger Smith, Florida state underwater archaeologist, visits the site.

1988  The proceedings of the 1984 conference are published, with articles by Donnellan, Fischer, Johnson, Skowronek, Vernon, and Wild.

April 28th, 1988  President Ronald Reagan signs the Abandoned Shipwreck Act of 1984 (Public Law 100-298) into law. House Report 100-514 (Parts I and II) notes that an affirmative act of abandonment is required of a sovereign to abandon sunken warships and that passage of time or lack of positive assertions of right is insufficient to establish such abandonment.

December 04, 1990  The National Park Service issues the final Abandoned Shipwreck Act Guidelines (available through http://www.nps.gov/history/archeology/sites/subcul.htm) to assist state and federal agencies in carrying out their responsibilities under the act, including guidance concerning historic shipwrecks entitled to sovereign immunity, which are not subject to the act.

1992  The Legare Anchorage wreck is cited in Craft, CV 92 1769 (1992). “In Klein, the Eleventh Circuit found that when the federal government creates a national park in navigable waters, possession of resources beneath those waters vests in the United States. Klein, 758 F.2d at 1514. Although that case involved a designation of a national park, the analysis is the same. In passing the [National Marine Sanctuary Act: NMSA] Congress asserted its possession in the [sanctuary]. As the Ninth Circuit has explained, under admiralty law principles, someone in possession may refuse services of would be salvors like the plaintiffs.” Craft, 34 F.2d 918 (9th Cir. 1994).

August 24, 1992  Hurricane Andrew strikes Florida. Destroying six of the remaining thirteen houses in Stiltsville (Cantillo et al., 2000: 11).

September 20, 1992  David Brewer (SEAC) and Larry Murphy (Submerged Cultural Resources Unit) assess the site for storm damage.

1993  The Submerged Cultural Resources Unit, with support from the University of Maryland and the Maritime Archaeological and Historical Society, conducts a project on the Legare Anchorage wreck.

1995  The Fowey site Stabilization Seminar is held at the Sheraton Key Report in Key Largo, Florida.

Jan 1, 1996  John Seidel and Larry Murphy deliver a paper on the 1993 project and the 1995 conference at the Society for Historical Archaeology and Conference on Underwater Archaeology Annual meeting in Cincinnati, Ohio.

Dec 1, 1996  Eric Adams publishes an article on the 1993 project in Naval History.
1997 Fischer and Skowronek write *Naval History* about the Adams article. Mention of the 1993 projects is made in James Delgado’s *British Museum Encyclopedia of Underwater and Maritime Archaeology*.


1999 Stiltsville is scheduled to be removed (Cantillo et al., 2000: 11; Morgan, 1999).

July 21st, 2000 The U.S. Court of Appeals, Fourth Circuit, upholds the Kingdom of Spain’s rights as owner of its sunken navy frigates *Juno* and *La Galga* to prevent unauthorized disturbance or commercial salvage and orders the salvor to return to Spain’s possession all artifacts it has removed from the sites.

Sep 9, 2000 Major Denis Trelewicz requests under the Freedom of Information Act documentation pertaining to the Legare Anchorage shipwreck.

Nov 8, 2000 The British naval attaché to the British Embassy in Washington, D.C., responds to an inquiry from Denis Trelewicz saying that the United Kingdom has not waived any rights to HMS *Fowey* and that the United States Department of State is in discussion with the United Kingdom to gain permission to take steps to preserve HMS *Fowey*, which has begun to erode and deteriorate since the passage of Hurricane Andrew.

Jan 19, 2001 President William J. Clinton issues a *Presidential Statement on United States Policy for the Protection of Sunken State Craft*, which includes sunken government vessels, aircraft, and spacecraft (state craft) of the United States and foreign nations (Weekly Compilation of Presidential Documents, vol. 37, no. 3, pp. 195-196, available through [http://www.access.gpo.gov/nara/nara003.html](http://www.access.gpo.gov/nara/nara003.html)). The statement reaffirm that title to sunken statecraft is retained by a sovereign indefinitely unless title has been abandoned or transferred in accordance with the law of the sovereign and that such titles is not extinguished wherever located, by passage of time, regardless of when the sunken state craft was lost at sea.

Feb 2, 2001 The Ministry of Defense for the United Kingdom notes that the United Kingdom retains sovereign rights and continuing ownership of its warship in accordance with the International Salvage Convention.

