REPORT ON THE SHIPWRECK AND BIOLOGICAL SURVEY CONDUCTED ON THE COAST OF FLEMMING KEY MARCH 10-12 2001

Research Reports # 12

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INTRODUCTION AND PROJECT DESIGN

The 2001 research and survey of the shipwreck on Flemming Key, Florida was the third project conducted on this site, the others were conducted in 1998 and 2000. All of the projects were conducted through the Florida State University (FSU), Department of Anthropology's Program in Underwater Archaeology (PUA) and Academic Diving Program (ADP). The 2001 research took place from March 10-12, 2001 as part of ANT 4131 class, *Techniques of Underwater Site Research*, taught by Dr. Michael Faught. A crew of two graduate teaching assistants and eight students were utilized to conduct archaeological and biological research on and around the shipwreck. The project was based off of the Research Vessel *Bellows*, and supported by a research grant for 5 days from the Florida Institute of Oceanography.

The research project is designed to familiarizing students with methodologies used in recording and surveying and provide practical experience working on a shipwreck site. In addition to manual mapping and survey work, a biological survey was conducted on the wreck; limited magnetometer and side scan sonar surveys were also conducted in outlying areas. The ship is located at 24º xx.xxxx N, 81º xx.xxxx W and is designated as Florida Keys National Marine Sanctuary site G3001 (FKNMS G3001). The site is located in shallow waters off the northern gulf side of Key West (Figure 1) allowing most of the research to be conducted with snorkeling necessitating only limited SCUBA dives.

From 10-12 March, a total of 8 teams conducted 5 dives, including two dives dedicated solely to the biological survey lead by Zuleyha Gokay. The main purposes of the archaeological and biological surveys were to increase the overall knowledge of the site and determine its candidacy for an underwater preserve. Trips to the site for each dive were conducted in either a small whaler or a zodiac, both of which were provided by the R/V *Bellows*. Trial runs utilizing a Marine Sonics Splashproof Seascan PC with a 600kHz towfish and a Geometrics 881 Cesium magnetometer with depth sensor were conducted on the R/V *Bellows* to familiarize students with their various functions and to test their operational abilities.

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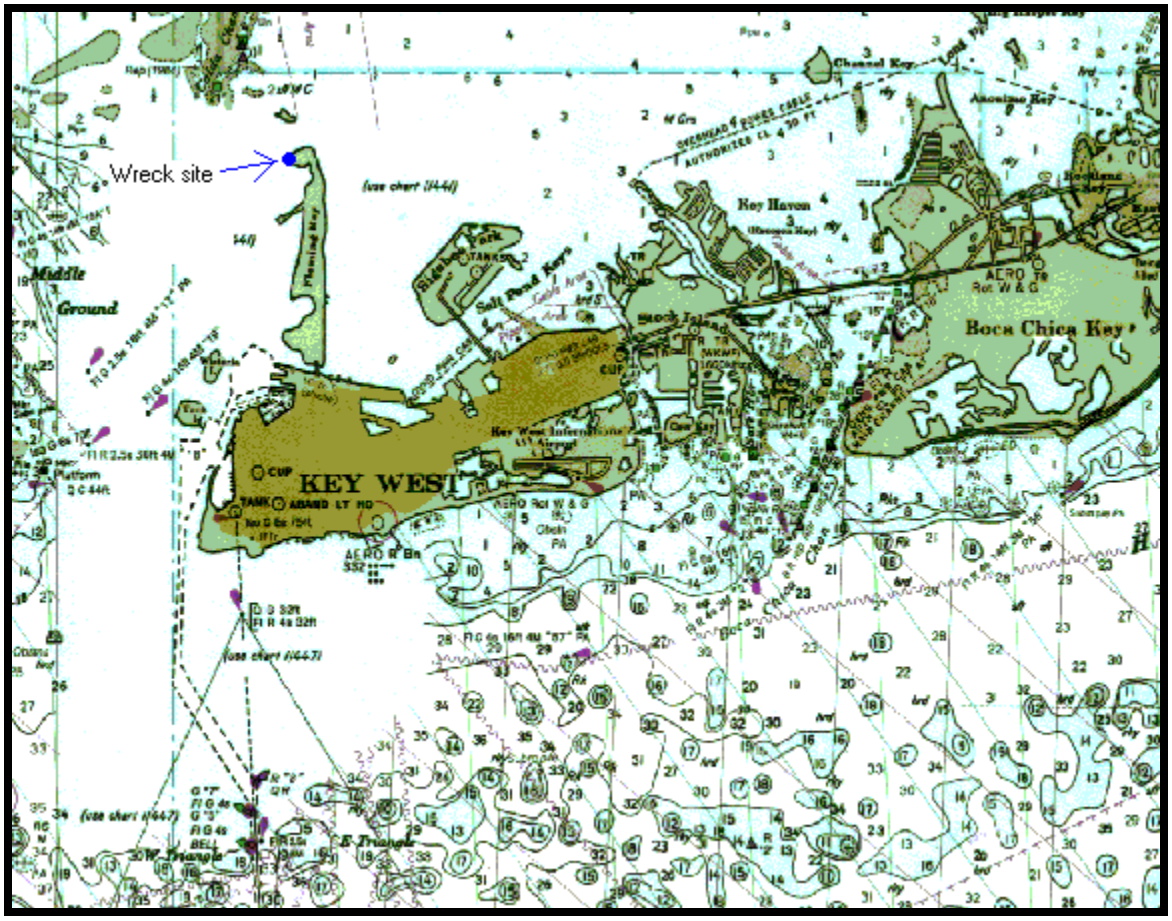

Figure 1: Key West and Flemming Key

DESCRIPTION OF STUDY AREA

The Flemming Key wreck, FKNMS G3001, is located on the west side of the northern tip of Flemming Key, a manmade key constructed from 1941 to 1942 using fill dredged from the surrounding Man of War Harbor area (Figure 3). The key is the property of the Key West Naval Air Station and the wreck lies on base property. Portions of the wreck are exposed from the water and the bottom slopes down to 3 m deep. The wreck slopes downward to the northwest and low tides expose more of the wreck throughout the day.

Global Positioning System coordinates for the shipwreck taken with a Lorance Globalmap100 12 channel receiver, range from 24º xx.xxx' N, 81º xx.xxx' W in the stern to 24º xx.xxx' N, 81º xx.xxx' W in the bow. The wreck is las 320º from the proposed stern to the bow determined by GPS. The steel construction of the ship makes magnetic determination unreliable. Tides in the area range from +1.5ft in the morning to -0.4ft in the afternoon on the dates of the fieldwork according to the NOAA National Ocean Service. The currents are not excessive and often help to clarify the waters and provide good visibility, often up to 10-15 ft.

ISLAND HISTORY

Originally Flemming Key was an uninhabited, low-lying marsh plain (Figure 2). Between 1941 and 1942, the United States Navy dredged sand surrounding Flemming Key, widening and deepening the channel for better access to Key West Naval Air Station. Sand was deposited on Flemming Key, extending the length of the key but also decreasing its width.

