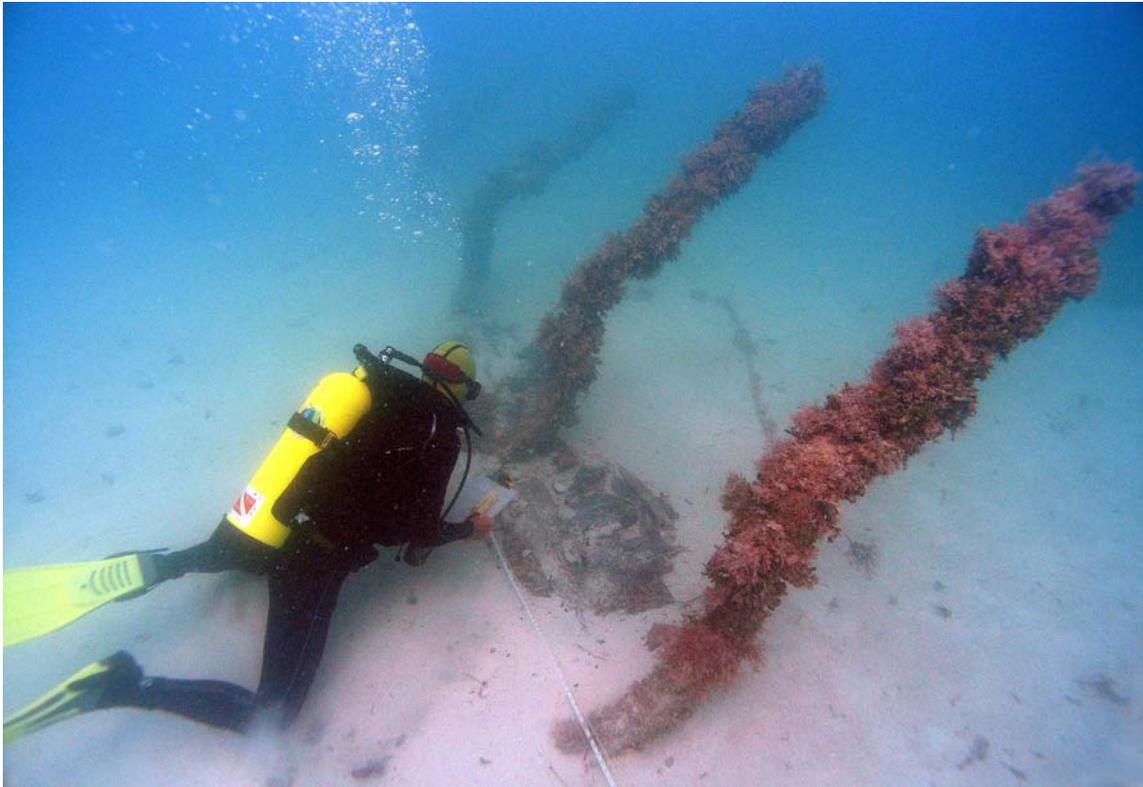


# Archaeological and Biological Examination of the Rib Wreck (8MO1880) off Vaca Key, Monroe County, Florida

Daniel P. McClarnon, Roger C. Smith, Debra G. Shefi,  
and John Broadwater



A Report by the Florida Underwater Archaeology Team,  
Bureau of Archaeological Research, Division of Historical Resources,  
Department of State

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## Acknowledgments

Principal participants included Dr. Roger Smith, Debra Shefi, and Daniel McClarnon of the Bureau of Archaeological Research; Dr. John Broadwater, Chief Archaeologist for the NOAA National Marine Sanctuaries Program (Fig. 1); and KC Smith of the Museum of Florida History. Valuable assistance for the project was provided by Dave Score, John Halas, Bill Valley, and Cheva Heck of the Florida Keys National Marine Sanctuary. Richard Tanner and Austin Middleswart, Harbormasters of Boot Key Harbor City Marina, provided excellent logistical support.



Figure 1. Rib Wreck team (from left to right): Daniel McClarnon, Roger Smith, Debra Shefi, and John Broadwater.

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## Introduction

The site (Fig. 2) was first reported to the Florida Keys National Marine Sanctuary by Robert Weller, in a report of his survey and inventory activities, conducted during 1999-2001 under permit FKNMS-99-068. He named it the Rib Wreck and produced a brief description and sketch of the site, which had not previously been recorded. In October of 2004 Roger Smith, Jennifer McKinnon, and Jason Raupp examined the wreck and confirmed the site had potential for further research.

The project was undertaken by BAR archaeologists between May 23<sup>rd</sup> and June 12<sup>th</sup>, 2007. This three-week period was characterized by windy and stormy weather, hindering access to the site until conditions moderated and seas became calm. Underwater visibility was generally poor due to rough seas in the shallow water. Six days were spent at the site, mapping and recording its features.

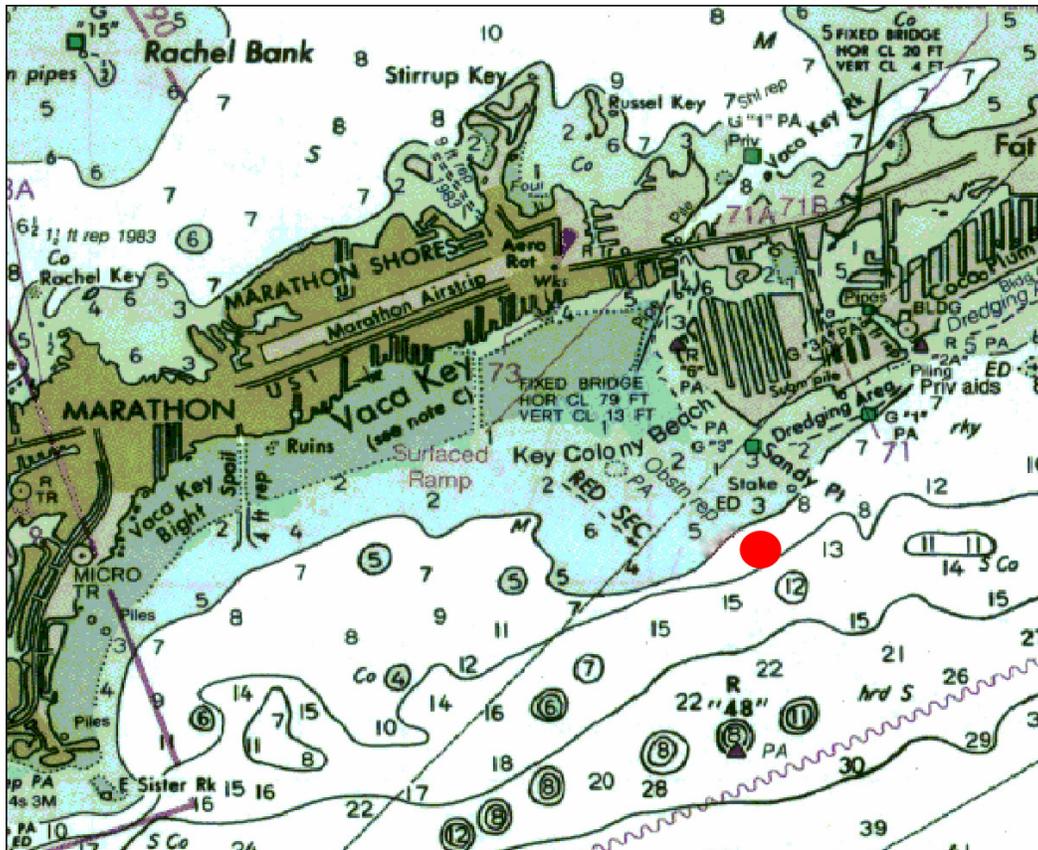


Figure 2. Location of Rib Wreck, 8MO1880. (Nautical Chart 11452, "Alligator Reef to Sombrero Key," U.S. Dept. of Commerce, NOAA, National Ocean Service Coast Survey, Dec. 4, 1999)

## **Research Design and Proposal**

Given the cooperative relationship between staffs of FKNMS and BAR, resulting from a 1988 Programmatic Agreement (between NOAA and the State of Florida for Historical Resource Management in the FKNMS), it was proposed that the two staffs continue to work together to record and assess known shipwrecks within the Sanctuary.