2002 An entry on HMS *Fowey* written by Skowronek appears in the *Encyclopedia of Historical Archaeology*.

Jul 4, 2003 The Foreign and Commonwealth Office of the United Kingdom reaffirms to the United States Department of State its policies concerning ownership of sunken state vessels and aircraft, that such ownership rights are not lost by the passage of time, and that no action may be taken in relation to the United Kingdom’s sovereign immune state vessels or aircraft without the express consent of the United Kingdom.

Feb 2, 2004 Book contract is finalized between Skowronek and Fischer and the University Press of Florida for HMS *Fowey Lost and Found*.

Feb 5, 2004 The United State Department of State issues Public Notice 4614 on *Protection of Sunken Warships, Military Aircraft and Other Sunken Government Property* (Federal Register vol. 69, no. 24, pp. 5647-5648, available through [http://www.gpoaccess.gov/fr/index.html](http://www.gpoaccess.gov/fr/index.html)). The notice provides information concerning the policies of France, Germany, Japan, the Russian Federation, Spain, the United Kingdom, and the United States and includes contacts in the respective government offices for each nation as well as a contact for and other nation not listed above.
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
</tr>
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<tbody>
<tr>
<td>Oct 28, 2004</td>
<td>President George W. Bush signs the Sunken Military Craft Act, which is part of the Ronald W. Reagan National Defense Authorization Act for Fiscal Year 2005 (Public Law 108-375, Division A, Title XIV). It affirms that the right, title, and interest of the United States in and to any United States sunken military craft is not extinguished by the passage of time, regardless of when the sunken military craft sank.</td>
</tr>
<tr>
<td>Jan 1, 2007</td>
<td>The National Park Service publishes <em>Science, Politics and the “Big Dig”: A History of the Southeast Archeological Center</em> by Cameron Binkley. It is distributed the following July.</td>
</tr>
<tr>
<td>Jul 31, 2007</td>
<td>Following anonymous review, HMS <em>Fowey Lost and Found</em> is accepted for publication by the University Press of Florida.</td>
</tr>
<tr>
<td>Oct 11, 2012</td>
<td>Tropical wave leaves the west coast of Africa and would develop into Hurricane Sandy by the 22nd of October.</td>
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<tr>
<td>October 22-29, 2012</td>
<td>Hurricane Sandy (AL182012)</td>
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<tr>
<td>July 15 – August 06, 2013</td>
<td>Hurricane Sandy Disaster Relief Fund gives $0.4 million to Biscayne National Park for Perform Site Assessment and Recover Artifacts at Storm Impacted “HMS Fowey” Shipwreck project (Project Number FL – 195882).</td>
</tr>
</tbody>
</table>
APPENDIX 1B
A Glossary of Terms

Abandoned Shipwreck Act (ASA 1987) (Public Law 100-298, signed into law April 28th, 1988; 43 U.S.C. §§ 2101-2106 [1994]) Vests title to certain abandoned shipwrecks in state submerged lands to the federal government which, with certain exceptions, immediately transfers ownership to the state whose submerged lands contain the shipwreck. States are encouraged to develop policies to allow for public and private sector recovery of shipwrecks consistent with the protection of historical values and environmental integrity and with guidelines issues by the Secretary of the Interior.

Abiotic Process  A chemical or physical change in the natural world that occurs independently of biological agents.

Absolute dating  the determination of age with reference to a specific timescale (e.g. dendrochronology and radiocarbon dating).

Accuracy  the precision and reliability of a measurement.

Acoustic imaging  The propagation of sound waves and analysis of their reflections to create an image.

Acoustic Pulse  A short burst of sound energy.

Acoustic shadow  An area of sonar record showing no return energy due to the relief of the target impending the path of the acoustic signal.

Acquisition  the act or process of acquiring fee title or interest other than fee title of real property (including acquisition of development rights or remainder interest).

Aerobic  An environmental condition where air, either in its native form or as a dissolved gasses, is present.

Adjudicate  To settle a legal controversy by the exercise of judicial authority.

Administrative Agency  A governmental body charged with administering and implementing particular legislation.

Administrative Procedure  Methods and processes of administrative agencies regarding the resolution of a controversy, as distinguished from judicial procedure, which applies to courts.

Administrative Procedure Act (APA)  (5 USC § 500 et seq.) A federal act that sets forth the procedures that agencies must follow in adopting regulations and making administrative decisions.