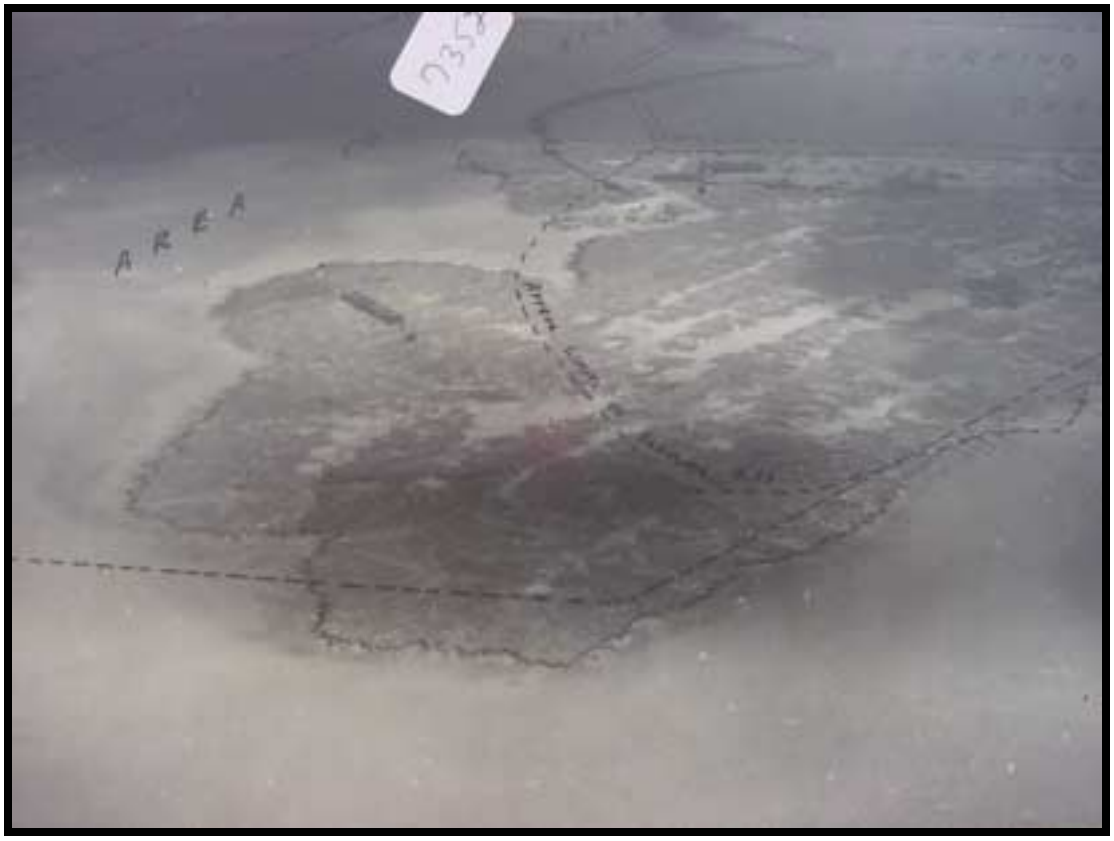

Figure 2: Naval photograph of Flemming Key before dredging 1941.

Old charts list Flemming Key as "*Cayo Canalete*" a name dating from the Spanish colonial period. A "*canalete*" is a single or double canoe paddle made of palm. The key bears this name on the 1770 O'Carrol chart and the DeBrahm chart of 1771. Flemming Key was also referred to as "Mangrove Island" due to large numbers of mangrove trees that grow there. The name of Flemming key is first mentioned on a chart in 1855 in a United States Coast Survey Chart showing it as a tiny island just north of Key West.

Key West's naval history begins in 1823 with the founding of the first naval base on the island as a reaction to piracy in the Caribbean. The United States government sent Commodore David Porter to Key West to establish a military presence and protect the waters of south Florida. In 1824 fortifications were complete and the "Mosquito Fleet" of the West Indies Anti-Piracy Squadron patrolled the keys to deter piracy.

Florida became a state in 1845 and began construction of Fort Zachary Taylor, a massive fort situated at the entrance to Key West Harbor. Instability in Europe in the early 20th century necessitated further fortifications on the island beginning in 1902. Over 100 ships were torpedoed in the Straits of Florida by German submarines during World War II. The United States instituted the Gulf Control Center to combat submarine attacks with blimps, civilian aircraft, increased patrols and minefields. Flemming Key was also enlarged to its present shape by the dredging conducted in 1941 to 1942 to widen the canal into Key West.

Figure 3: Construction of Flemming Key December 1941.

Tom Hambright, an archivist in the Key West library and a former naval officer previously stationed in Key West, was instrumental in attempting to determine when the wreck first appeared on Flemming Key. Hambright also knew many of the local names for the Flemming Key wreck including the "Snook Wreck." At certain times of the year snook can be found on the wreck where they are difficult to find elsewhere. Many people also call it "Little Schooner," although it is unknown if it is a term for a rigging type or simply a name for a common type of ship. Hambright had no recollection of the wreck being mentioned in any newspaper articles, books or documents in the library. He was also sure that the wreck had not appeared on the key until after the construction of the key, which ended in 1942. In pictures from 1941 (Figure 3) and 1942 (Figure 4) the wreck is not evident giving a post date of at least February 14, 1942.

Hambright speculated that a hurricane might have washed the ship ashore where it was deemed unsalvageable and abandoned. Scuttling was also common in the 1950's due to the burgeoning popularity of fiberglass boats for both commercial and private ventures. The Flemming Key wreck may be a victim of these changing times and technology or it could simply be an accident.

Figure 4: Naval photograph of Flemming Key, February 14, 1942.

A large level 3 hurricane hit Key West on September 21, 1948, passing five miles east of Naval Air Station Key West (Figure 5). The location and date of the 1948 hurricane in Key West matches well with what might have caused an accidental grounding. This large hurricane is the best candidate for the cause of the grounding, given the time frame provided by the photographs of the Navy and the Department of Transportation.

