

**REPORT ON A MID-TO-LATE NINETEENTH-CENTURY WOODEN SHIPWRECK
IN THE EAST CHANNEL OF THE MOBILE RIVER SUGGESTED AS A CANDIDATE
FOR THE 1855 SCHOONER *CLOTILDA*,
BALDWIN COUNTY, ALABAMA**

PREPARED FOR

THE ALABAMA HISTORICAL COMMISSION,
THE PEOPLE OF AFRICATOWN,
AND THE SLAVE WRECKS PROJECT

CONDUCTED BY

A JOINT PARTNERSHIP BETWEEN
SEARCH,
THE ALABAMA HISTORICAL COMMISSION (AHC),
AND THE SLAVE WRECKS PROJECT (SWP), A GLOBAL NETWORK, INCLUDING
THE GEORGE WASHINGTON UNIVERSITY,
THE NATIONAL PARK SERVICE (NPS),
SOUTHEAST ARCHAEOLOGICAL CENTER (SEAC),
NPS SUBMERGED RESOURCES CENTER (SRC),
DIVING WITH A PURPOSE (DWP),
AND THE SMITHSONIAN INSTITUTION NATIONAL MUSEUM OF AFRICAN AMERICAN HISTORY AND CULTURE
(NMAAHC)

JULY 2018

**REPORT ON A MID-TO-LATE NINETEENTH-CENTURY WOODEN SHIPWRECK
IN THE EAST CHANNEL OF THE MOBILE RIVER SUGGESTED AS A CANDIDATE
FOR THE 1855 SCHOONER *CLOTILDA*, BALDWIN COUNTY, ALABAMA**

PREPARED BY

JAMES P. DELGADO, PHD, RPA, KYLE LENT, MA, RPA, JOSEPH GRINNAN, MA, RPA,
DAVID W. MORGAN, PHD, STACYE HATHORN, MA, AND DAVID CONLIN, PHD

JULY 2018

EXECUTIVE SUMMARY

This report presents the results of a shallow-water archaeological investigation and diver evaluation of a potentially significant semi-submerged shipwreck site in the Mobile River near Twelvemile Island, Baldwin County, Alabama. The resource is referred to as the Twelvemile Island Wreck Site (1BA694), and has been registered by the Alabama Historical Commission (AHC) with the Director of the Office of Archaeological Research at the University of Alabama, as field site 1BA694. This report is prepared for AHC, the people of Africatown, and the Slave Wrecks Project (SWP), and was conducted by a joint partnership between SEARCH, AHC, and the SWP, a global network including the George Washington University, the National Park Service (NPS) Southeast Archaeological Center (SEAC), and Submerged Resources Center (SRC) branches, Diving with a Purpose (DWP), and the Smithsonian Institution National Museum of African American History and Culture (NMAAHC). AHC contacted the partnership to assess the previously unrecorded resource in an effort to determine the identification of the wreck, and assess its eligibility for listing in the National Register of Historic Places (NRHP).

The wreck of a mid- to late-nineteenth-century wooden vessel lies in the bank of the Mobile River in the Mobile Bay Estuary off Twelvemile Island, Mobile, Alabama. On January 23, 2018, reporter Ben Raines of *Al.com* published a story that a partially buried wreck on the Mobile River might be that of *Clotilda*, the last known ship to bring a human cargo bound for slavery to the United States. The report noted that a preliminary assessment of the visible portions of the wreck by University of West Florida (UWF) archaeologists John Bratten and Greg Cook, and shipwright Winthrop Turner, indicated the wreck was that of a nineteenth-century craft, and that there were visible indications of having been burned, features Raines noted were consistent with his theory that the wreck might be *Clotilda*. The story also noted that Bratten and Cook had stressed there was no conclusive documentation of the identity of the wreck and that further research and excavation was needed (Raines 2018).

The team conducted initial archival research to determine if the wreck had previously been documented in the archaeological record. The partnership also recommended a phased approach to archaeological examination of the wreck. The first phase would be preparation of a detailed site map to document as much of the full extent of the wreck as possible. The initial phase would also include limited test excavation to assess hull form, determine the presence or lack of copper sheathing, and provide insight into the extent of burning on the vessel. The fieldwork for this investigation was scheduled for, and took place on, March 1 to March 4, 2018, under the direction of Stacye Hathorn, MA, AHC State Archaeologist.

Additionally, the team investigated five targets within close proximity to the Twelvemile Island Wreck (1BA694) location. The evidence of additional wreck sites suggested that the Twelvemile Island Wreck (1BA694), and the area around the Twelvemile Island Wreck (1BA694), may be part of a larger maritime landscape referred to colloquially as a “ship graveyard,” a location where the hulls of scrapped vessels are left to decay. The five additional target areas were investigated, four of which proved to be either ship remains or barge wrecks. The fifth (Target 2) proved to be a natural feature. The four targets have been assigned provisional names: Hicks

(Target 1), Dobbs (Target 3), Harm (Target 4), and Kennedy (Target 5). Archaeological site numbers for these four targets have been assigned as follows: Hicks Wreck (1BA695), Dobbs Wreck (1BA696), Harms Wreck (1BA697), and Kennedy Wreck (1BA698).

The team utilized high precision GPS, a Trimble Model M3 DR 5" total station, hand probing, photo documentation, measured drawings, artifact illustration, and field observations to conduct shallow-water archaeological investigation (i.e., archaeological investigation did not require diving technologies). In addition, the team conducted scientific diving utilizing Self-Contained Underwater Breathing Apparatus (SCUBA) at the Twelvemile Island Wreck site. Diver investigations included those areas thought to include portions of shipwreck features, which were too deep for shallow water investigation. The team conducted a total of two dives from March 1 to 2, 2018.