Affirm  In the practice of appellate courts, to declare that a judgment, decree, or order is valid and right and must stand as rendered.

Airlift  tool used for underwater excavation, driven by compressed air so as to create suction at the head of the tool.

Amendment  An alteration by modification, deletion, or addition. The correction of an error committed in any process, pleading, or proceeding at law, or in equity, which is done either as a
matter of course or by the consent of parties or upon motion to the court in which the proceeding is pending.

**Amidship** The middle part of a ship, between the bow and stern.

**Anaerobic** An environmental condition where air, either in its native form or as a dissolved gasses, is absent.

**Anoxic** An environmental condition where oxygen, either in its native form or as a dissolved gas, is absent.

**Anthropogenic** Caused, produced, or influenced by human activity.

**Anthropology** the scientific study of humanity, its origin, its physical characteristics and its culture. It can generally be broken down into three sub-disciplines: biological (physical); cultural (social) and archaeological.

**Antiquities Act of 1906 (P.L. 59-209)(16 U.S.C. §§431-433)** Authorizes a permit system for investigation of archaeological sites on federal lands and allows the President to establish national monuments on federal lands in order to protect them.

**Appeal** A request that a superior (e.g., appellate) court or another authority review a decision by a lower court or administrative tribunal.

**Appellant** The party who takes an appeal from one court or jurisdiction to another; the one who appeals a court decision.

**Appellate Court** A court having authority to review and decide a case appeal.

**Appellee** The party against whom an appeal is taken, or the party who has an interest adverse to setting aside or recovering a prior judgment.

**Archaeology** The study of human culture and history through the examination of material culture and its context.

**Archaeological Record** set of data collected by archaeological, which will preserve information about sites after they have been destroyed by excavation.

**Archaeological Recovery Act** See Historical and Archaeological Data Preservation Act

**Archaeological Resource** any material remains or physical evidence of past human life or activities which are of archaeological interest, including the record of the effects of human activities on the environment. An archaeological resource is capable of revealing scientific or humanistic information through archaeological research.

**Archaeological Resources Protection Act of 1979 (ARPA) (P.L. 96-95, 16 U.S.C. §§470aa-470mm [1994])** Regulates the taking of archaeological resources on federal lands, contains a permit system for excavating or removing archaeological resources and prohibitions on the sale, purchase, transport, or entry into interstate commerce of items taken in violation of the Act. Penalties include fines and imprisonment.

**Archaeological Resources Protection Act Amendments (P.L. 100-555, 100-588)** 100-555 amends ARPA by requiring federal agencies to develop plans for surveying lands not scheduled for projects and develop and implement a uniform system for reporting and recording archaeological violations. 100-588 amends the Act by lowering the felony threshold to $500.00 USD.
**Artifact.** Any portable object used, modified, or made by humans; e.g. stone tools, pottery, and metal weapons.

**Assemblage.** A group of artifacts found in association with one another, that is, in the same context, often representing a limited time period or a discrete human activity.

**Attenuation** A reduction of amplitude of an electrical or acoustic signal.


**Backfill** The process of filling in an excavated archaeological site with sediment in order to protect it from further degradation.

**Bandwidth** In acoustics, the range of frequencies of a propagating acoustic signal. In network communications, the rate at which data can be transferred over a computer network.

**Bathymetry** A measurement of the depth within bodies of water, or a series of measurements to make, for example, a nautical chart or a map of seafloor topography.

**BCE** Before the Common Era. Refers to the number of years prior to the start of the Common Era.

**Benthic** Relating to, or living in or on the bottom of a body of water.

**Biodeterioration** Degeneration and disintegration due to biological processes.

**Biological Accretions** Any solid material that has been chemically precipitated or otherwise developed on a surface as a by-product of biological activity or growth.

**Before Present (BP)** Refers to the number of years before present day, either in calendar years or radiocarbon years.

**Calcium Carbonate** A soluble chemical compound, CaCO3, which occurs naturally in solid form in the minerals calcite and aragonite, as well as in bone and shell material. It is commonly found dissolved in natural bodies of water.

**Commerce Clause** A section of the Constitution that allows regulation of commerce between the states.

**Common Era (CE)** The Common Era. Refers to the number of years following the start of the Common Era.

**Common Law** A body of case law based on generally accepted legal principles adopted from England and modified over the years.