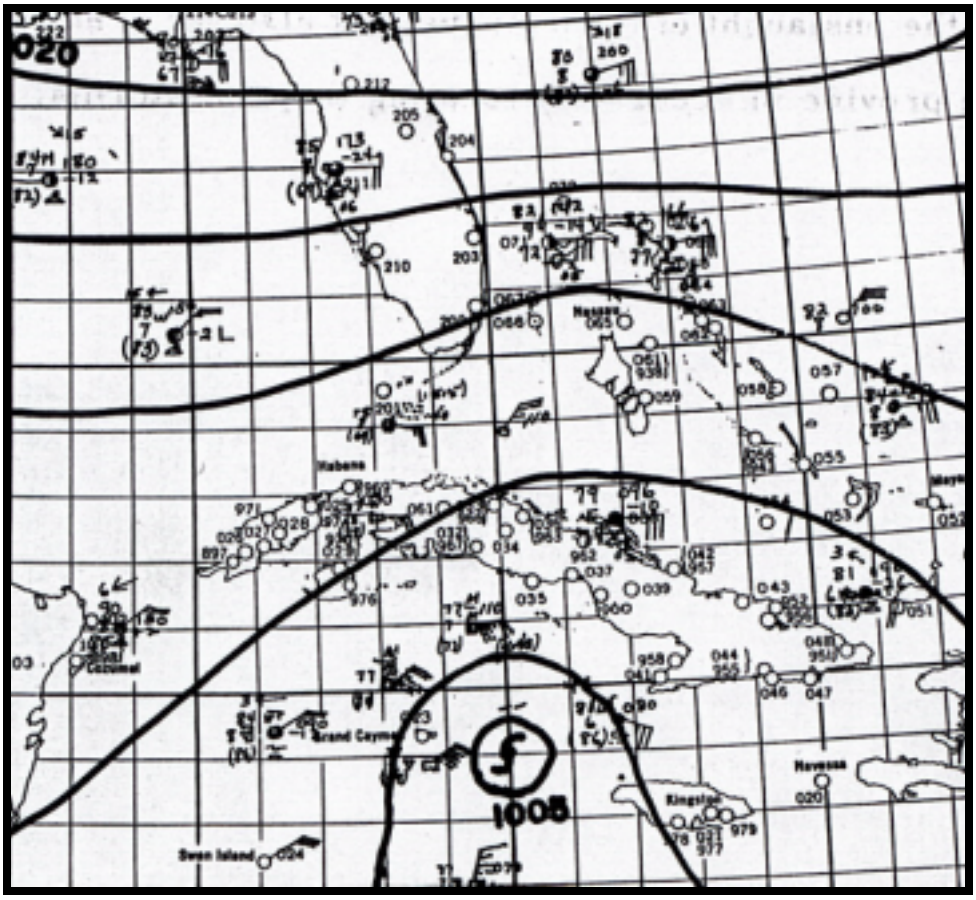

Figure 5: The path of the 1948 hurricane that hit Key West on September 21st.

PHOTOGRAPHIC ANALYSIS

It is clear from the dramatic geomorphologic change of Flemming Key from 1941 to 1942 that no wreck could have survived the dredging activity intact. This high degree of disturbance suggests that the ship must have appeared after completion of the key and February 14, 1942 is the last photograph available of the construction (Figure 4). Although Naval photographs are taken at a high elevation and distance, the Flemming Key wreck is clearly not present in any of the photos of the construction.

Figure 6: Department of Transportation Aerial Photograph, 1959.

Reginald Bradley, Department of Transportation Aerial Survey Division, provided photographs of Flemming Key from 1959, 1963, 1971 and 1998. The earliest photograph provided, February 22nd, 1959, clearly has the wreck lying off of Flemming Key (Figure 6). The wreck was also clearly demonstrating the hull slippage observed indicating that hull degradation had been occurring for some time previous to 1959. This photograph provides the necessary predate for the appearance of the wreck on Flemming Key. The wreck and the associated sediment accumulation can be seen in the close-ups in Figures 7-10. The wreck arrived on the northwest shore of Flemming Key sometime between February 14, 1942, and February 22, 1959 an 18 year range.

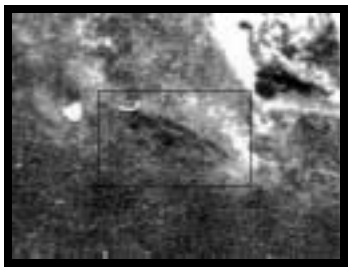

Figure 7: DOT photograph, 1959.

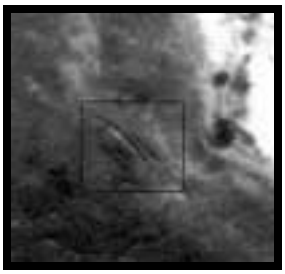

Figure 8: DOT photograph, 1963.

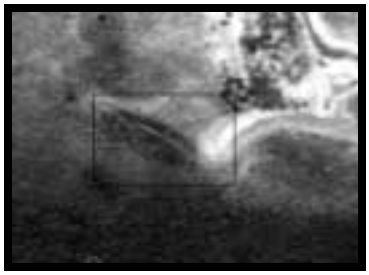

Figure 9: DOT photograph, 1971.

Figure 10: DOT photograph, 1998.

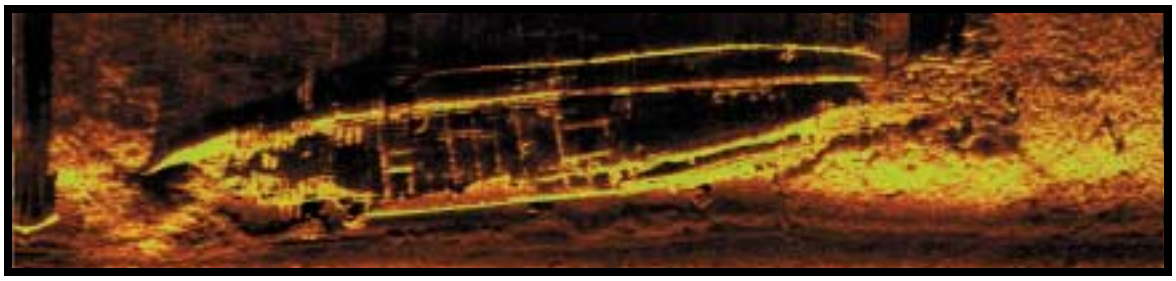

Figure 11: 1998 side scan image of the wreck

RESEARCH DESIGN

Two previous research projects have been conducted on the Flemming Key wreck by FSU, in 1998 and 2000, by the ANT 4131 class. The main purpose of the survey was to try and determine an overall shape and size of the ship as it appears now and how it might have been originally. The function and propulsion of the ship was also examined to better understand the ship before it sank. The age of construction and when/how it came to rest on Flemming Key was something that was attempted to be discovered through historical and documentary sources by Michael Arbuthnot. The biological survey was conducted to determine the marine floral and faunal species that currently inhabit the site and the impact they are have on the ship and its visitors.