The results of the investigation indicate that the Twelvemile Island Wreck is not that of the *Clotilda*. Based on comparing the Twelvemile Island Wreck with *Clotilda's* Certificate of Enrolment and Registry, the overall length of the Twelvemile Island Wreck (1BA694) is much larger than that of *Clotilda*, the size of the timbers on the Twelvemile Island Wreck (1BA694) are much larger than that of the timbers on *Clotilda*, and the Twelvemile Island Wreck (1BA694) likely had three masts instead of *Clotilda's* two. The Twelvemile Island Wreck (1BA694) also was constructed with flat iron reinforcement within the hull, which is commonly found on larger wooden vessels than that of *Clotilda*. Additionally, no evidence of burning was observed on the Twelvemile Island Wreck (1BA694). Nine wood samples were collected during the March 2018 investigation and initial analysis suggests the samples consist of a combination of Douglas Fir and Larch, a lumber typically grown and harvested in the Pacific Northwest region of the United States.

Although the team believes the Twelvemile Island Wreck is not the *Clotilda*, the grouping of five shipwrecks in close proximity, including Site 1BA694, represents a larger maritime landscape of the Mobile River, and is likely eligible for nomination to the NRHP under Criteria A, C, and D pending further investigation. The Twelvemile Island Wreck vessel represents a unique example of a likely mid-to-late nineteenth-century wooden, West Coast-built sailing vessel, probably a schooner, and may yield, or is likely to yield, information important to Mobile and the broader history of the Gulf coast.

The waterway along the Mobile River is an important and tangible element of maritime commerce and maritime trade within the Delta, the Mobile River, and the city of Mobile, Alabama. The Twelvemile Island Wreck site appears to exist within, and is part of, a larger maritime landscape referred to as a ship graveyard. The overall boundaries of the waterway, including the Twelvemile River Wreck, the four additional wreck sites, and any additional unrecorded resources that comprise the ship graveyard in the portion of the Mobile River surrounding the Twelvemile Island Wreck, are of national significance due to Mobile's important role in the history of the Gulf region and the nation and the Mobile waterfront, and merit a comprehensive evaluation and a nomination to the NRHP. Such a nomination, with boundaries extending into the Mobile River to incorporate known and suspected submerged and buried features and artifacts, is key not only for recognizing the area's significance, but also

for asserting that what lies in the Mobile River is important and should be seen as archaeological resources that will add to a more detailed understanding of the activities and people who worked there.

This page intentionally left blank.

ACKNOWLEDGEMENTS

Several individuals and organizations greatly contributed to the successful completion of this project. Most notably, the community members of Africatown, for whom we would like to extend our utmost gratitude to as they have allowed us all to play a small role in aiding in the narrative of the people of Mobile River and the State of Alabama. We would like to thank Smithsonian Institution and the Slave Wrecks Project of the Smithsonian's National Museum of African American History and Culture (NMAAHC), George Washington University, and the National Park Service (NPS) for their support of this project, and in particular, we thank Paul Gardullo, Steve Lubkemann, Mary Elliott, and Kamau Sadiki, for their ongoing support and assistance throughout the operation. We would also like to extend our recognition and gratitude to the staff at the Alabama Historical Commission (AHC), specifically Lisa D. Jones (Director), Stacye Hathorn (State Archaeologist), Clara Nobles (Assistant Executive Director), Lee Anne Wofford (Deputy State Historic Preservation Officer, Historic Preservation Division Director), and Jacquelyn Kirkland, Eleanor Cunningham, and Dorothy Walker, whose tireless contributions allowed for the project to run smoothly throughout the entirety of the operation. We are grateful for Senator Vivian Figures for her involvement with this operation; her dedication to the project is a testament to her character as a person, and to how much she cares about the people of the State of Alabama.

In February 2018, the Archaeological framework for the operation was established by an executive team including Lisa D. Jones, Dr. Paul Gardullo, and Dr. David Morgan. Fieldwork crew consisted of Archaeologists Dr. James Delgado, Kyle Lent, and Joe Grinnan of SEARCH; Dr. David W. Morgan and Clete Rooney of NPS Southeast Archaeological Center (SEAC); Dr. Dave Conlin of NPS Submerged Resources Center (SRC); Stacye Hathorn of AHC; NMAAHC representatives, including Mary Elliott and Kamau Sadiki; as well as the rest of the abovementioned AHC team. Stacye Hathorn was the project Principal Investigator, with Dr. Conlin and Dr. Delgado as co- Principal Investigators. Mr. Grinnan served as dive safety officer and led dive operations. Mr. Lent served as archaeologist and diver, and was SEARCH's lead contributor for reporting of the investigation. David W. Morgan and Clete Rooney of NPS offered their expertise and conducted GIS and total station recordation of the site, with Dave Conlin and David W. Morgan acting as NPS liaisons and team archaeologists. As representatives of the NPS, the direction of leadership of Dr. Morgan and Dr. Conlin were instrumental in the success of the project.

We are indebted to The City of Mobile and the University of Southern Alabama, who went above and beyond the call of duty by providing operational support during the project, along with Alabama Department of Conservation and Natural Resources officers Jeremy Hicks, Jordan Kennedy, Thomas Harms, and Joseph Dobbs Jr., who piloted and transported team members while on the water in Mobile.

We would also like to extend our gratitude to Alabama news reporter Mr. Ben Raines, whose initial groundwork investigations led to this operation, as well as University of West Florida

archaeologists Dr. John Bratten and Dr. Greg Cook, and shipwright Winthrop Turner, who indicated that the wreck site may be of a nineteenth-century watercraft. We also thank Dr. Amy Mitchell-Cook, who provided laboratory analysis and identification of wood samples taken from the wreck site.