The Research Design submitted to NOAA in 2006 briefly described the Rib Wreck and its current status. Photographs of the ship's surviving structure and site features were included. Cooperation was requested by Roger Smith to assemble staff from both agencies, consisting of a team of archaeologists to investigate, document, and study the remains of the shipwreck. Smith created a plan that included methods and materials that would be used in the investigation.

Updated documentation (site plans, cultural and natural inventories, underwater photographs, and videos) would be utilized to assess the shipwreck and its management needs. Historical research both in the Florida Keys and the State Library of Florida would be conducted. Assessment data would be assembled to produce a report detailing the ship's history, overall condition, and suggestions for future research and minimizing visitor impact on cultural and natural features.

The following timeline of objectives and tasks was proposed:

Objective 1: Initiate project, first quarter (October—December 2006)

Task 1: Assemble team members including visiting NOAA archaeologist

Task 2: Secure field accommodations and travel arrangements

Objective 2: Conduct historical research, second quarter (January—March 2007)

Task 1: Conduct oral interviews with local informants

Task 2: Document the history of the Rib Wreck

Objective 3: Inspect and assess the Rib Wreck, third quarter (April—June)

Task 1: Relocate the vessel and establish a temporary mooring system onsite

Task 2: Survey and document features of the sunken ship

Objective 4: Assemble historical and archaeological data, third quarter (April—July)

Task 1: Create a site plan from data collected in field

Task 2: Assemble historical information

Task 3: Discuss management strategies for protecting site

Objective 5: Prepare and print report on findings, fourth quarter (September—December)

Task 1: Write final report

- Task 2: Print final report
- Task 3: Update Florida State Master Site File

Objective 6: Disseminate report, fourth quarter (December)  
Task 1: Deliver copies of report to interested parties

### **Rib Wreck Project**

A plan of action for 20 days of fieldwork from May 23 to June 12, 2007 called for assembling a team of researchers consisting of Roger Smith, Dan McClarnon, and Debra Shefi of BAR; John Broadwater of NOAA’s Maritime Heritage Program, and KC Smith of the Museum of Florida History. The team gathered at Boot Key Harbor Marina in Marathon, where NOAA R/V *Odyssey* was docked to serve as the field headquarters. Survey equipment, including two state boats (R/V *Workhorse* & R/V *Scout*), accompanied the state team, and diving gear was supplied by both agencies. Food, emergency supplies, and air fills were provided by BAR.

### **Fieldwork**

Diving operations:

Each day R/V *Workhorse* (21-ft. Offshore) and R/V *Scout* (18-ft. Angler) traveled in company to the location of the Rib Wreck site and moored to a temporary buoy attached to a Danforth® anchor installed for the project (Fig. 3). Diving operations



Figure 3. State vessels on site.

consisting of buddy teams using open-circuit SCUBA proceeded from the two vessels. Safety equipment, including first aid and oxygen, was carried by both boats. A single dive log was maintained throughout the project for all divers. Because the depth of the site is less than 30 ft., decompression limits were not applicable. Archaeological divers worked approximately 40 hours of total bottom time during 6 full days of fieldwork. A full day of fieldwork included two dives on site.

#### Mapping:

Archaeologists laid a baseline along the centerline of the vessel. This method remains as the primary tool for documenting structural elements and orienting archaeological divers to certain areas of the shipwreck site. The baseline, laid with nylon line, measured 100 ft. in length and was tied to iron rebar stakes placed along the south side of the protruding ribs. The stakes established two datum points: 'A' to the northeast and 'B' to the southwest. A 100-ft. reel tape was secured to it. The zero point of the baseline tape was established east of the first frame but within the scatter of material discovered after the fact. The baseline was thus extended 30 ft. to the east to include the scattered material. Measurements using 90° offsets were taken from 5-ft. intervals along the baseline to reconstruct the outermost edges of the site in plan view. Archaeologists recorded a portion of the vessel's framing timbers for their exact location in relation to the baseline. Exposed remains of the site were drawn by hand on Mylar® and recorded in relation to each other. An overall site plan depicting the extent of the exposed timbers, iron



Figure 4. Archaeologist measuring Section I at baseline.

frames, and other material was produced (p. 10). Detailed feature drawings of the exposed timbers in two separate areas, Sections I and II, were also made.

#### Photographic recording:

The site was recorded using extensive digital still and digital video. Plan view photos, profile photos, work shots both above and below water, and marine life photos were taken. Still and video photographers included State staff, volunteers, and journalists.

### Site Description

The Rib Wreck is approximately three-quarters of a mile off Vaca Key and one-half mile southwest of Key Colony Beach in the Middle Florida Keys. The site has an average depth of 14 feet and is located in the intermediate shallows between Hawk Channel and the inshore tidal flats off Marathon. The Brick Wreck (8MO1881) lies nearby, .2 nautical miles to the northwest, in a similar environment.

The Rib Wreck lies in a shallow sand pocket approximately 140 feet long and 100 feet wide, oriented in a northeast/southwest direction. The pocket is surrounded by sea grass and is influenced by tidal fluctuations between the Atlantic Ocean and through Florida Bay via Vaca Cut and Moser Channel. One of several sand pockets in the immediate area, the bottom sediments are composed of coral cobbles, shell hash, and carbonate sand. Visibility at the site depends on weather, winds, and tides.

#### **Marine Life Survey**

During the project, several species of marine life were observed inhabiting the immediate vicinity of the wreck including crustaceans, fish, corals, and marine plants (see App. IV).

## Site Features

The Rib Wreck is oriented north-northeast by south-southeast (240° magnetic north) with neither bow nor stern currently distinguishable. The majority of the site lies in a scoured sand pocket surrounded by sea grass. The rectangular iron reinforcing frames are the most obvious feature of the site protruding to between 1 and 5 ft. above the sand. These frames mostly lie to the west of the baseline and other features of the site. Other features recorded include tapered pipes and collars, and other iron objects or potential frames lying on the sand around the site. Archaeologists exposed timbers between two of the northern reinforcing frames (Section I) and also portions of timbers near the keelson (Section II). At the exposed areas, planking and framing was measured and recorded as well as concretions, ballast fragments, and a brick fragment.

## Architecture and Other Features

### Keelson and Sister Keelson:

Only two small areas of the site were excavated by hand fanning (Sections I & II).



Otherwise, only portions of the wreck that were exposed above the sand were recorded. Large keelson and potential sister keelson or planking timbers run along the axis of the site and are partially exposed over a length of 80 ft. (Fig. 5). The molded height of the keelson is undetermined with a sided thickness approximately 1 ft. but generally worm eaten and deteriorated by exposure to the elements. The southern terminus of the keelson has two sets of four bolts protruding. The molded height of the potential sister keelson is undetermined; its sided thickness is approximately .70 ft.

Figure 5. Diver video recording; keelson, sister keelson, and pipe in view.

### Planking and Framing:

The ceiling planking in Section II has a width of .80 ft. and is .26 ft. thick. The frames that offered preserved dimensions are of a molded height of .95 ft. and a sided thickness of approximately .60 ft. The ceiling planking in Section I has an undetermined width and is .3 ft. thick. The frames beneath have a molded height of .5 ft., were .7 ft. to .75 ft. sided thickness, and spaced .25 to .66 ft. apart. Hull planking was exposed in Section I with an undetermined width and a thickness of .3 ft. The hull planking appeared to be made of two layers or, more likely, split at the exposed outer edge (see App. I).