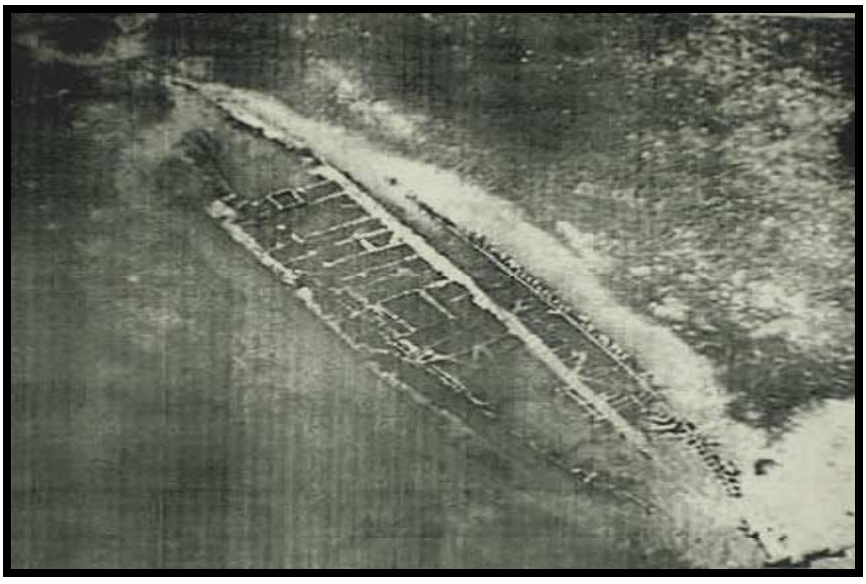

Figure 12: Aerial view of the Flemming Key shipwreck

RESEARCH METHODS

SCUBA operations were conducted on the wreck each day with support by several students on snorkel. Two dives were devoted solely for the biological survey on March 11 and 12. To map and survey the wreck accurately a temporary baseline was laid on each dive with metric measuring tape. This baseline was measured off of to determine the dimensions of the ship and relationships to various features and structures within it. To determine the overall length of the ship and the remaining outline; offsets were taken every 5 meters to a stringer on each side. The length of the wreck above the sediment is 42m 20cm, (138ft 5in), although the complete length remaining beneath the sediment is unknown.

Figure 13: Zuleyha Gokay and Brian Dean taking measurements of the wreck

There are two hatchways visible in the aerial photograph (Figure 12) and in the side scan image from 1998 (Figure 11). These hatchways are 11m 53cm apart and the larger one is located directly behind a circular structure in the middle of the ship, see site map (Figure 18). This large circular structure, which is bent and twisted now, is 56cm in diameter and is possibly a casemate for a mast or smokestack. A conglomeration of long pipe like remains approximately 7 m to the west of the ship and have a diameter of 50cm, these may be the remains of a mast or smoke stack (Figure 14). It is still unknown what it is or if it is even associated with the wreck, but it may be that the structure may have fallen off or been removed and later settled there.

Figure 14: Conglomeration of debris west of the wreck

The middle of the ship was identified by the change in the placement of the frames and the width at amidships was measured at 9m 80cm (32ft 2in). The frames north of this point are "facing" one way and then at amidships an aberrant frame occurs (possibly the main frame), then all "face" the opposite direction for the rest of the ship (Figure 16). This is the clearest evidence observed to determine the middle of the ship given that both ends are disarticulated. The bow probably faced north since structures that appear to be haws holes are still present in some of the remaining deck structure. The placement of the hatchways also seems to be in a typical pattern with the larger one around amidships (Figure 18).

Figure 15: The frames underwater

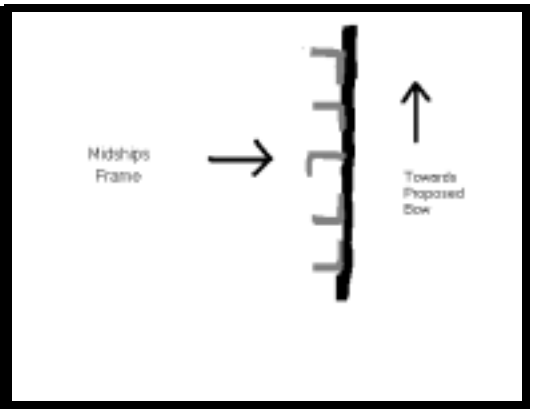

Figure 16: The placement of frames midships

No excavations were conducted to find the keel or any other structure below the sediment. The original length of the wreck could not be determined because much of the wreck is buried in the sediment. Two GPS readings were taken by a swimmer over each end of the wreck using a Lorance Globalmap100 12 channel receiver and plotted in to an ARCVIEW map (Figure 17). The measurements from the GPS do not correspond to the overall length determined by direct measurements of the wreck because of inherent inaccuracies of the GPS system.

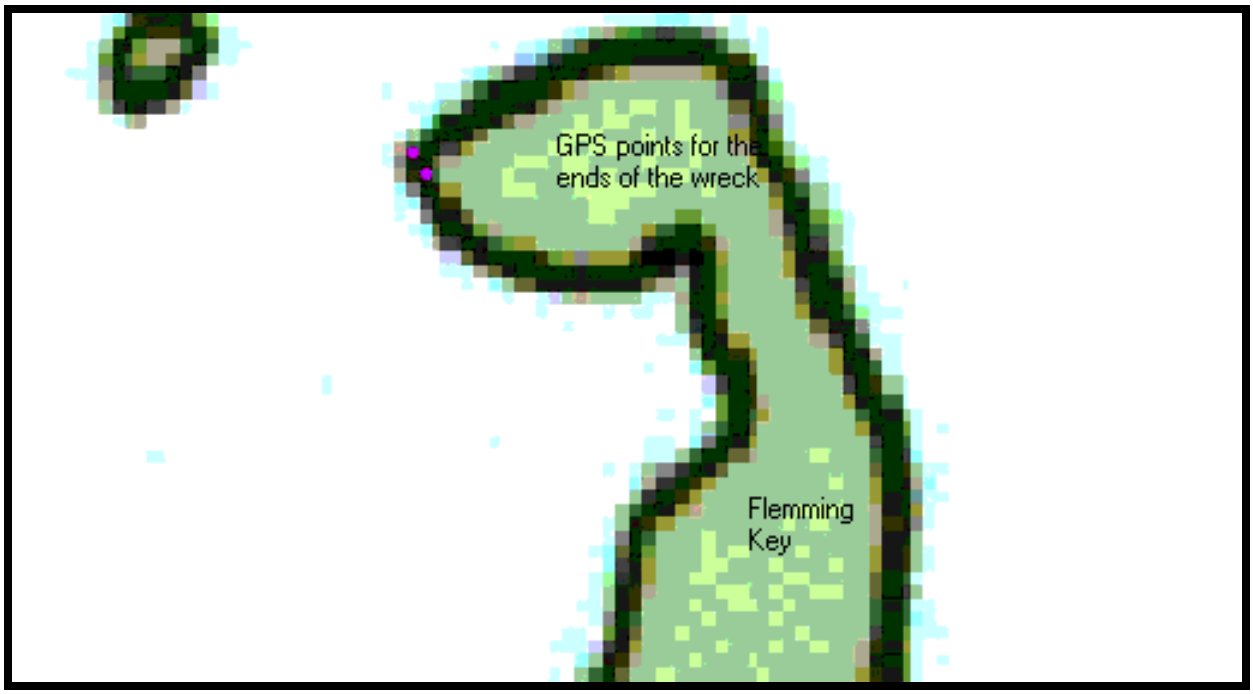

Figure 17: GPS readings of the ends of the wreck

A boiler was reported in the 1998 FSU field report as possibly being associated with the wreck, but that is unlikely given the other evidence for a sail and its distance from the wreck at 7.5 meters. The boiler may have been used to lift the sails or anchors. Further analysis is required to determine its association with the wreck. A copper plate was also analyzed in the 1998 survey and replaced on site. It was from a truck transmission, which makes the association ephemeral at best. The ship was built with a steel hull and riveted together unlike modern steel ships, which are welded, indicating its age.