**Comprehensive Historic Preservation Planning** The organization into a logical sequence of preservation information pertaining to identification, evaluation, registration and treatment of historic properties, and setting priorities for accomplishing preservation activities.

**Computer Assisted Drafting (CAD)** A set of computer programs designed to assist in the process of drafting. It is normally used for architectural purposes but can also be sued for drafting maps and as an input to GIS.

**Concretions** In underwater archaeology, a type of corroded metal artifact encased in a surrounding shell of dense corrosion products. During the corrosion process, some or all the original metal is dissolved leaving an internal cavity that takes the form of the original artifact.
**Continental Margin** The region that separates the continental landmass from the deep ocean floor and consists of the continental shelf, slope, and rise.

**Continental Shelf** The part of the ocean floor that is characterized by a very gentle slope and lies between the shoreline and the beginning of the continental slope, which represents the steeper portion of the continental margin.

**Conserve** to protect from loss or harm; preserve. Historically, the terms conserve, protect, and preserve have come collectively to embody the fundamental purpose of the National Park Service – preserving, protecting, and conserving the national park system.

**Corrosion** The breakdown or alteration of a material, especially a metallic substance, through chemical or biochemical reactions with its environment.

**Cultural Landscape** a geographic area, including both cultural and natural resources and the wildlife or domestic animals therein, associated with a historic event, activity, or person, or exhibiting other cultural or esthetic values. There are four non-mutually exclusive types of cultural landscapes: historic designed landscapes, historical vernacular landscapes, and ethnographic landscapes.

**Cultural Resource** The physical products associated with art and manufacturing and the intangible aspects of culture such as folklore and dance. (see also heritage resource).

**Cultural Resources Management (CRM)** The practice of managing, maintaining and studying cultural sites, artifacts, and traditions. The safeguarding of the archaeological heritage through the protection of sites and through salvage archaeology (rescue archaeology), generally within the framework of legislation designed to safeguard the past.

**Database** A collection of many files collectively associated with a single general category.

**Datum** A reliable starting point from which accurate measurements of the earth’s size can be made.

**Defendant** A party against whom a legal action is brought.

**Dendrochronology** The study of growth rings in trees for the purpose of analyzing the past climate conditions and used in archaeology for the dating of wooden artifacts and the structures they comprise.

**Deposition** The constructive process of accumulation of any kind of loose rock material by any natural agent, such as the mechanical settling of sediment from suspension in water, the chemical precipitation of mineral matter by evaporation from solution, or the accumulation of organic material following the death of plants and animals.

**Desalination** The removal of soluble salts from a porous artifact through a process of soaking in changes of fresh or distilled water.

**Digital Elevation Models (DEM)** Digital model of landform data represented as point elevation values. Also called digital terrain models (DTM).

**Dissent** The explicit disagreement of one or more judges of a court with the decision passed by the majority upon a case before them. In such even the nonconcurring judge is “dissenting.” A dissent may or may not be accompanied by reasons for such dissent.

**Echosounder** An acoustic instrument that measures the depth of water below a ship.

**Environmental Assessment (EA)** The beginning of the process found in the National Environmental Policy Act (NEPA) to determine the impact of certain proposed federal actions.
Environmental Impact Statement (EIS) A detailed analysis of the environmental impact of a proposed federal action. Follows the environmental assessment (EA) as part of the NEPA process.

Electric resistivity A measure of how strongly a material opposed the flow of electric current. The measurement of this property can be used in archaeological surveys to identify features buried beneath the surface because electricity flows differently through archaeological materials and the surrounding sediment matrix.

Electrolysis A standard cleaning process in archaeological conservation. Artifacts are placed in a chemical solution, and by passing a weak current between them and a surrounding metal grill, the corrosive salts move from the cathode (object) to the anode (grill), removing any accumulated deposit and leaving the artifact clean.

Excavation In archaeology, the systematic documentation and removal of sediment or soil to expose artifacts and features from an archaeological site in order to analyze past human behavior.

Freedom of Information Act (FOIA) (5 USC sec. 552, et seq.) A federal act giving the public access to records kept by governmental agencies.

Geographic Information Systems (GIS) A computer system for capturing, storing, integrating, managing, and displaying data that are spatially referenced to the earth. This tool allows individuals to analyze the spatial information, edit data and maps, and create georeferenced data products.