### Reinforcing Frames:

The Rib Wreck gets its name from the thick, .33 by .5 ft., iron reinforcing frames which have the appearance of ribs prominently protruding from the sand at the site (Fig. 6). Ten of these frames (designated 1-10, Appendix II) were recorded in line along the baseline and appear to be attached to the wooden hull structure beneath the sand.



Figure 6. Archaeologist drawing between frames 1-2.



Figure 7. "Scratching station" on frame 12.

Frames 11 and 12 are at the southern end of the baseline; 11 is in a similar line with 1 through 10 and lying close to the sand. Frame 12 is to the southeast of Frame 11 and to the east of the baseline. Frame 12 is protruding from the sand to the east and opposite of Frames 1 through 11. Frame 12 is worn thin in an unusual concave pattern midway along the protruding portion. The worn portion is free of any growth or concretion and has a thin, fresh red

oxidation. It is likely that sea turtles use this frame as a “scratching station” to remove growth from their carapaces (Fig. 7).

Objects 13 and 14 are at the northwestern most part of the site and sit to either side of the baseline. Although these two objects are of the same general dimensions of the reinforcing frames, they have large regular fasteners attached and do not have the curve of Frames 1 through 12. Likewise, another large iron object (15) to the east of the site has similar characteristics to the reinforcing frames and to the objects 13 and 14.

#### Pipes:

Three pipes were recorded and mapped at the site. One pipe measures 7.5 ft. in length and .5 ft. diameter (Fig. 5). The other two pipes are identical to each other and lie partially buried in the sand near the northeast terminus of the keelson remains (Fig. 8). The pipes are 6.7 ft. in length and tapered from .8 ft. to .4 ft. diameter in the last couple feet of their length. The two pipes are also reinforced with heavy bands at three points along their length.

#### Rings and Collars:



Figure 8. Parallel tapered pipes.



Figure 9. Grooved collar/gear and rings.

Several rings and collars are located near and to the east of the southern terminus of the Keelson. The rings are C-shaped, of various thicknesses, and range from a few inches to almost 2 ft. in diameter. A large, grooved collar or gear was partially buried in the sand among the rings (Fig. 9).

## Artifacts

During investigations of the Rib Wreck, researchers recovered one artifact and a few samples of ballast and wood. The artifact recovered was a piece of planking with a bronze nail driven through (Fig. 10). It was photographed and turned over to the conservation laboratory of the Bureau of Archaeological Research in Tallahassee, Florida.

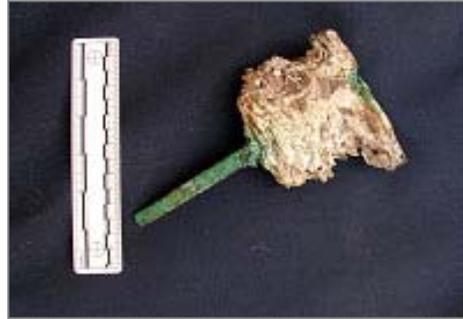
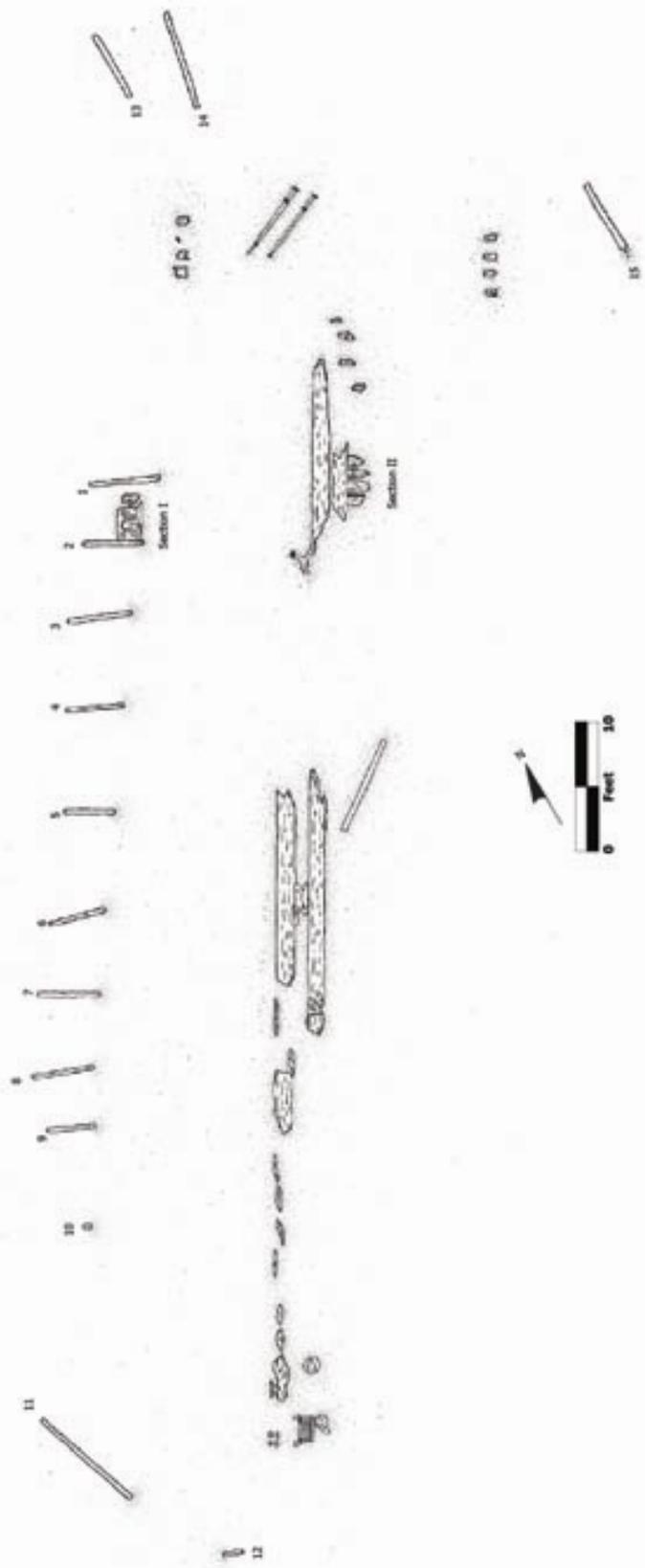


Figure 10. Wood fragment with bronze nail.



**Rib Wreck**  
**8MO1880**  
**Florida Bureau of Archaeological Research**  
**Site Plan by BAR Underwater Team**  
**May 2007**

## Interpretation

### Historical Context

The Florida Keys were in a period of transition during the late 19<sup>th</sup> and early 20<sup>th</sup> centuries. In the years following the Civil War, the population of the Keys was concentrated on Key West. The middle and upper Keys were mostly occupied by farmers and seamen providing the crops, fish, and sponges for flourishing Key West markets.<sup>1</sup> Between 1870 and 1900, the Middle Keys were the least populated area, with a total of 34 settlers in 1870; that number dwindled to 10 by 1900.<sup>2</sup> Wrecking was still an occupation for some, but many had left the business with the start of the Civil War. The Union blockade of the southern ports had significantly reduced maritime traffic.<sup>3</sup> Shipping increased following the war but so did construction of the railroads. The railroads would be replacing a portion of the shipping vessels, and the maritime industry was changing to accommodate the new era of rebuilding and construction.