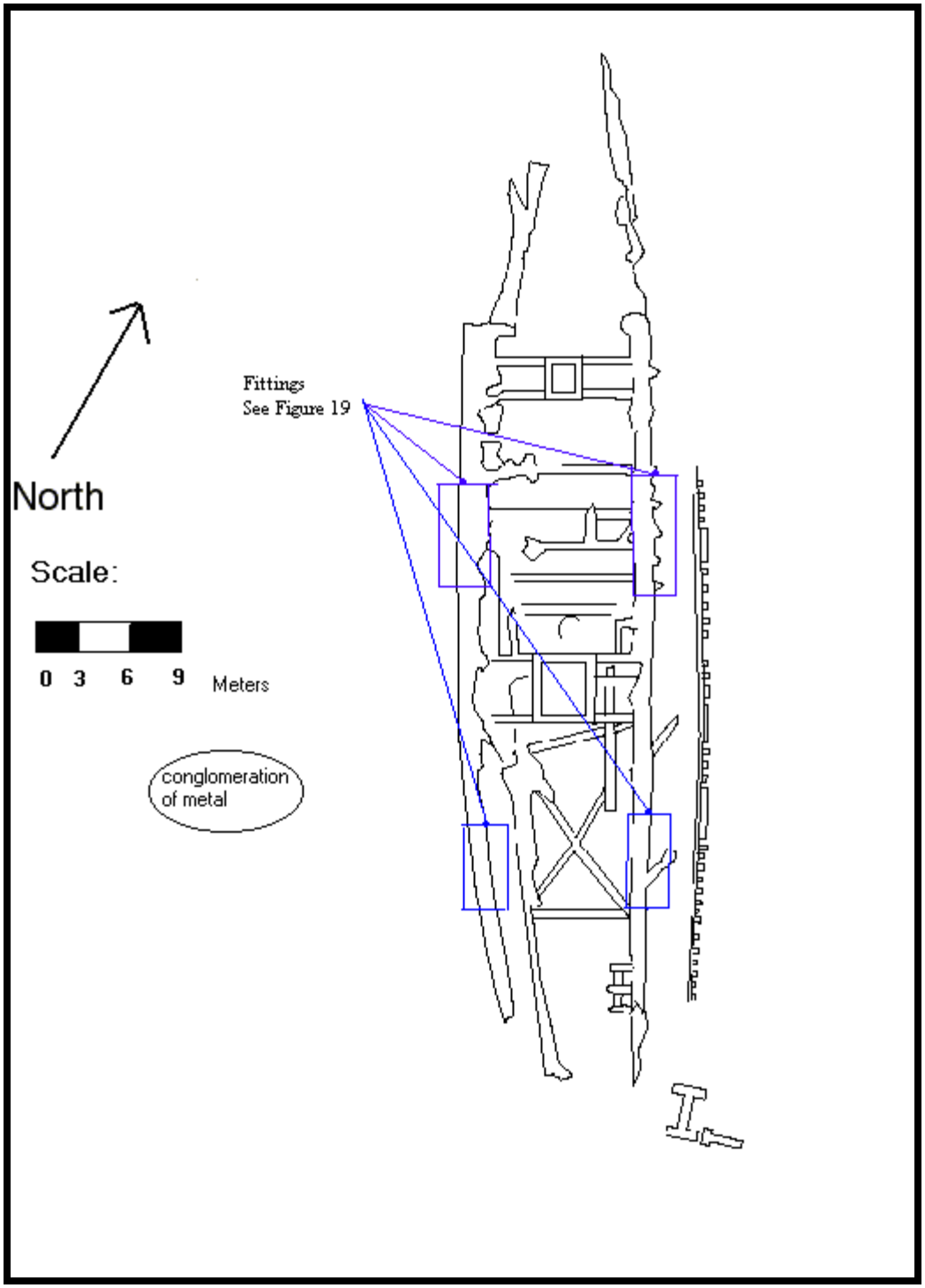

Figure 18: Site plan of the wreck

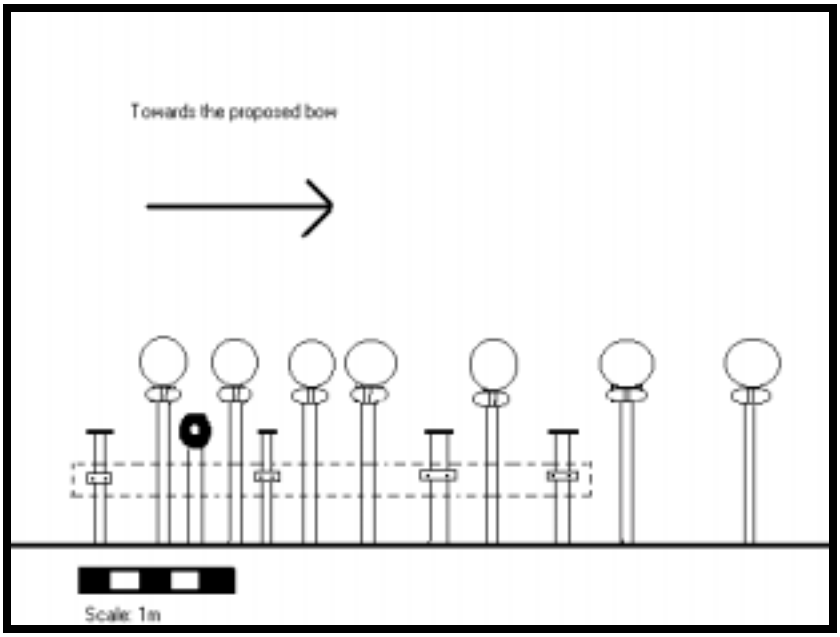

Figure 19: Fittings

There are four sets of fixtures protruding from the wreck, possibly standing rigging, each of which are constructed of standard shapes and sizes and have been reconstructed in Figure 19. Only the most forward set on the proposed starboard side is out of the water, and all are in various states of degradation. The original planking of the ship is unknown, but it is likely that it was a wooden deck. The upper deck planking is missing but various bolts measuring approximately 5cm high protrude from the crossbeams. Wood may have been attached by the bolts and supported by limited steel decking.