This report is the result of the combined efforts of multiple specialists who completed background research, analysis, and authorship in their various specializations. Special credit is given to John Cloud and Dr. Delgado of SEARCH for providing archaeological and historical characterization, and Mr. Lent for compiling the report. In-house SEARCH support included Ray Tubby, MA, and Christopher Altes, MA (GIS), and Katy Harris, MS (Lead Technical Editor).

Our knowledge of current maritime landscapes and the historic context of the Mobile River was enhanced by time shared with John Sledge, Historian. Finally, we would like to thank the AHC for their continued efforts in overseeing the preservation of Mobile River's rich cultural heritage.

TABLE OF CONTENTS

Executive Summary.....	iii
Acknowledgements.....	vii
Table of Contents.....	ix
List of Figures	xi
List of Tables	xv
Introduction	1
Project Background.....	1
Environmental Conditions	4
Project Personnel.....	4
Survey Expectations.....	5
Historic Background.....	6
Africatown and <i>Clotilda</i>	7
The Development of the American Schooner	7
Characteristics of <i>Clotilda</i>	10
Presumed Site Formation Processes for <i>Clotilda</i>	12
Twelvemile Island	14
Historic Photograph and Map Review of the Project Area	14
Navigation Charts and Aerials.....	15
Methods.....	23
Dive Operations	24
Survey/Dive Vessel.....	24
Survey Equipment and Site Relocation.....	25
Results.....	26
Twelvemile Island Wreck (1BA694)	27
Ship Components	30
Analysis	41
Additional Fieldwork Photos and Total Station Results.....	45
Probable Context	54
Additional Shipwrecks Investigated.....	55
Target 1: Hicks Wreck (1BA695)	55
Target 2: Trees	58
Target 3: Dobbs Wreck (1BA696).....	58
Target 4: Harms Wreck (1BA697)	59
Target 5: Kennedy Wreck (1BA698).....	61
NRHP Evaluation	64
The Development of the American Barge	65
Understanding and Assessing a Ship Graveyard.....	67
NRHP Eligibility.....	69
Conclusions and Recommendations.....	73
References Cited	74

Appendix A: Dive Logs

This page intentionally left blank.

LIST OF FIGURES

Figure 1.	Aerial of the Twelvemile Island Wreck (1BA694) location in the Mobile River, Baldwin County, Alabama.....	2
Figure 2.	Topographic Map of the Twelvemile Island Wreck (1BA694) in the Mobile River, Baldwin County, Alabama.....	3
Figure 3.	Environmental conditions were favorable during fieldwork with clear days, cool temperatures, and 65 °F water temperature. View southwest down Mobile River.....	4
Figure 4.	<i>Clotilda</i> 's Certificate of Enrolment and Registry, 1855 (US Customs Service 1855). .	11
Figure 5.	This 1851 Plan from a British shipbuilding treatise indicates what a two-masted vessel similar to <i>Clotilda</i> would generally look like in profile (Peake 1851:Plate 1). .	12
Figure 6.	H1918 diagram of the Mobile River Surveys. Source: USC&GS 1889b.	16
Figure 7.	H1909 showing the navigationally-preferred side of Twelvemile Island. Source: USC&GS 1888.....	16
Figure 8.	1938 Historic aerial of the Mobile River with the Twelvemile Island Wreck (1BA694) location.	17
Figure 9.	1952 Historic aerial of the Mobile River with the Twelvemile Island Wreck (1BA694) location.	19
Figure 10.	1941/43 Historic Topo Map of the Mobile River with the Twelvemile Island Wreck (1BA694) location.	20
Figure 11.	1958 USC&GS chart showing Twelvemile Island and obstructions along the eastern bank.	21
Figure 12.	Historic photograph (ca. 1912) identified as showing the remains of <i>Clotilda</i> (Roche 1914:102).....	22
Figure 13.	Historic aerials and zoomed-in photograph showing what appears to be exposed pilings near the wreck site.....	23
Figure 14.	"Rotting hulk of Schooner <i>Clotilde</i> , last 'slaver' yields museum piece" (June 1965). Source: <i>Alabama on the Go</i> 1965:29.....	23
Figure 15.	Diver Kyle Lent, equipped with SCUBA and team members, as well as members of the public.	24
Figure 16.	The team used a 21-foot (6.4-meter), flat-bottomed, aluminum vessel for diving operations.	24
Figure 17.	Archaeologists Clete Rooney and Stacye Hathorn using the Trimble Total Station to map features of the Twelvemile Island Wreck (1BA694) site.	25
Figure 18.	Kamau Sadiki drawing the stem feature of the Twelvemile Island Wreck Site (1BA694).	26
Figure 19.	Total Station placement alternate view showing Twelvemile Island Wreck (1BA694). David W. Morgan background with stadia rod, facing northwest.	26
Figure 20.	Twelvemile Island Wreck (1BA694) site and additional five target areas, Mobile River, Alabama.	28
Figure 21.	Historic aerial showing the Twelvemile Island Wreck (1BA694). Source: University of Alabama 1952.....	29

Figure 22. Exposed elements of the wreck during a January 2018 site visit. Source: Raines 2018. 29

Figure 23. Bow of the Twelvemile Island Wreck (1BA694) in January 2018. Source: Raines 2018. 30

Figure 24. Outboard Profile of *C.A. Thayer* showing the placement and characteristic of the bowsprit, bobstays, and foremast. Source: Library of Congress. 31

Figure 25. Left: The basic form of a nineteenth-century wooden hull (Paasch 1885). Right: the location of visible elements on the stem of the Twelvemile Island Wreck (1BA694). Profile example of *C.A. Thayer*. Source: Library of Congress..... 31

Figure 26. Erosional wear on the fallen stem piece; visible after hand excavation. 32

Figure 27. Left: The stem attached to the hull (note bobstays), looking aft and along the starboard side. Right: The upper stem, laying off the starboard bow. 32