Geotextile A large woven or non-woven fabric engineered to be applied in or on soils or sediments to achieve specific goals such as sediment isolation, consolidation, or the prevention of erosion.

Geographic Positioning System (GPS) A system of multiple satellites used to determine absolute positions on the earth's surface (latitude and longitude). A GPS receiver uses radio time signals sent from the satellite to calculate and record the positions. A differential GPS (DGPS) compares a fixed reference to the calculated position to correct and improve the reported position.

Ground-penetrating radar (GPR) An electronic device that emits electromagnetic pulses towards a surface and records the pattern of reflections from the subsurface features. GPR has many applications but is most commonly used to identify either manmade or geologic features buried beneath the surface of the earth.

Heave The vertical motion of a vessel on water, generally due to wave action.

Historic Context a unit created for planning purposes that groups information about historic properties based on a shared theme, specific time period and geographic area.

Historic Property a district site, building, structure or object significant in American history, architecture, engineering, archaeology or culture at the national, state, or local level.

Holocene The geological time period spanning from about 11,000 years ago to the present time. It is characterized by the rise in human civilization and is the last epoch in the Neogene period of the Cenozoic Era.

Homo erectus An extinct species of humans who migrated out of Africa around 2 million years ago and colonized most of Eurasia.
**Homo sapiens** The scientific name for anatomically modern humans. It is widely believed that Homo sapiens first appeared in Africa around 200,000 BP, migrated into Eurasia and Oceania by 40,000 BP and the Americas around 10,000 BP.

**Inclusion** Any foreign material in a larger matrix. In archaeological ceramic materials, inclusion are often in the form of minerals or organic matter in a clay matrix.

**Injunction** A court order to do (or refrain from doing) a specific act.

**In Situ** Situated in the original place of deposition or discovery; in context.

**Integrity** the authenticity of a property’s historic identity, evidenced by the survival of physical characteristics that existed during the property’s historic or prehistoric period.

**Intensive Survey** a systematic, detailed examination of an area designed to gather information about historic properties sufficient to evaluative them against predetermined criteria of significance within specific historic context.

**Intrusive techniques** Archaeological methods that disturb the surface features of a site. Any act which involved disrupting the stratigraphy, moving artifacts, or altering the original context.

**Inundation** The process of becoming covered with water; submergence.

**Insonified** When an object or area of the seafloor is scanned by a sonar system.

**Inventory** a list of historic properties determined to meet specified criteria of significance.

**Karst terrain** A region characterized by the dissolution of bedrock, usually a carbonate such as limestone or dolomite, to produce erosional features such as sinkholes, underground streams and caverns.

**Historical and Archaeological Data Preservation Act** of 1974 (also known as “Moss-Bennett Act” or “Archaeological Recovery Act”) (P.L. 86-523, 16 U.S.C. §§469-469c [1994]) Requires federal agencies to provide notice to the Secretary of the Interior of any dam construction and, if archaeological resources are found, for recovery or salvage of them.

**Historic Context** a unit created for planning purposes that groups information about historic properties based on a shared theme, specific time periods and geographic area.


**Injunction** a probative, equitable remedy issued or granted by a court directed to a defendant in an action, forbidding that defendant to do some act that he or she is threatening or attempting to commit because such act is unjust or injurious to the plaintiff and cannot be readdressed by an action at law.

**Layback** Horizontal distance from the ship to a towed vehicle, usually calculated for the known length of the cable deployed and the depth of the towed vehicle.

**Law of Finds** The law of Finds is based on the principle of “finders, keepers’. if ownership has been abandoned, finders are entitled to become owner once they have taken the property into possession. The state most often associated with the law of the finds is the United States, where it has been used as an alternative to salvage law. This is particularly important in the case of historic shipwrecks where ownership is difficult to determine.

**Lithic** Stone, or made from stone.
**Magnetometer**  An instrument that measure the magnitude and direction of a magnetic field, usually the earth's magnetic field. In archaeological survey, a magnetometer can detect variations in the field caused by man-made objects.

**Marine transgression**  A rise in sea level that inundates the land and causes the shoreline to move to higher elevations on the terrestrial landscape.

**Mass Wasting**  The process of movement of material down slope due to gravity.

**Matrix**  In archaeology, the physical environment surrounding an artifact, i.e. the sediment in which it is embedded. The matrix and its components are studied to better understand the age and alteration of original artifacts and archaeological features.