Figure 20: Picture of the fittings from shore.

SIDE SCAN SURVEY

On March 11 a limited side scan survey was conducted using the Marine Sonics Splashproof Seascan PC with a 600 kHz towfish onboard the Boston Whaler provided by the R/V *Bellows*. The survey was undertaken to determine the functioning capabilities of the unit after a recent repair and to familiarize students with its operation. The range was set to 75 meters with the line spacing at 125 meters (Figure 21). The Lorance Globalmap 100 12-channel receiver tied into the PC maintained the GPS control for the survey. The side scan data was not studied and is stored in the George R. Fisher Underwater Laboratory at Florida State University.

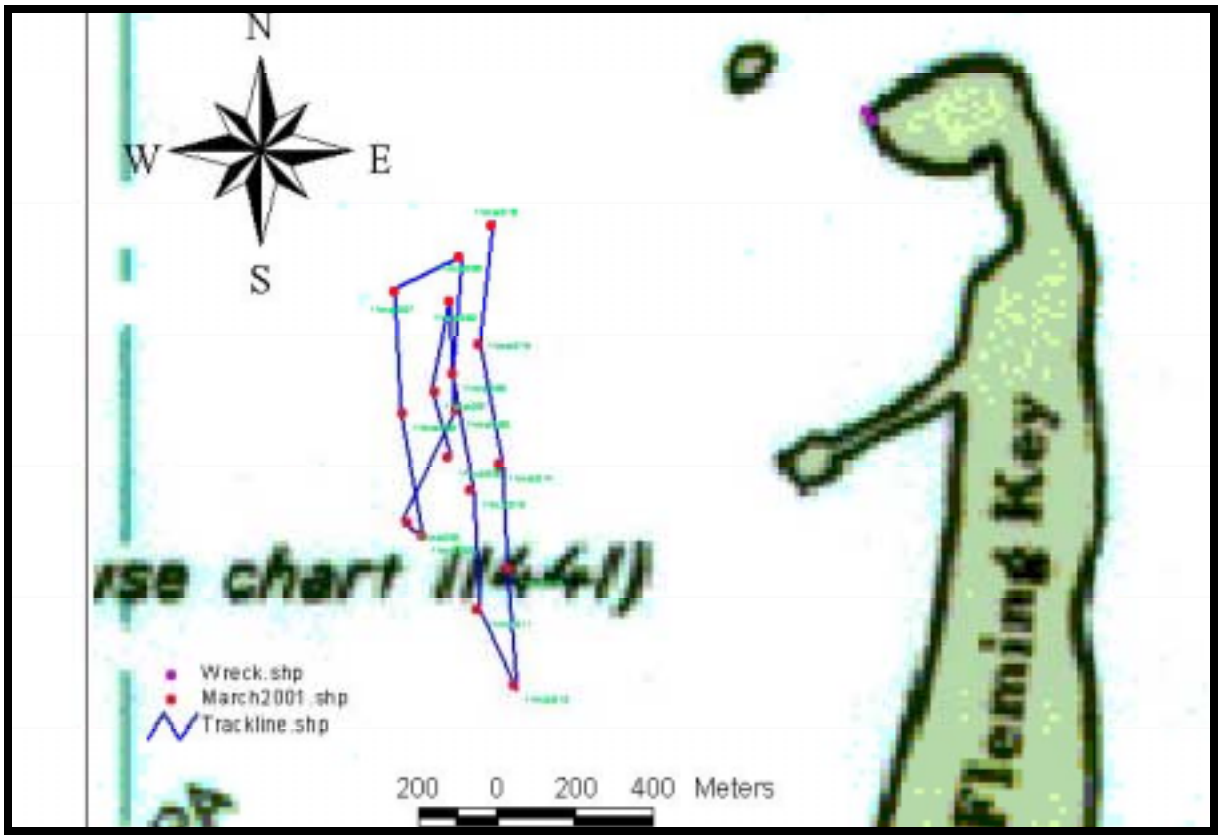

Figure 21: SidesScan tracklines

BIOLOGICAL SURVEY

The best method for the biological survey was snorkeling without the use of SCUBA. Divers snorkeled around the wreck and surrounding areas with each two person team given a specific section to concentrate on. The areas of the survey were separated into three sections: pilings/stern, midships, bow and surrounding areas. The roving diver method was utilized to record and to identify the various flora and fauna around the wreck. The data collected was averaged from one morning dive and two afternoon dives and the results are listed in Table A in the appendix of this report. The sheer volume of species in the area necessitated the accurate listing and categorizing of the biological component of the site.

Figure 22: Green moray eel found lurking in the metal conglomeration

CONCLUSIONS AND RECOMMENDATIONS

The present working hypothesis for the Flemming Key wreck is that it is a steel hulled sailing ship that sits on the seafloor listing slightly to port running aground sometime after 1942, possibly in a major hurricane in 1948. It is still unknown why the ship sank, intentionally or accidentally, or even what the name of the ship is. The tidal action of the saltwater drying out and soaking the metal at the waterline corroded away the steel along the side closest to the sea and significantly weakened the corresponding side. When the weight of the upper deck structure became too great for the corroded sections to bear the entire upper deck structure sloughed off in one piece (Figure 11). The deck beams that once supported the deck, held the sides together as the upper portion separated from the bottom of the hull. The bottom hull in contrast appears to have remained in a relatively unchanged position.