Figure 28. Examples of bobstay fasteners on wooden vessels (Underhill 1946). 33

Figure 29. Iron strap for securing bobstays on the starboard side of the stem, as exposed in January 2018 (left) and March 2018 (right)..... 33

Figure 30. Bow of *Coronet* (1885) showing the bobstay fasteners on the stem. Source: Daniels 2010..... 34

Figure 31. Collapsed upper hull inside the bow. Source: Raines 2018. 34

Figure 32. The partial separation of the stem and apron timbers still attached to the wreck, with the stem twisted to starboard and toward shore. 35

Figure 33. Midship section of the *C.A. Thayer*. Source: Library of Congress..... 36

Figure 34. Midship cross-section with nomenclature. Source: Paasch 1885. 37

Figure 35. Example of steel arch strapping. Source: Estep 1918..... 38

Figure 36. Archaeologist Stacye Hathorn measuring steel reinforcing straps along the starboard side of the vessel. 39

Figure 37. Probable iron reinforcing strap from the Twelvemile Island Wreck Site (1BA694). Illustration by Kamau Sadiki..... 40

Figure 38. Port hull of *Wawona* showing the mainmast chainplates. Source: Library of Congress..... 40

Figure 39. UWF measurement of a section of midships hull showing outer hull planking, the butt-ends of frames, likely at the third or fourth frame futtock level, and ceiling planking with the likely hold-beam shelf. Source: Raines 2018. 41

Figure 40. The exposed line of the starboard hull, midships, heading aft toward the stern during the January 2018 site visit, showing the frame ends, fasteners, outer and ceiling planking, and large size of the exposed frames. Source: Raines 2018..... 42

Figure 41. Shackle and wire rope identified at the site during the March 2018 field visit. 45

Figure 42. Clete Rooney (left) gathers GPS data over forward starboard iron strap. 45

Figure 43. Kyle Lent measuring possible beam on the Twelvemile Island Wreck (1BA694) site..... 45

Figure 44. View of forward portion of the Twelvemile Island Wreck (1BA694) site showing bobstay fastener, stem, and the cant frames (image facing roughly north-northwest). David W. Morgan holding stadia rod atop cant frame. 46

Figure 45. View of aft to midships section of the Twelvemile Island Wreck (1BA694) site showing frames, image facing northeast..... 46

Figure 46. View of Twelvemile Island Wreck (1BA694) site from forward cant frames down starboard side; Joe Grinnan measuring drift bolt fastener; David W. Morgan in background with stadia rod; image facing west..... 47

Figure 47. View of Twelvemile Island Wreck (1BA694) site as seen at low tide on March 2, 2018. Jim Delgado in foreground, image facing west, with scale in 6-inch units atop the stem feature..... 47

Figure 48. Plan view of wooden bow/stem feature at the Twelvemile Island Wreck (1BA694) site. Illustration by Kamau Sadiki..... 48

Figure 49. Disarticulated stempost feature at the Twelvemile Island Wreck (1BA694). Illustration by James Delgado..... 49

Figure 50. Total Station Map of the Twelvemile Island Wreck (1BA694). Details shown in Figures 51-53. Map by David W. Morgan..... 50

Figure 51. Total Station map of forward portion of the Twelvemile Island Wreck (1BA694) site showing disarticulated stem element. Map by David W. Morgan..... 51

Figure 52. Total Station map of the Twelvemile Island Wreck (1BA694) showing forward section. Map by David W. Morgan..... 52

Figure 53. Total Station map of the Twelvemile Island Wreck (1BA694) showing aft section. Map by David W. Morgan..... 52

Figure 54. Three-masted schooner on the Mobile waterfront, ca. 1909. Source: Library of Congress..... 55

Figure 55. GPS locations of the corner points of the Hicks wreck barge discovered at Target 1 area..... 56

Figure 56. GPS-based schematic of the Hicks barge wreck site discovered at Target 1, showing photo points..... 57

Figure 57. Probable bollard at southeast corner of Target 1, facing southwest..... 58

Figure 58. Southwest corner of Target 1, facing northeast..... 58

Figure 59. Target 2, as shown on 2002 Google Earth Imagery, which appears to be a linear feature approximately 100 feet (30 meters) in length. Google Earth aerial..... 58

Figure 60. GPS locations of the southern and eastern edges of the barge and visible features at the Dobbs site..... 59

Figure 61. Photographs of the Dobbs Site. Top Left: Southeast corner, facing west. Top Right: Southeast corner, facing southwest. Bottom Left: Vent shaft, plan view. Bottom Right: Vent shaft in profile view, facing west..... 60

Figure 62. What appears to be a shipwreck visible at the Target 4 location. Source: University of Alabama 1952..... 61

Figure 63. Shipwreck visible at the Target 5 location. Source: University of Alabama 1952..... 61

Figure 64. GPS locations of the corner points of the potential barge and second wreck discovered at Target 5 and named the Kennedy site..... 62

Figure 65. GPS locations of the southern edge of the barge and visible features at the Kennedy site..... 63

Figure 66. Close-up image of barge push-point feature at the Kennedy site showing rivets..... 64

Figure 67. Southern edge of barge at the Kennedy site, facing northeast..... 64

Figure 68. David W. Morgan (left) and Kyle Lent (right) inspecting push-point barge feature at the Kennedy site, facing northeast..... 65

Figure 69. Historic Photographs of the steamboat *John Quill* (left), loading freight; ca. 1912-1915 (right) steamer at the lower end of Twelvemile Island on the Mobile River. Source: Alabama Department of Archives and History 2018. 68

Figure 70. Historic aerial dated 1958 showing multiple shipwrecks in the Mobile River. 68

Figure 71. *Rachel*, as exposed on the beach after storm erosion, September 5, 2012. Source: Raines 2018. 71

Figure 72. Waterfront, Mobile, Alabama (1909). Note three-masted schooner in foreground. Source: Library of Congress. 72