**Mineralization**  In archaeology, a process of alteration or corrosion, in which a metal or organic object is converted to a mineral substance by reaction with its environment.

**Mitigation**  Alleviation, reduction, abatement, or diminution of a penalty or punishment imposed by law.

**Multibeam sonar**  A sonar system that emits multiple simultaneous sound pulses and measures the timing of their reflections to determine distance to a number of points. Normally, it is configured in a fan-shaped pattern perpendicular to the direction of travel of the sensor and produces a detailed bathymetric profile of a swath of seafloor.

**Multiplex**  The process of combining input signals from multiple sources onto a single communications path.

**National American Graves and Repatriation Act (NAGPRA) (P.L. 101-602; 25 U.S.C. §§3000-3013 [1994])**  Signed into Law November 16th, 1990. Requires federal agencies and museums to inventory human remains associated funerary objects and to provide culturally affiliated tribes with the inventory of the collections; requires reparation, or request, to the culturally affiliated tribes; makes the sale or purchase of Native American human remains, whether or not they derive from federal or Indian lands, illegal.


**National Marine Sanctuaries**  Diverse marine protected areas (marine ecosystems) in the United States, administered by the Sanctuaries and Reserves Division of the National Oceanic and Atmospheric Administration (NOAA), United States Department of Commerce. NOAA serves to conserve, safeguard, and enhance the biodiversity, ecological integrity, and cultural legacy of these areas.

**National Park System**  The National Park System, administered by the National Park Service, includes a number of national parks in coastal or ocean areas, including in Florida, Alaska, Maine, Michigan, California, U.S. Virgin Islands, and American Samoa. Other ocean and coastal elements of the system include national seashores (ten national seashores on the Atlantic, Gulf and Pacific Coast), national lakeshores (four, all on the Great Lakes), and a number of national monuments (landmarks, structures, and other items of historic or scientific interest situated on federal lands). Web: [http://www.nps.gov](http://www.nps.gov).

**National Register Criteria**  The established criteria for evaluating the eligibility of properties for inclusion in the National Register of Historic Places.
**National Register of Historic Places**  Created by The National Preservation Act (NHPA) to serve as the nation's inventory of historic properties. The Secretary of the Interior, acting through the National Park Service, maintains the National Register. The Register lists buildings, sites, districts, structures, and objects, which are deemed significant in American history, architecture, archaeology, engineering and culture.

**Navigable**  The term used in the definition of waters of the United States to mean "deep and wide enough to afford passage for ships."

**Oceanography**  The exploration and scientific study of oceans, the life that inhabits them, and their physical characteristics.

**Paleshoreline**  A relic surface associated with the shore of an ancient body of water.

**Parrel**  A mechanism for fastening the yard of a sailing ship to the mast, ranging from a simple rope to a system of beads and ribs that facilitate raising and lowering the sail.

**Pelagic**  Relating to, or living in or on the open ocean.

**Photogrammetry**  A measurement technology in which the three-dimensional coordinates of points on an object are determined by measurements made in two or more photographic images taken from different positions.

**Photomosaic**  A set of photographs that overlap and are stripped together to produce a composite image of a large region or feature that cannot be imaged by a single photograph.

**Plaintiff**  The party bringing a litigation action.

**Pleistocene**  The geologic time period spanning between about 1,806 years ago and the beginning of the Holocene Epoch about 11,000 years ago. The third epoch of the Neogene period, it is characterized by repeated glaciation and its end correlates to the end of the Paleolithic archaeological time period.

**Preservation**  The act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property. Work, including preliminary measures to protect and stabilize the property, generally focuses upon the ongoing maintenance and repair of historic materials and features rather than extensive replacement and new construction. New exterior additions are not within the scope of this treatment; however, the limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a preservation project.

**Property Type**  A grouping of individual properties based on a set of shared physical or associative characteristics.

**Provenance**  In general, the original source location of an artifact or feature of archaeological significance. Specifically, the three-dimensional location of an artifact or feature within an archaeological site, measured by two horizontal dimensions, and a vertical elevation.

**Pseudomorph**  In archaeology, the preserved form of a perishable organic substance resulting from the slow mineralization of the original.

**Quaternary**  The geologic time period that represents the most recent period if repeated glaciations to the present. It includes the Pleistocene and Holocene epochs.