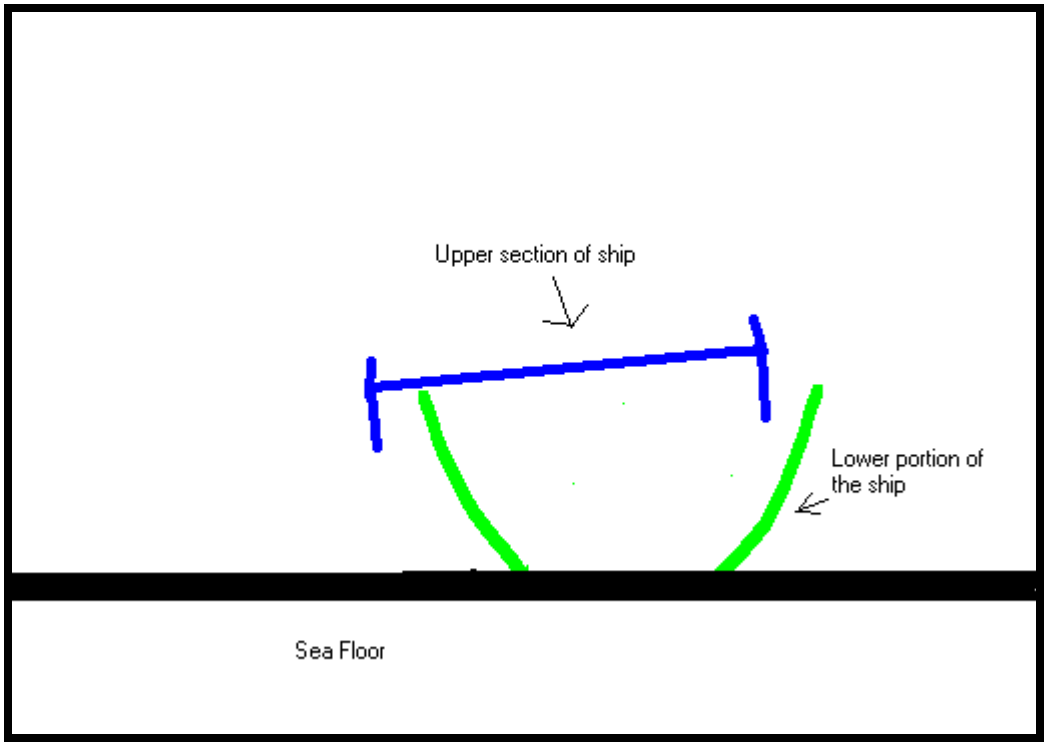

Figure 23: Upper hull slippage

The ideal location of the wreck coupled with its relatively solid and sturdy structure makes it ideal for an underwater preserve for the State of Florida. The biological surveys of this season and of those in 1998 and 2000, show that there is minimal risk to tourists diving on the site. The numerous juvenile fish that live around the site and in the mangroves nearby could also be protected. The local Key West business community already utilizes the wreck as a popular snorkeling expedition and fishing spot. The addition of the Flemming Key wreck to Florida's underwater preserves would greatly increase the benefits to everyone who visited it.

The condition of the shipwreck has apparently remained stable from 1959 until 2001, indicating that it is not in immediate danger of disintegration. Below the waterline the steel of the ship seems to be remaining intact, possibly because of the algae growing on it. The United States Navy technically owns the wreck, and Navy policy dictates a close regulation of its property. This tight control is not occurring however, since the ship is littered with trash, beer bottles, buckets, and other various debris. The traffic on the wreck by divers and fishermen is having an impact on the wildlife in the area, however further study is required to determine how much that impact is.

REFERENCES

Aerology Operational Analysis
1948 *Report of Hurricane at Key West 18-21 September, 1948.* Aerology, Flight Services Branch. Chief of Naval Operations. Washington, D.C.

Bray, M.
1979 *Mystic Seaport Museum Watercraft*. Mystic Seaport Museum Inc, Mystic Connecticut.

Deloach, N.
1989 *Reef Fish Identification.* Vaughan Press, Orlando.

Deloach, N.
1992 *Reef Creature Identification*. Vaughan Press, Orlando.

Faught, Michael, Melanie Damour, and Thadra Palmer Stanton
2000 Preliminary Report for the Survey of Man of War Harbor, Flemming Key in the Florida Keys National Marine Sanctuary.

Faught, Michael, John Patrick Kilgo, and Melanie Damour
2001 Report on the Shipwreck and Biological Survey Conducted Near Flemming Key, 17-20 March 1998.

GreenHill, B. and Ann Giffard
1970 *The Merchant Sailing Ship: A Photographic History*. Praeger Publishers, New York.

Hambright, T.
2001 Personal Communication. Key West Florida. (305) 294-1921 – office.

Hutchings, P., P. Saenger
1987 *Ecology of Mangroves*. University of Queensland Press. New York.

Kaplan, E.
1982 *A Field Guide to Coral Reefs: Caribbean and Florida*. Houghton Miffin Company, Boston.

Klingel, G.
1973 *Boatbuilding With Steel*. International Marine Publishing Company, Camden Main.

Littler, D., M. Littler. K. Bucher, J. Norris.
1989 *Marine Plants of the Caribbean: A Field Guide From Florida to Brazil*. Smithsonian Institution Press, Washington, D.C.

Nichols, S.
1989 *A Chronological History of Key West: A Tropical Island City*. Key West Images of the Past, Inc. Key West, Florida.

Simon, T.
1999 *Assessing the Sustainability and Biological Integrity of Water Resources Using Fish Communities*. CRC Press, New York.

Smirth, C.
1997 *National Audubon Society Field Guided to Tropical Marine Fishes of the Caribbean, the Gulf of Mexico, Florida, the Bahamas, and Bermuda*. Alfred A. Knopf, New York.

Underhill, H.
1952 *Deep-Water Sail*. Brown, Son & Ferguson Ltd. Glasgow.

APPENDIX A

Organizing a biological survey in an uncontrolled environment was very difficult to plan and conduct. The need for an adequate plan to gain the most scientific data possible was paramount. Designing an effective field method to gather information with the time constraints imposed was of the utmost priority concerning the biological survey conducted on the wreck at Fleming Key the results of which appear in (Table 1). A group called REEF was contacted to assist in the planning of the survey. The group is an active organization of recreational divers committed to the preservation of the marine environment. The Reef Environmental Education Foundation is a non-profit organization located in Key Largo, Florida. The organization is composed of recreational divers who regularly conduct fish surveys during their dives.

Utilizing the techniques of REEF, Florida State University's ANT 4131 *Techniques of Underwater Site Research* class conducted biological surveys without intense training and background expertise. The process of data gathering was simple and easy to understand, which was a necessity given that most of the students had never participated in a biological survey before. It was also interesting to observe the grouper in the area. The mangroves and sheltered areas of the wreck serve as nurseries for the juvenile of the species. The surveys had the following criteria to follow:

INFORMATION AND STATISTICS

- Time of day the survey was conducted: early morning, morning, afternoon, late afternoon
- High/low tide
- Current direction and speed
- Wind direction and speed
- Clarity of the water/visibility
- Location of fauna/flora in respect to the wreck
- Organism name/type

  Description of visual characteristics; colors, markings, shape and body characteristics (dorsal and caudal fins of fish viewed)
- Organism numbers

Single	1
Few	2-10
Many	11-100
Abundant	>100

- Effects/reactions to divers
- Location of marine plants

  Is growth prevalent/not prevalent?
  How far down does the growth go?
  Is it in particular areas?
  Possibly measure

Table 1: Biological survey results

The data was averaged from one morning dive and two afternoon dives.