LIST OF TABLES

Table 1.	<i>Clotilda</i> Characteristics.	10
Table 2.	Twelvemile Island Wreck (1BA694) Site and Additional Target Areas Location.	27
Table 3.	Twelvemile Island Wreck (1BA694) Location (State Plane, Alabama, W. Zone NAD83 [ft]).	27
Table 4.	Wood Samples Taken at the Twelvemile Island Wreck (1BA694) Site.	43
Table 5.	Codes Assigned to Survey Points and Their Explanations.	53
Table 6.	Hicks Wreck Location (State Plane, Alabama, W. Zone NAD83 [ft]).	57
Table 7.	Target 2 Trees Locational Information (State Plane, Alabama, W. Zone NAD83 [ft]).	58
Table 8.	Dobbs Wreck Locational Information (State Plane, Alabama, W. Zone NAD83 [ft]).	59
Table 9.	Harms Wreck Locational Information (State Plane, Alabama, W. Zone NAD83 [ft]).	60
Table 10.	Kennedy Wreck (Target 5) Locational Information (State Plane, Alabama, W. Zone NAD83 [ft]).	61

This page intentionally left blank.

INTRODUCTION

This report presents the results of an archaeological investigation of a wooden shipwreck suggested to be the 1855 schooner *Clotilda*, located in the eastern channel of the Mobile River in Baldwin County, Alabama (Figures 1 and 2). The wreck site is referred to as the Twelvemile Island Wreck Site (1BA694). The report also presents the findings of investigations at five additional target areas, [REDACTED]. The five additional target areas were investigated during field operations because the locations appeared to be shipwreck sites based on analysis of historic aerials. The work was conducted at the request of the Alabama Historical Commission (AHC). As a joint partnership between the multiple organizations, the focus was to assess the previously unrecorded shipwreck resource and determine if the site is that of *Clotilda*.

This project was conducted in accordance with the Secretary of the Interior's *Standards and Guidelines for Archeology and Historic Preservation* (36 CFR Part 61) and in compliance with the National Historic Preservation Act of 1966, as amended (Public Law [PL] 89-665), the Archeological and Historic Preservation Act, as amended (PL 93-291), and the Advisory Council on Historic Preservation revised 36 CFR Part 800 Regulations. The investigation was performed by professional archaeologists who meet the qualifications established in the Secretary of the Interior's *Standards and Guidelines*.

This investigation was conducted by a joint partnership between SEARCH, AHC, and the Slave Wrecks Project (SWP) the National Park Service (NPS) Southeastern Archaeological Center (SEAC), the NPS Submerged Resources Center (SRC), Diving with a Purpose (DWP), and the Smithsonian Institution's National Museum of African American History and Culture (NMAAHC). The investigation built on an initial site visit conducted by members of the University of West Florida (UWF) archaeological program, and an AL.com news reporter. The Partnership conducted shallow-water archaeological investigation, which included in-water inspection that was limited to wading reconnaissance, and two SCUBA diver investigations from March 1 to 4, 2018.

PROJECT BACKGROUND

On January 23, 2018, reporter Ben Raines of Al.com published a story that suggested a wreck on the Mobile River might be *Clotilda*, the last known ship to bring a human cargo bound for slavery to the United States. The report noted that an assessment of the visible portions of the wreck by archaeologists Dr. John Bratten and Dr. Greg Cook, and shipwright Winthrop Turner, indicated the wreck was of a nineteenth-century craft, and that there were visible indications of having been burned—features Raines noted were consistent with his theory that the wreck might be *Clotilda*. The story noted that archaeologists had stressed there was no conclusive documentation of the identity of the wreck and that further research was needed (Raines 2018).