The Overseas Railroad had been finished as far as Knight's Key by 1908 and reached Key West in 1912.<sup>4</sup> The railroad brought the Keys into the new century, and would bring the population and culture into a new era. Not only could goods move more freely to and from the Keys, but travelers and fishermen from the mainland could more easily visit these now-connected islands. The construction of the railroad also brought new types of vessels to the area; large steamboats and construction barges were bringing fill material, wood, and steel to every channel and pass.<sup>5</sup> Beginning in the 19<sup>th</sup>

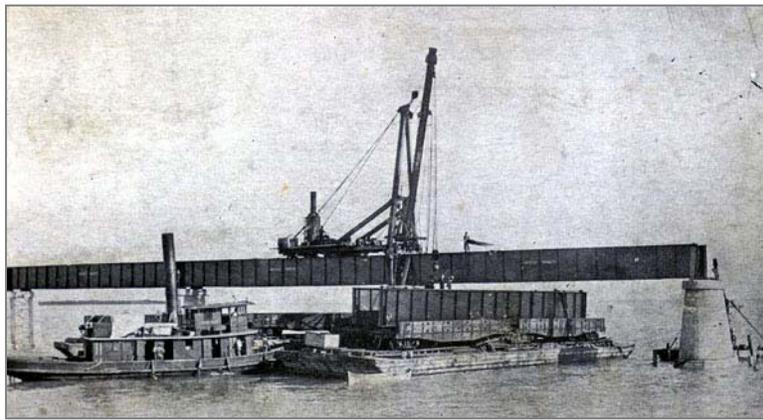


Figure 11. Tug and barge during construction of Knight's Key bridge. (Courtesy of State Library and Archives of Florida, Florida Photographic Collection)

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<sup>1</sup> Viele, 1996, 81-2.

<sup>2</sup> *Ibid.*

<sup>3</sup> Engle & Lott, 179-81.

<sup>4</sup> Viele, 1996, 99-100.

<sup>5</sup> Artman, 6; Carter, 10; Viele, 1996, 99-100.

century, shipbuilders were incorporating iron framing to maximize cargo space without sacrificing rigidity.<sup>6</sup> Many of the tasks involved in constructing the railroad placed demands on the maritime industry that composite-built ships could fulfill. Cement was imported from Belgium, and rock was brought south from New York.<sup>7</sup> After they were no longer useful for the railroad project, purpose-built vessels such as barges and derricks were scuttled alongside those diverted from their original glory as passenger ships or coastal traders.<sup>8</sup> A few such wrecks function as a breakwater in the shallow waters within the harbor of Knight's Key.<sup>9</sup>

Shortly after the Overseas Railroad was finished, the Overseas Highway project began in 1923. Supplemented by railroad cars, steamers and barges continued the construction well into the late 1930s. The devastating hurricane of 1935 tore through the Keys leaving few survivors. The hurricane damaged both the railroad and highway providing the opportunity for the two to converge. The Overseas Highway project scavenged material and roadbed from Flagler's bankrupt railroad.<sup>10</sup>

### **The Rib Wreck**

Sometime during the beginning of the 20<sup>th</sup> century, a heavily laden composite-built vessel went aground along the inner edge of Hawk Channel, about a mile offshore of Vaca Key in the middle Florida Keys.

The material aboard the stranded vessel would have been needed in the construction or repair of the railroad or highway, and the cargo would have been offloaded into wreckers' boats or other construction vessels when the grounded ship could not be refloated. Valuable portions of the ship's rigging and machinery also would have been salvaged, leaving a bare hulk. The pipes and collars could be all that remains from salvaging such machinery.

Like many abandoned wrecks in the warm, shallow Florida waters, the superstructure and upper works disintegrated quickly while shipworms ate portions of the

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<sup>6</sup> Ho, 5-6; Gould, 243.

<sup>7</sup> Artman, 6, 8.

<sup>8</sup> Carter, 10-15.

<sup>9</sup> Carter, 10-15; Site investigation by BAR Underwater Team, May 30, 2007.

<sup>10</sup> Viele, 1996, 133.

lower hull that were exposed and accessible. Storms may have shifted the wreckage shoreward before it sank into the sand and began to stabilize over time. More than a century passed before a new generation of scuba-diving wreckers began to work long-forgotten shipwrecks along the Florida Keys.

The maritime environment in the Keys during the transition into the 20<sup>th</sup> century

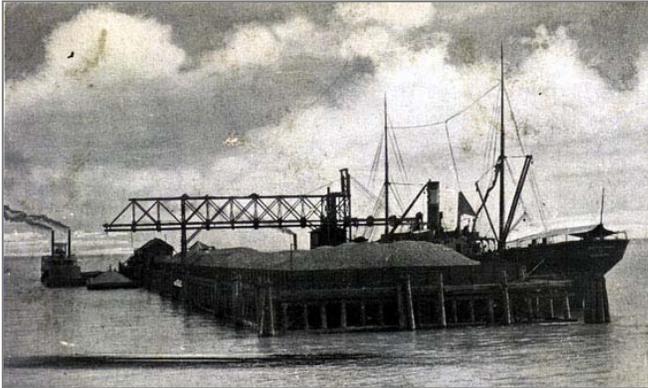


Figure 12. Knight's Key construction dock. (Courtesy of State Library and Archives of Florida, Florida Photographic Collection)

was based on supporting Flagler's massive-scale industrial projects. Based on measurements of the hull's architectural dimensions, the Rib Wreck was a large composite-built ship capable of carrying heavy cargo in deep water. This vessel may have been brought to the Keys from the shipyards of the north for the construction and repair projects

involved with the Overseas Railroad and the Overseas Highway. The lack of any significant ballast may indicate that its heavy construction cargo of rock, cement, or iron was its ballast at the time of grounding and thus salvaged for use. Its iron framing date the vessel to composite technology of the middle to late 19<sup>th</sup> century and also help identify the wreck as an

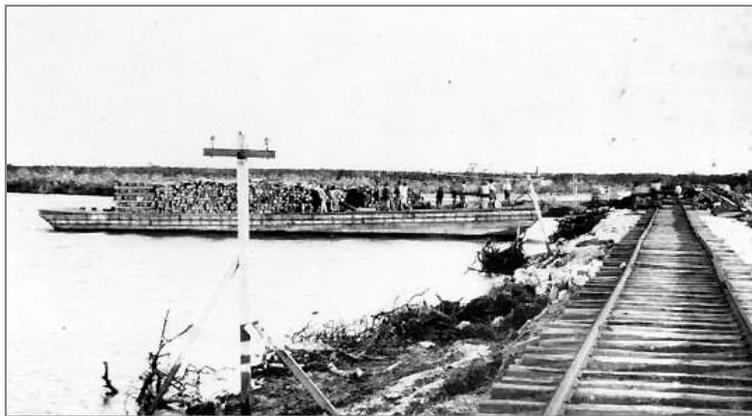


Figure 13. Barge loaded with railroad ties. (Courtesy of State Library and Archives of Florida, Florida Photographic Collection)

oversized workhorse.<sup>11</sup> No indication of sailing tackle or of steam power is obvious without further investigation, but the lack of such may also indicate the Rib Wreck was converted to an open barge at a later stage. The iron frames protruding from the site

<sup>11</sup> Thiesen, 61, 92-93; Doerffer, 326, 332.

retain the shape of a deep draft vessel and not the flat bottom profile of many working barges (see App. I).

As for the identity of the Rib Wreck, a database recently compiled by Dr. Jim Miller from existing historical sources of ship groundings and losses in the Florida Keys was consulted.<sup>12</sup> It contains many listings of vessels that grounded or were wrecked in the area of Key Vaca, but all are recorded as unknown in the vicinity of the Rib Wreck.

## **Recommendations**

This report provides the results of an archaeological and biological examination of the Rib Wreck. Continuing research and analysis is forthcoming including ballast sample identification. The Rib Wreck represents a unique composite-built ship likely utilized during a major transition for the Florida Keys at the beginning of the 20<sup>th</sup> century.