Name of Organism	Estimated Count	Time of Survey	Descriptions and Observations
Needle Fish *Tylosurus crocodilus*	Few	Afternoon	Silver, elongated with "needle-like" body, drifting in schools, showed up in the afternoon with the outgoing tide. It was 2-3 feet from the wreck and very shy of divers.
Gray Angel Fish *Pomaceanthus arcuatus*	Single	Morning Afternoon	Adult seen. Juveniles have distinct color variations from adults. Uniformly gray-brown, flattened and elongated. It was within the hypothesized mast just westerly from the hull. Highly territorial and not wary of the divers.
Blue Angelfish *Italacanthus bermuden*	Single	Afternoon	Adult seen. Purplish to blue-green coloring with yellow tip pectoral fins. Fins covered with brown dots. Juveniles have distinct color variations from adults.
French Angel Fish *Pomacanthus paru*	Single	Afternoon	Black with yellow bars with a flattened and elongated body. Relatively unafraid.
Silverside *Atherindae* Herrings *Clupeide* Anchovies *Engraulidae* Scad *Carangidae*	Abundant	Morning Afternoon	The reason there are multiple families is due to the number of species involved. There are 10 similar species that are difficult to distinguish from one another underwater. Many species mix together into a single school. Found within crevices and interior of the wreck. Skittish around divers. There were an increased number of schools found in the morning rather than the afternoon possibly due to weather conditions; increased wind, current speed or the possibility of predators or lack of in the area.
Red Grouper *Epinenphelu striatus*	Few (2)	Afternoon	Blended very well with surroundings, highly curious of divers.
Snowy Grouper	Single	Afternoon	Observed within areas of the wreck. Very weary of divers. The possibility that it was a juvenile is very high. Seek sheltered areas, in-shore wreck, and mangroves as nurseries for developmental growth.

Mutton Snapper *Lutjamus analis*	—	—	Drifted slightly above the sandy bottom. Very wary of divers.
Smallmouth Grunt *Haemulon chrysargyreum*	Few	Morning Afternoon	Drifted in small schools, near bottom.
Bluestriped Grunt *Haemulon scriurus*	Abundant	Morning Afternoon	Drifted in small-mid size schools. Shy of divers and flowed away when approached. Found all throughout the wreck.
White Grunt *Haemulon plumieri*	Abundant	Morning Afternoon	Drifted in small groups and schools on the wreck, often was seen in shady and sheltered areas of the wreck. Very shy of divers.
Caesar Grunt *Haemulon carbonarium*	Few	Afternoon	Found to be juvenile or intermediate due to its consistency to inhabit sheltered areas while it is young.
Seargant Major *Abudefduf saxatilis*	Few	Afternoon	Observed populations were juvenile due to distinct colors that were bright.
Rainbow Parrotfish	Few	Morning Afternoon (↑#)	A higher number was observed in the afternoon. Relatively comfortable with divers. Found all throughout the wreck.
Rosy Razorfish *Xyrichtys martinicensis*	Single	Afternoon	Hovered above sandy areas with occasional sea-grasses. When alarmed, dove into the sand and tunneled underneath.
Porkfish *Anisotremus virginicus*	Single	Afternoon	Known to be solitary as adults. Adult.
Yellowtail Snapper *Ocyurus chrysurus*	Many	Morning Afternoon	Found swimming in small schools of 3-4 in population.
Spotted Snapper	Many	Morning Afternoon	Found all throughout the wreck
Lane Snapper *Lutianus synagris*	Abundant	Morning Afternoon	
Great Barracuda *Sphyaena barracuda*	Single	Afternoon	Solitary swimmers, very curious with the divers. Interesting habit of open and closing its mouth for respiration.
Cero Mackerel *Scomberomorus regalis*	Few	Afternoon	Silvery, elongated body. Solitary, possibly in the area as a predator. When approached swam off at high speed. Larger sizes were seen as the afternoon progressed.
Sheepshead *Archosargus probatocephalus*	Few	Afternoon	Dark overall with a dark bar at the nape with 5-6 brown bars on the side. It feeds on mollusks and crustaceans. Found in sheltered areas of the wreck.
Horseshoe crab *Limulus polyphemus*	Few	Afternoon	Gray to brown coloring that is horseshoe-shaped, the tail is long and spike like. 2 were observed mating within the wreck and just west of the concrete pilings.
Bivalve (wide)	Single	Afternoon	Sessile, found on the frame, possibility as filter feeders.

Bivalve (round)	Few	Afternoon	Found all through the sandy bottom of the wreck. The appearance of a predator was prevalent due to the presence of multiple open shells in the environment
Loggerhead Sponge *Spheciospongia vesparium*	Few	Morning Afternoon	Brown-gray barrel-shape with flattened top, numerous excurrent openings. Known to host a number of symbiotic shrimp that live in its canals.
Turtle Grass *Thalassia testudinum*	Many	Morning Afternoon	
Black-Ball Sponge *Ircinia strobilina*	Few	Morning Afternoon	Ball shaped with lobes. Excurrent openings. Black to gray color. Prefer brightly lit areas.
Eucheuma isiforme	Many	Morning Afternoon	Color varying from pale straw to yellow. These species are found in sheltered areas loosely entangled with turtle grass. This species is highly valuable because their colloidal extracts are used to suspend particles and smooth the texture of many dairy products and other foods.
Brown variable Sponge *Anthosigmella varians*	Many	Morning Afternoon	Tan to brown irregular shaped sponge that appears to encrust the substrate. They bore onto solid substrate by secreting minute amounts of acid.
Mermaid's Shaving Brush *Penicillus capitatus*	Many	Morning Afternoon	Resembles a shaving brush. Often mixed with turtle grasses or among mangrove roots.
Viscous Sponge *Plakortis angulospiculatus*	Abundant	Morning Afternoon	Brown encrusting sponge often resembles a flow of viscous material.
Black Condominium Tunicate *Eudistoma obscuratum*	Abundant	Morning Afternoon	Numerous small individuals embedded in a firm, common berry-like, tunic that attaches to the substrate by a short stalk.
Red Boring Sponge *Cliona delitrix*	Many	Morning Afternoon	Red to red-orange sponge that appears to encrust but actually bores into coral heads and substrates. They secrete minute amounts of acid. Very damaging to corals, the acid they secrete bores holes and chambers within the coral eventually destroying it.
Branching Hydroid *Sertularella speciosa*	Few	Morning	Branches extend alternately on a single plane. Usually inhabit shipwrecks and prefer areas with some water movement.

Shy Feather Duster *Megalomma sp.*	Few	Afternoon	Radioles of crown form circular pattern with a V-shaped fold into one side. Extremely sensitive to any movement. They are a type of worm.
Rock-Boring Urchin *Echinometra viridis*	Few	Morning Afternoon	Short, thick, pointed spines. Blackish color. Most common in shallow rocky, tidal areas during the day. Bore holes into substrate. Feed on algae in the open at night. Spines can produce a puncture wound.
Sessile Barnacles *Cirripedia*	Many	Afternoon	Affix at the base of their shells to the substrate. Found most of them on the frames of he wreck less than 8 inches from the surface of the water.
Netted Flatworm Crozier's Flatworm *Pseudoceros texarus*	Single	Morning	Inhabit shallow areas of rocks and patch reefs and around mangroves.
Mangrove	Abundant	Morning Afternoon	Located on the shores of Flemming Key. Species is of the red mangrove species. As the species grows inland it then is called a white mangrove.
Scallop	Few	Afternoon	Located on the pilings/concrete dock.
Green Moray *Gymnothorax funebris*	Single	Afternoon	Found within the proposed mast of the wreck just west of the wreck.