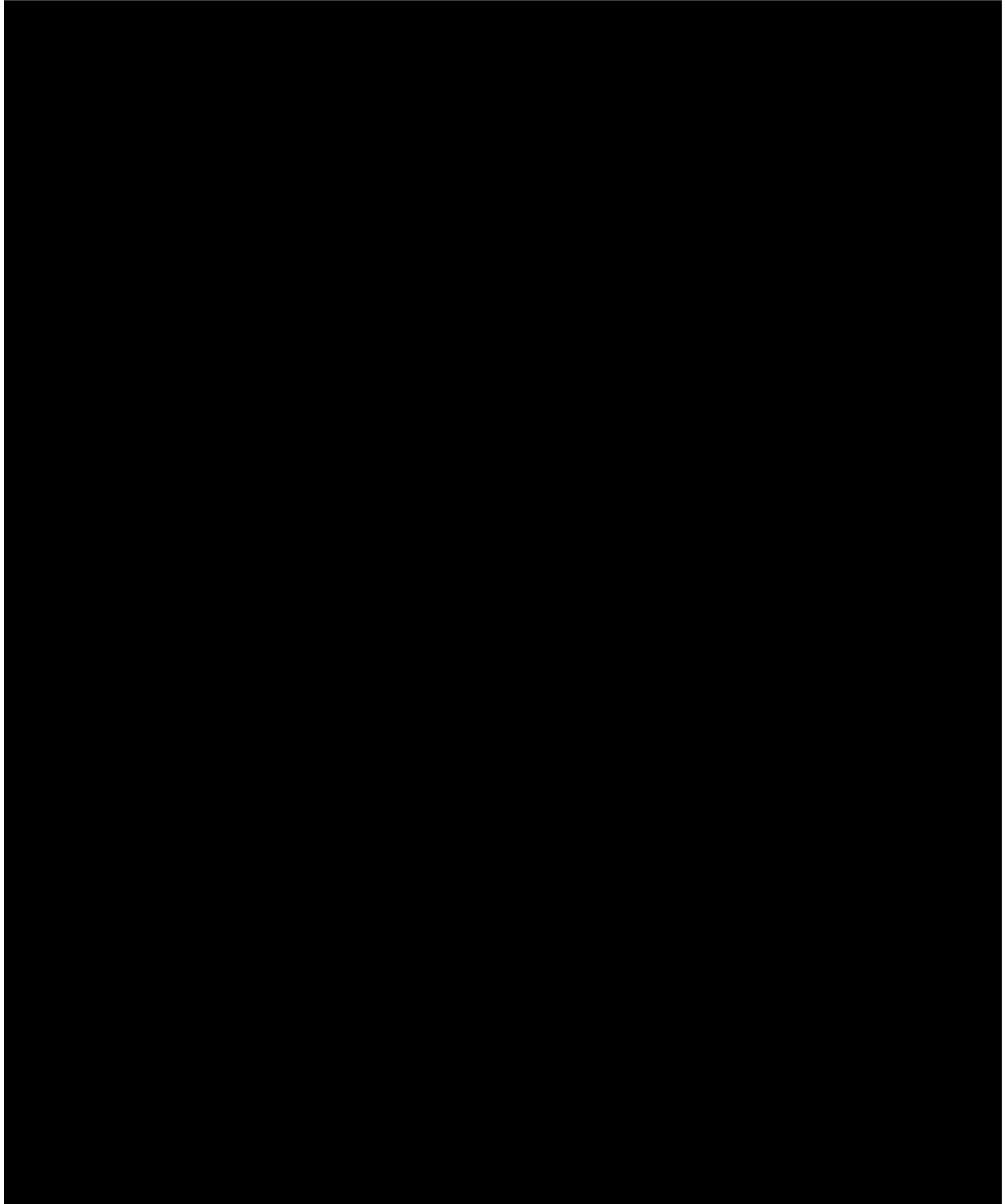


Figure 1. Aerial of the Twelvemile Island Wreck (1BA694) location in the Mobile River, Baldwin County, Alabama.

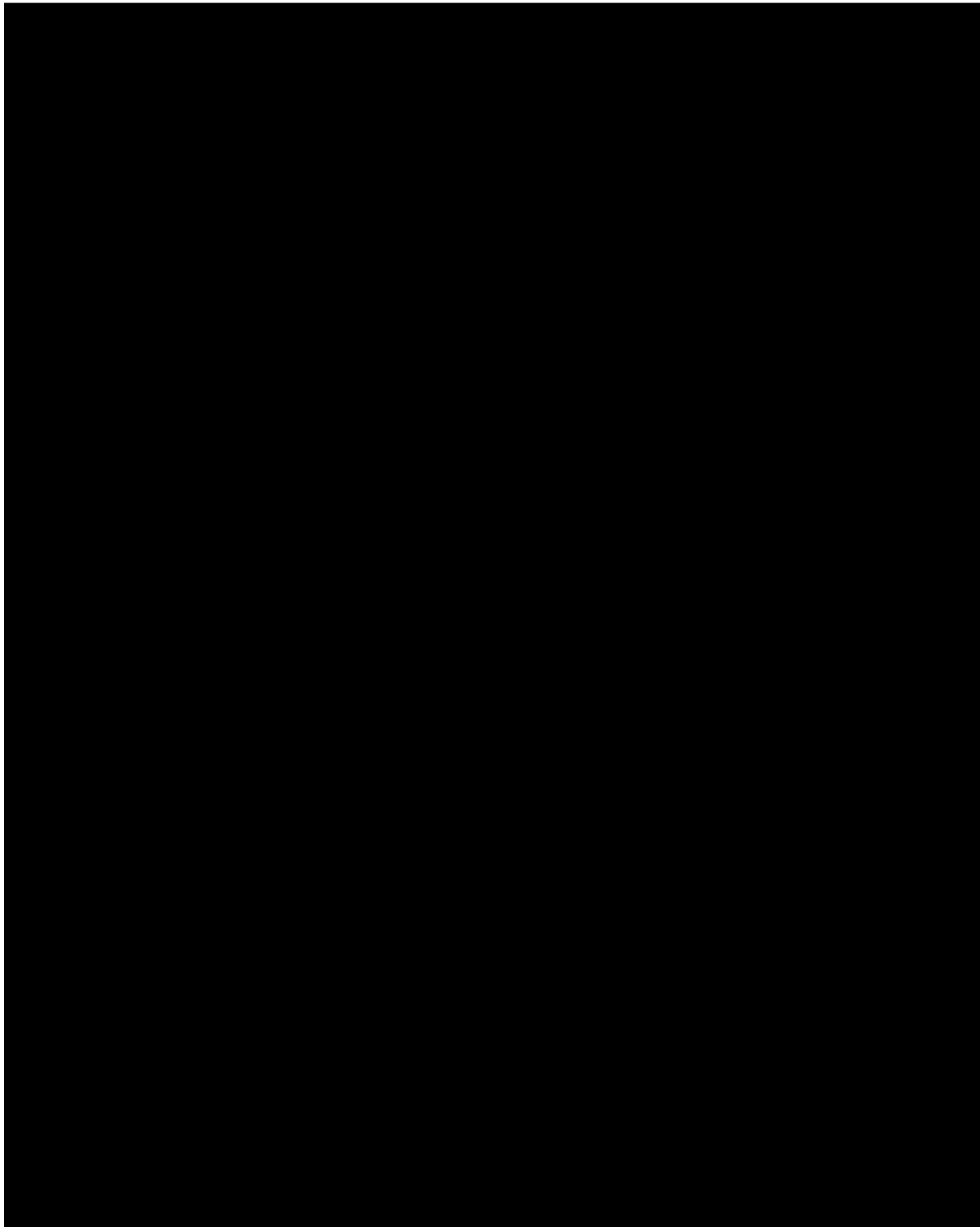


Figure 2. Topographic Map of the Twelvemile Island Wreck (1BA694) in the Mobile River, Baldwin County,

Following widespread international media coverage, the team was asked by AHC to assess the site in an effort to determine whether or not the wreck is *Clotilda*. The team recommended archival research and a phased approach to archaeological examination of the wreck in anticipation of the fieldwork mobilization. The first phase was conducted from March 1 to 4, 2018.