The Rib Wreck is well-preserved beneath the sand, but portions of its wooden structure and much of its iron structure are exposed to the active shallow water environment. It is recommended that the site be visited periodically by staff of the Florida Keys National Marine Sanctuary to monitor its condition and record any changes to its situation. Should the site become more exposed and a significant degree of degradation or disarticulation become apparent, planning for mitigation activities to prevent further damage should be undertaken immediately. Without appropriate measures for resource management, this site could become lost to time and nature.

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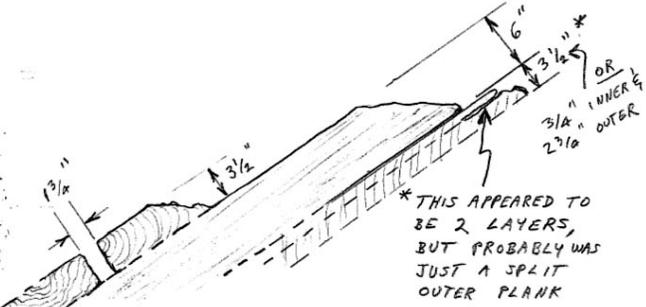
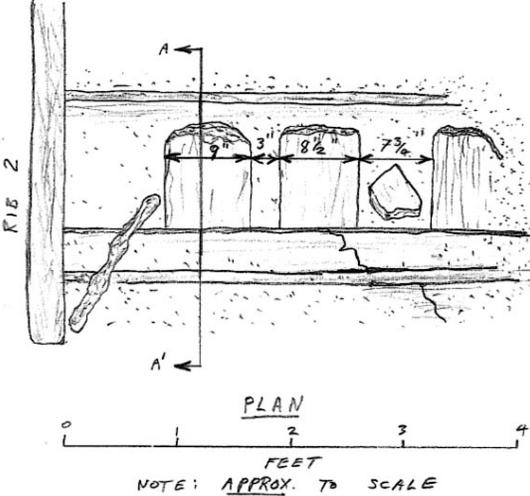
<sup>12</sup> Miller, *Reported Maritime Heritage Resources Not Recorded in the Florida Master Site File*, 1-10 of 10.

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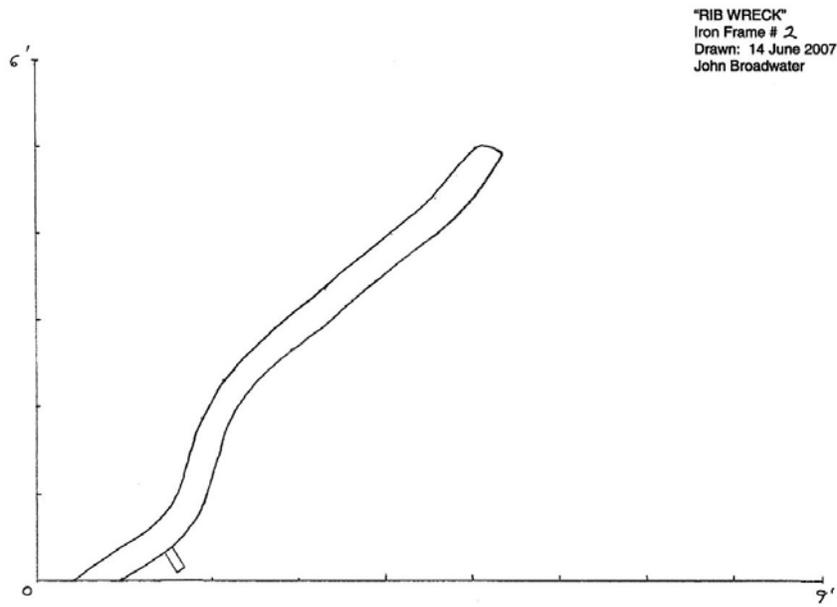
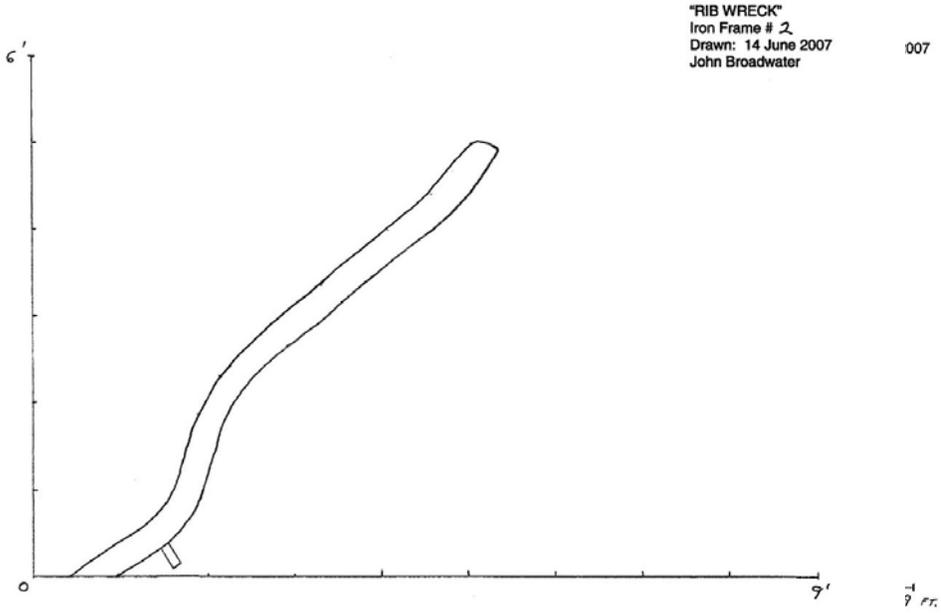
Appendix I:

Drawing of Section I, wooden framing and planking between reinforcing frames 1 and 2

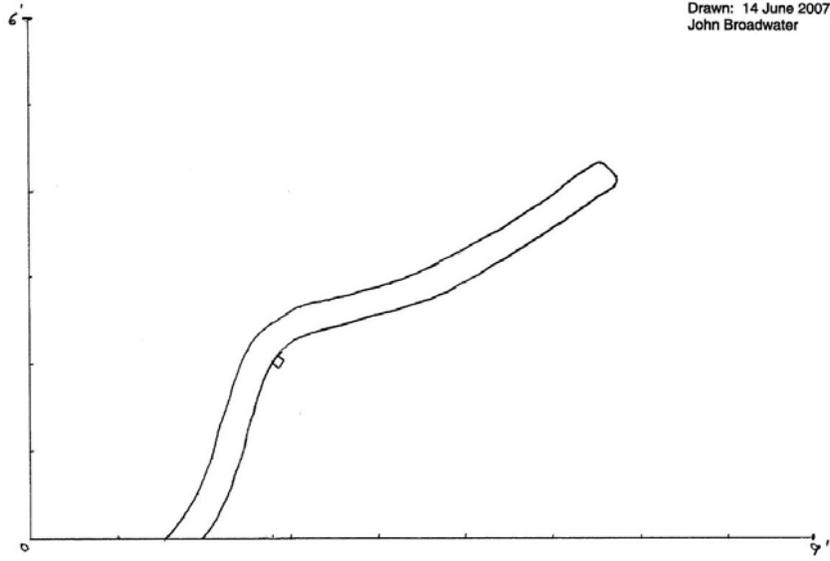


RIB WRECK  
 EXPOSED TIMBERS BETWEEN  
 "RIBS" 1 & 2, PARALLEL TO  
 BASE LINE (DWG. 2 OF 2)  
 DATA RECORDED 7 JUN 07  
 John Broadwater