**Radiocarbon Dating**  A method that uses the ratio of the naturally occurring radioactive isotope carbon-14 to the stable isotope carbon-12 and the rate of decay of carbon-14 to determine the age of organic material.
Remotely Operated Vehicle (ROV)  A tethered, unoccupied, highly maneuverable underwater robot operated by a person aboard a surfaced vessel.

Research Design  a statement of proposed identification, documentation, investigation, or other treatment of a historic property that identifies the project’s goal, methods and techniques, expected results, and the relationship of the expected results to other proposed activities or treatments.

Restoration  the act or process of accurately depicting the form, features, and character of a property as it appeared at a particular period of time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period. The limited and sensitive upgrading of mechanical, electrical, and plumbing systems and other code-required work to make properties functional is appropriate within a restoration project.

Sample Survey  a survey of a representative sample of lands within a given area in order to generate or test predictions about the types and distributions of historic properties in the entire area.

Section 106  Section 106 of the National Historic Preservation Act sets forth the legal protection and requires that a federal agency proposing to carry out, assist or license an undertaking that affects a listed or eligible-for-listing property take into account the effects of the undertaking. The rules for the Section 106 process can be found under 36 C.F.R. Part 800.

Sector-scanning sonar  A sonar system in which the acoustic path is sequentially moved around the arc of a circle, or a part of a circle.

Sedimentation  The deposition or accumulation of solid fragmented material, such as silt, sand, gravel, chemical precipitates, and fossil fragments, that is transported and deposited by water, ice, or wind, or that accumulated through chemical precipitation or secretion by organisms, and that forms layers on the earth’s surfaces.

Sedimentology  The study of modern depositional processes of sediments and the understanding of these processes applied to the formation of sedimentary rocks.

Seismic stratigraphic profiling  The use of sounds waves to determine the internal structure of sedimentary deposits.

Side Scan mosaic  A georeferenced composite image that merges multiple side-scan images.

Side Scan Sonar  A sonar system that emits sound pulses, aimed to hit the seafloor at a shallow angle, and records the timing and amplitude of their reflections patterns to create an image of the sea floor. Side-scan sonar emits fan-shaped pulses out to the side, perpendicular to the direction of travel of the sensor, to produce a swath of coverage with a fixed width depending on the signal frequency.

Site formation Process  The cultural and natural events that form and transform archaeological material and its matrix over time to produce an archaeological site.

Slant Range  The slanting distance between two points (e.g., a sonar and a target) at different depths.

Snow  the largest type of two-masted sailing vessel to carry square sails on both masts. Immediately behind the mainmast was a trysail mast used for setting fore-and-aft trysails.

Sonar  An acoustic system for making measurements or detecting objects under water (see also Multibeam sonar, Sector-scanning sonar, Side-scan sonar).

Statue  A rule of general applicability passed by the legislative branch of the government.
**Stratigraphy**  In geology, the classification, analysis and correlation of layers, or strata, in sedimentary rocks. In archaeology, the sequence of layered sediments and cultural deposits in an archaeological site that it used to determine relative ages of artifacts and to identify context within the site.

**Subbottom Profiler**  A sensor that emits a sound pulse towards the seafloor and records the reflections to identify and characterize the layers of sediment or rock under the seafloor. The sound pulse emitted by the subbottom profiler penetrates the seafloor and is reflected off different layers in the substrate to provide information on what is below the surface.

**Submersible**  An underwater vehicle that must rely on human pilots who either occupy the vehicle or control the vehicle remotely from a support ship.

**Thermocline**  A layer within a body of water (or air) in which the temperature gradient changes rapidly with depth (or altitude).

**Topography**  The detailed surface and relief features of a region, determined by elevation measurements.

**Towfish**  A piece of equipment, that is usually hydrodynamically streamlines and is towed under water behind a vessel.

**Trial**  The forum in which a lawsuit is adjudicated.

**Transducer**  A device that converts electrical energy into sound waves.

**Uranium-series analysis**  The measurement of the radioactive decay of Uranium, which is commonly used to determine the age of carbonate materials.

**Vibracorer**  A long hollow cylindrical coring device that inserts a tube into sediment to retrieve a sample. The cylinder is vibrated to loosen the sediments and ease its insertion into the solid surface.

**Waters of the United States**  All waters in which the United States has an interest, including navigable waters in the United States, interstate waters and their tributaries, and waters that may be used in commerce.

**X-radiography**  Production of an image on a radiosensitive surface by x-radiation.
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