ENVIRONMENTAL CONDITIONS

Weather and environmental conditions during operations were favorable: sunny days with light breezes (**Figure 3**). Air temperatures averaged 60-70 degrees Fahrenheit (°F) with water temperatures averaging 65° F. Underwater visibility was extremely limited at less than 1 foot (0.3 meter) due to high amounts of sediment in the river. Water depths increased from shore to a maximum depth of 8 feet (2.4 meters). Tidal patterns consisted of a low tide in the morning, gradually increasing as the day progressed.

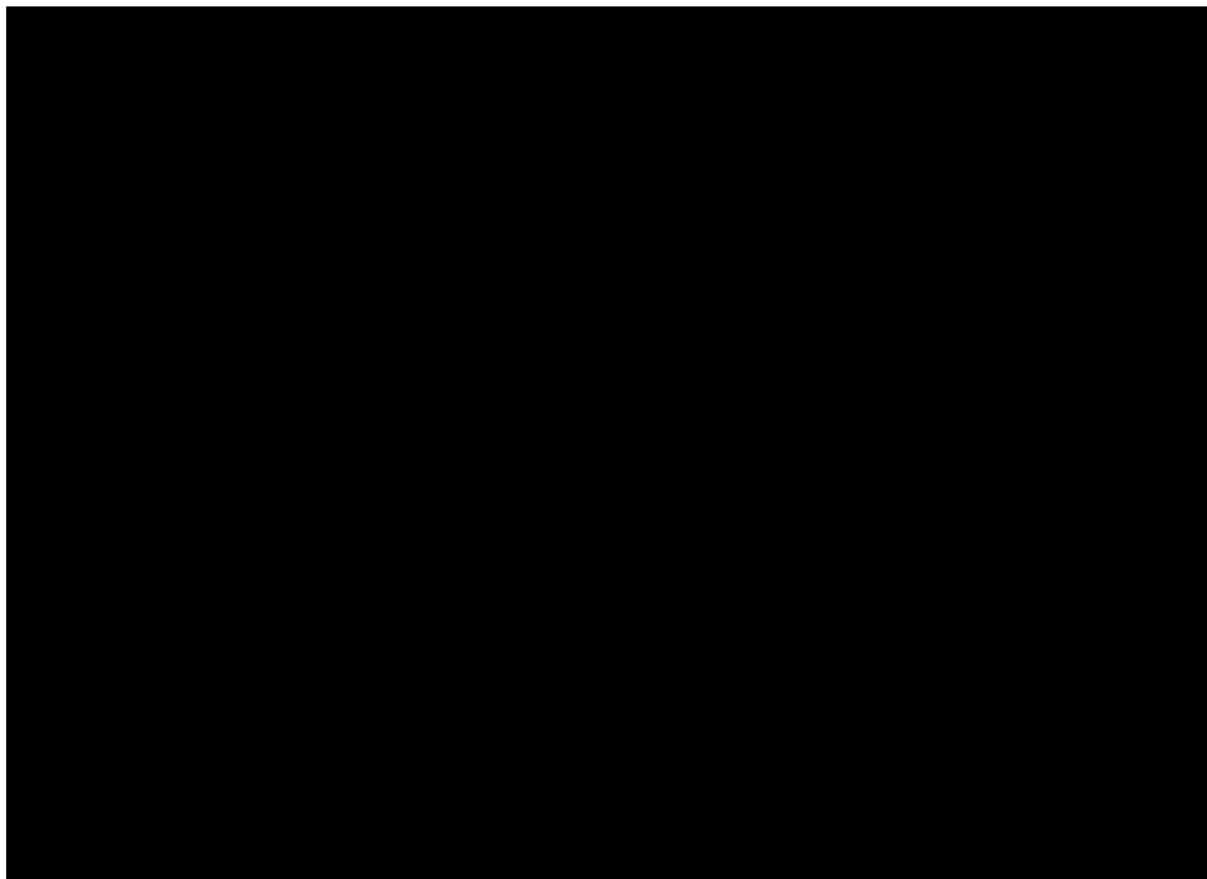


Figure 3. Environmental conditions were favorable during fieldwork with clear days, cool temperatures, and 65 °F water temperature. View southwest down Mobile River.

PROJECT PERSONNEL

James P. Delgado, PhD, RPA, served as SEARCH'S Project Manager for this project. State Archaeologist Stacye Hathorn was the Principal Investigator. Kyle Lent, MA, RPA, and Joe Grinnan, MA, RPA, assisted as SEARCH field archaeologists. The investigation was done in collaboration with representatives from AHC, including Lisa D. Jones (Executive Director), State Historic Preservation Officer (SHPO) Stacye Hathorn, and Clara Nobles, Lee Anne Wofford, Jacquelyn Kirkland, Eleanor Cunningham, and Dorothy Walker; NPS SEAC personnel David W. Morgan and Clete Rooney; NPS SRC personnel David Conlin; SINMAAHC; Diving with a Purpose personnel Mary Elliott and Kamau Sadiki; UWF personnel John Bratten, and Gregory Cook; and members of the community of Africatown, Alabama. Archaeological and historical characterization was provided by Dr. Delgado and John Cloud, PhD. Mr. Lent, Dr. Delgado, and David W. Morgan, PhD, contributed to reporting. Total Station and some GIS contributions were from Dr. Morgan and Mr. Rooney. In-house support included Ray Tubby, MA, and Christopher Altes, MA (GIS), and Katy Harris, MS (Lead Technical Editor).