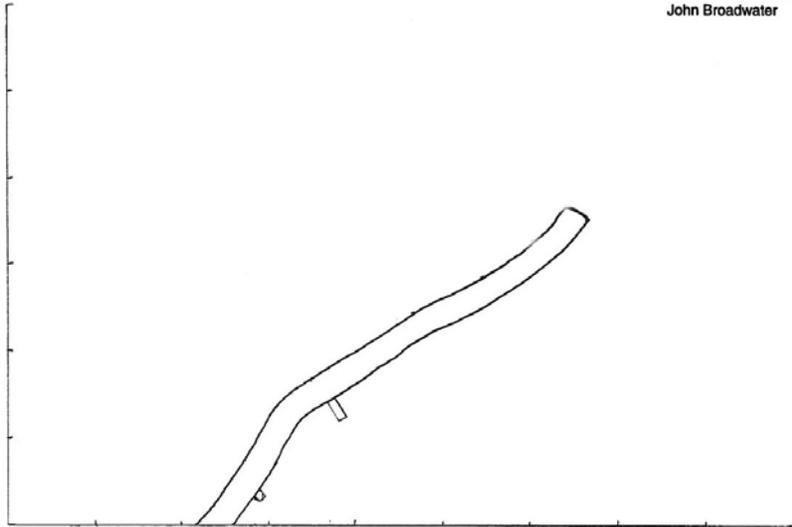
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Reinforcing Frames 1-12 and Objects 13-15



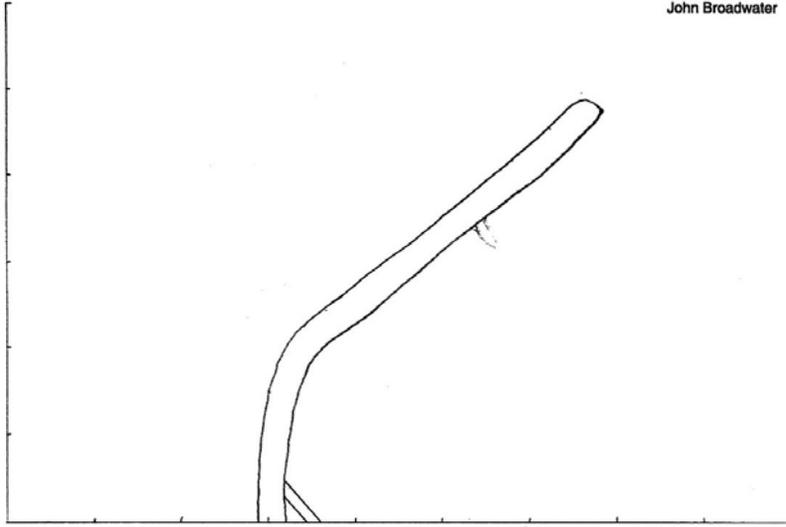
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Iron Frame # 3  
Drawn: 14 June 2007  
John Broadwater



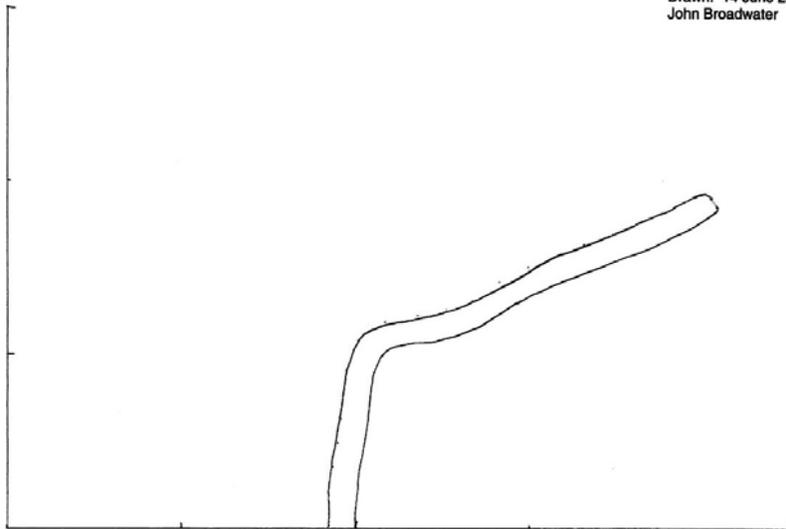
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Iron Frame # 4  
Drawn: 14 June 2007  
John Broadwater



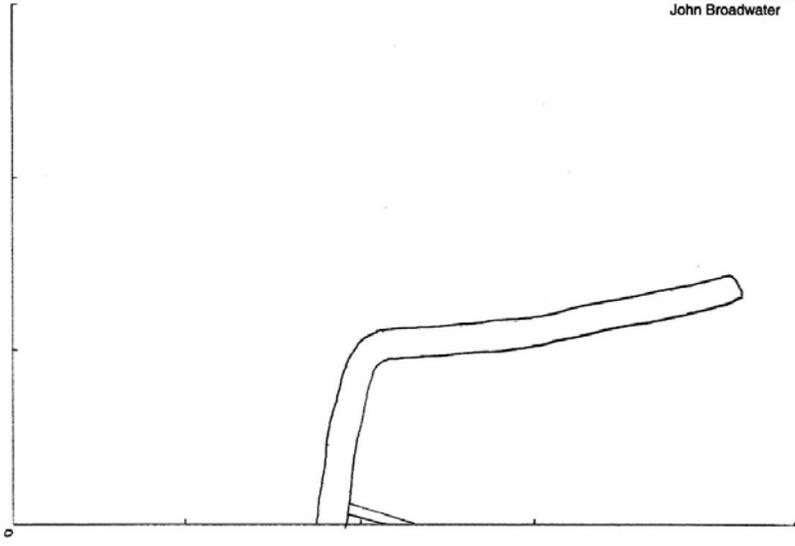
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Drawn: 14 June 2007  
John Broadwater



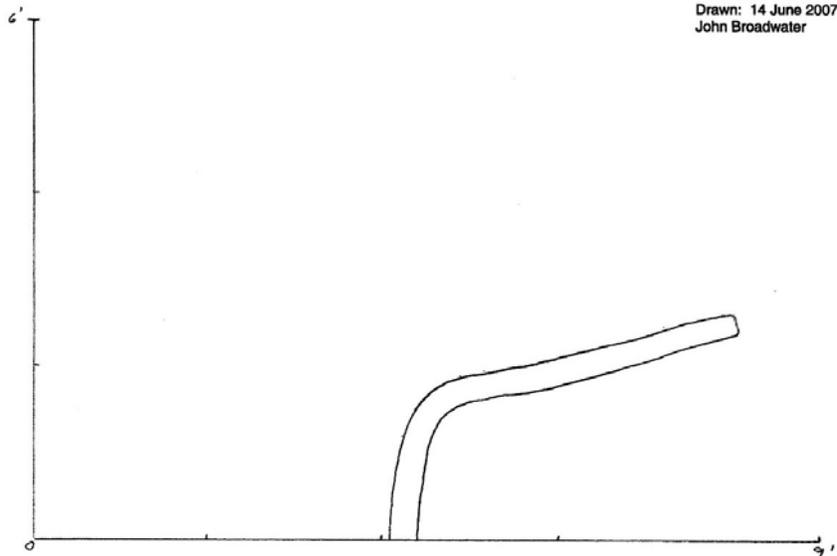
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Iron Frame # 6  
Drawn: 14 June 2007  
John Broadwater



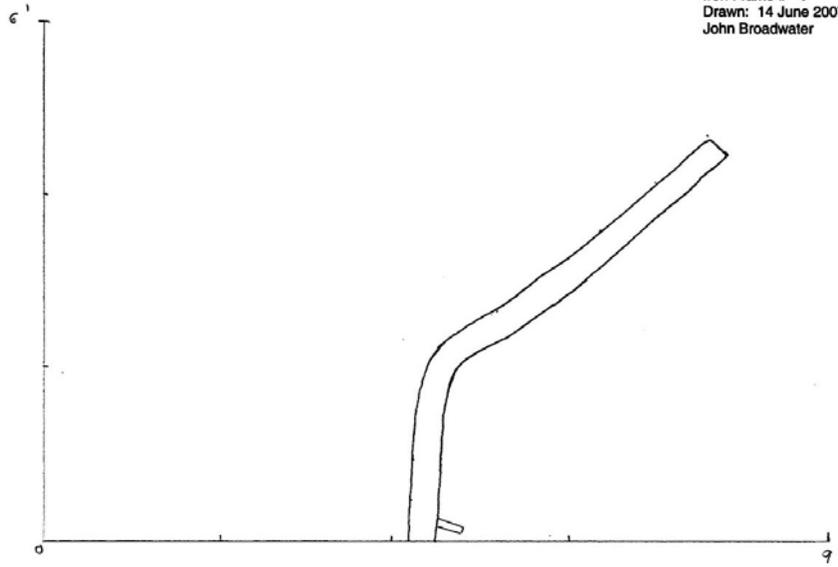
"RIB WRECK"  
Iron Frame # 7  
Drawn: 14 June 2007  
John Broadwater



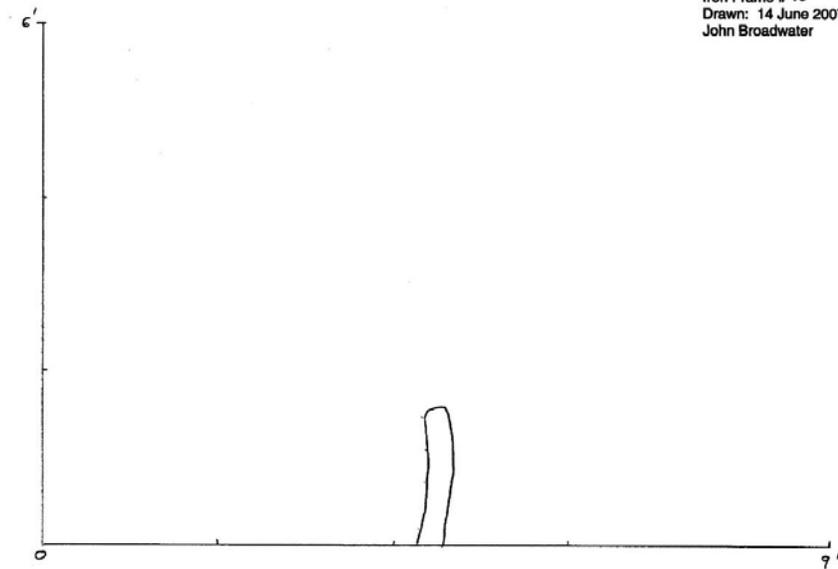
"RIB WRECK"  
Iron Frame # 8  
Drawn: 14 June 2007  
John Broadwater

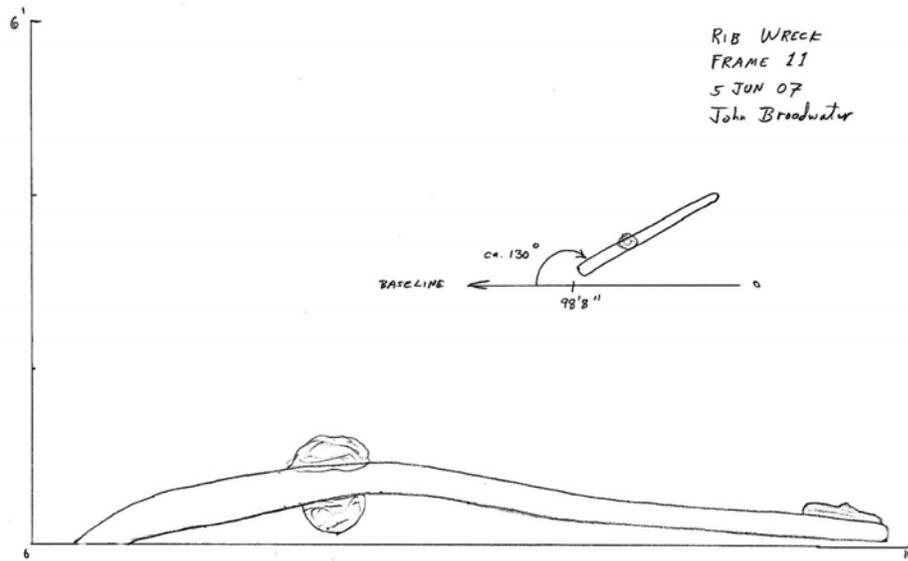


"RIB WRECK"  
Iron Frame # 7  
Drawn: 14 June 2007  
John Broadwater

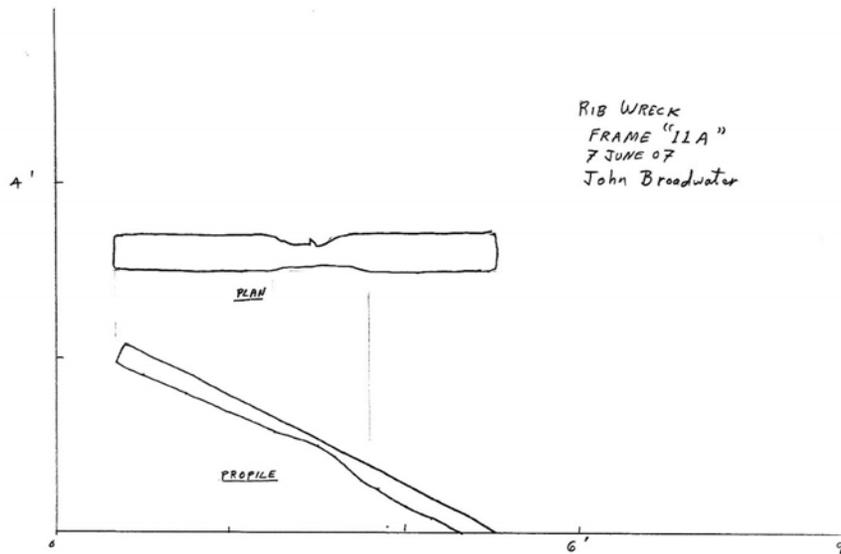


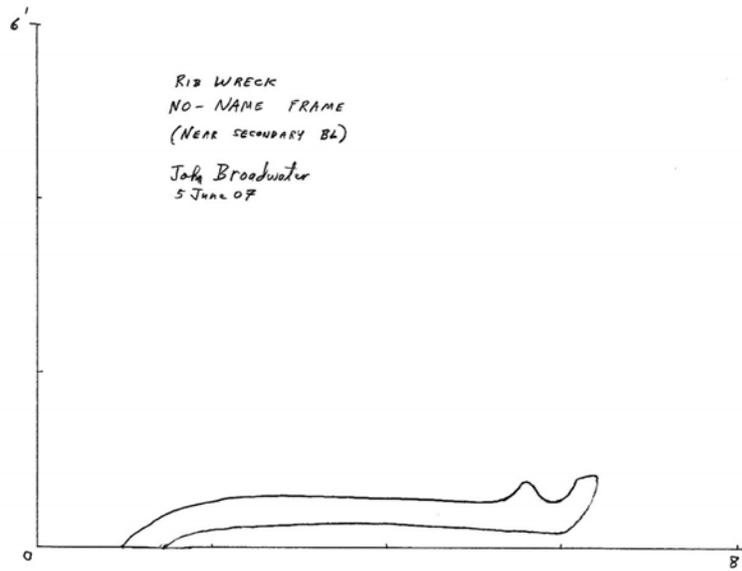
"RIB WRECK"  
Iron Frame # 10  
Drawn: 14 June 2007  
John Broadwater



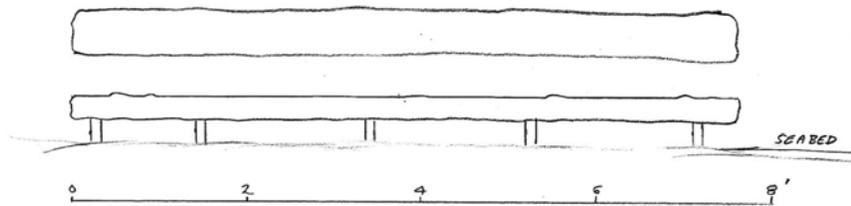


Note: Frame labeled "11A" below is labeled number 12 on site plan.





Note: "No Name" frame above is labeled number 13 on site plan and object below is labeled number 14 on site plan.

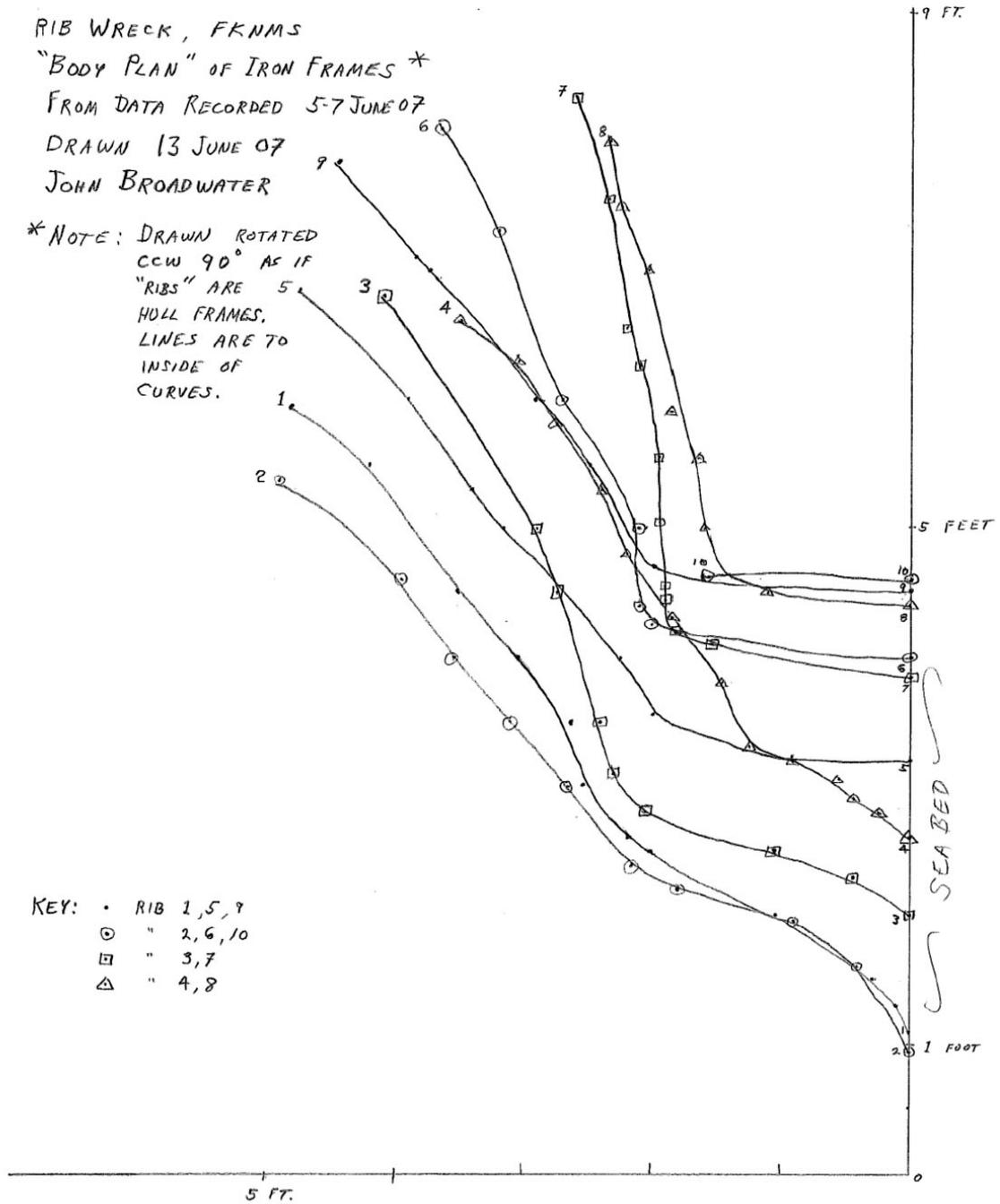


RIB WRECK  
 IRON OBJECT APPROX 18-26' ON NEW BL  
 7 JUNE 07  
 John Broadwater

Appendix III:  
 "Body Plan" of Reinforcing Frames 1-10

RIB WRECK, FKNMS  
 "BODY PLAN" OF IRON FRAMES \*  
 FROM DATA RECORDED 5-7 JUNE 07  
 DRAWN 13 JUNE 07  
 JOHN BROADWATER

\* NOTE: DRAWN ROTATED  
 CCW 90° AS IF  
 "RIBS" ARE 5  
 HULL FRAMES.  
 LINES ARE TO  
 INSIDE OF  
 CURVES.



KEY: • RIB 1, 5, 9  
 ○ " 2, 6, 10  
 □ " 3, 7  
 △ " 4, 8

## Appendix IV: Biological Inventory

### FISH

Great Barracuda – *Sphyrea barracuda*  
Grey Trigger fish – *Balestes capriscus*  
Red Grouper – *Epinephelus morio*  
French Angelfish, Juvenile – *Pomacanthus paru*  
Cocoa Damselfish, Juvenile – *Stegastes variabilis*  
Highhat, Juvenile – *Pareques acuminatus*  
Oyster Toadfish – *Opsanus Tau*  
White-eye Goby – *Bollmannia boqueronensis*  
Tiger Goby – *Gobiosoma macrodon*  
Frillfin Goby – *Bathygobius soporator*  
Spotted Burrfish – *Chilomycterus atinga*  
Sand Diver – *Synodus intermedius*



Figure 14. Split-crown Feather Dusters.

### CRUSTACEANS

Banded Coral Shrimp – *Stenopus hispidus*  
Pederson Cleaner Shrimp – *Periclimenes pedersoni*  
Spotted Cleaner Shrimp – *Periclimenes yucatanicus*  
Caribbean Spiny Lobster – *Panulirus argus*  
Red Reef Hermit – *Paguristes cadenati*  
Florida Stone Crab – *Menippe merenaria*  
Blue Crab – *Callinectes sp.*



Figure 15. Spiny lobster sheltering in collar.

### EELS

Reticulate Moray – *Muraena retifera*

### CNIDARIANS

Giant Anemone – *Condylactis gigantea*

### WORMS

Leopard Flatworm – *Pseudoceros pardalis*  
Christmas Tree Worm – *Spirobranchus giganteus*  
Split-Crown Feather Duster – *Anamobaea orstedii*

### MARINE PLANTS

Turtle Grass – *Thalassia testudinum*  
Midrib Seagrass – *Halophila baillonis*  
Stalked Lettuce Leaf Alga – *Halimeda tuna*  
Fuzzy Finger Alga – *Neomeris annulata*  
Flat Green Feather Alga – *Caulerpa mexicana*  
Green Grape Alga – *Caulerpa racemosa*  
Mermaid's Fans – *Udotea sp.*  
Three Finger Leaf Alga – *Halimeda incrassata*  
Flat-Top Bristle Brush – *Penicillus pyriformis*  
Green Mermaid's Wine Glass – *Acetabularia calyculus*  
Pink Bush Alga – *Wrangelia penicillata*



Figure 16. Anemone attached to object 15.