SURVEY EXPECTATIONS

Ben Raines' story quickly became an international news story with widespread coverage throughout the United States. While the coverage did not positively identify the wreck as *Clotilda* and noted further archaeological work was needed, in some coverage and in public reaction it was taken as fact that the wreck was *Clotilda*. With the intensity of interest came risk to the site, despite the fact that there was no conclusive identification. The project acquired all requisite permits (from the US Army Corps of Engineers [USACE], and the AHC Maritime Exploration and Evaluation Permit). The locational information of the unidentified shipwreck was provided to the team, which was then used to conduct historic map review. The historic setting, review of known resources, and previous investigations indicated that the researched portion of the Mobile River should contain a high probability for encountering historic resources. The team expected to encounter the Twelvemile Island Wreck (1BA694) site [REDACTED] of the Mobile River and anticipated that an initial documentation of the wreck site would take approximately two to three days, based on environmental conditions at the time.

HISTORIC BACKGROUND

The schooner *Clotilda* became the last known slave ship to carry human captives from Africa to the United States. Shortly after this transit, local lore circulated that the waters surrounding Twelvemile Island in the Mobile River is the location in which Captain William Foster burned and scuttled her remains. In July of 1860, Captain Foster, after successfully navigating the Atlantic and purchasing 110 slaves from Africa, returned to the American port of Mobile where he then, under cover of the night, evaded the law and transferred his human cargo to a river steamboat and “sent them up into the canebrake to hide them until further disposal. [He] then burned [his] ship to the water’s edge and sunk her” (Foster 1860) in an effort to cover up the illegal operation.

Built and licensed in Mobile, Alabama, in 1855, the *Clotilda* (often misidentified in later accounts as *Clotilde* or *Clothilde*) was a two-masted schooner that measured 86 feet long by 23 feet wide (26 by 7.0 meters). The vessel had a wooden hull and measured 120 tons. She spent the majority of her short-lived career as a cargo vessel transporting goods around the Gulf of Mexico and into the Caribbean. She entered Mobile Bay on July 7, 1860 with her human cargo, 52 years after the United States legally ended American participation in the international slave trade (slavery remained legal in the United States).

Historical sources suggest that the wreck site is located somewhere near Twelvemile Island. As part of his investigation, reporter Ben Raines conducted local interviews from community members who had ties to the waterway, one of whom, Russell Ladd, stated “When I was a boy, we used to go up the Mobile River to fish various places. On low tide, we’d see this burned out ship and my father and his friends would say, ‘There’s the *Clotilda*.’” (Raines 2018). Emma Langdon Roche’s book *Historic Sketches of the South* suggests that “the Clotilde was scuttled and fired, Captain Foster himself placed seven cords of light wood upon her. Her hull still lies in the marsh at the mouth of Bayou Corne and may be seen at low tide” (Roche 1914:97). In her book *Dreams of Africa in Alabama: The Slave Ship Clotilda*, Sylviane A. Diouf writes that after the transfer of human cargo:

A man was posted near the burning vessel to make sure pieces of the wreckage did not float down the river.... But it was a futile exercise because her hull remained visible at low tide for three quarters of a century (Diouf 2007:75).

Below, the team offers a detailed assessment of the background of the schooner, the characteristics of the *Clotilda*, presumed site formation processes of *Clotilda*, and a brief description of Africatown, a local Mobile community of freed slaves whose origins were linked to the *Clotilda* voyage. Additionally, the context provides information on post-Civil War waterway improvement projects on the Mobile River. Projects such as dredging, removing snags, placing riprap, and installing engineering structures may have had an impact on any potential shipwreck sites in the river.

AFRICATOWN AND *CLOTILDA*

Africatown exists as a historic community located 3 miles (4.82 km) north of downtown Mobile. The community was formed by a group of 32 West Africans, who in 1860 were among the last known illegal shipment of 110 slaves to the United States onboard *Clotilda*. The community represents the triumphs of the human spirit in the face of adversity, and is an exemplary instance of perseverance during the hardest of times. As Diouf notes in a 2007 interview:

Even though it's a terrible story, it's uplifting.... It's not about what was done to them. It's about what they did. They came as children, maintained their traditions, their language. If they could do that, we can do anything (Diouf 2007).

One historical account in the *Harpers Monthly* publication notes that:

Notions and customs of their African homes had clung to the captives long after they had been brought over and dumped into the canebrakes by the Alabama River. They still buried their dead in graves filled with oak leaves. Once a year the whole tribe plunged into some river (Byers 1906:743).

Clotilda also speaks to the forced migration of a group of people, the last Africans brought to the United States to be enslaved. It also led, in the aftermath of the war and the end of slavery in America, to the establishment of a distinct and unique community, Africatown. *Clotilda*, and the eventual rediscovery of its remains is of great importance to that community, and to the descendants of *Clotilda*'s unwilling human cargo. Ben Raines' rediscovery of the Twelvemile Island Wreck (1BA694) reminds us that finding *Clotilda* is important and a goal that the local community feels should be pursued. For a more comprehensive review of Africatown, readers are referred to Diouf (2007) and Robertson (2008).

THE DEVELOPMENT OF THE AMERICAN SCHOONER

The schooner created a long and lasting maritime tradition in the United States. Developed in the mid-to-late eighteenth century, these vessels reached a more or less standard form by the mid-nineteenth century. The design continued to be built into the first decades of the twentieth century (Morris 1927). They were the longest-lasting American sailing vessel type and the "last representatives of commercial activities under sail" in the mid-twentieth century (Morris 1973:ix). Tens of thousands of these vessels were built and operated on the Pacific, Atlantic, and Gulf of Mexico coasts, and on the Great Lakes in the nineteenth and early twentieth centuries. The "freight trucks" of their time, the coasting schooners carried the bulk of American coastal trade between ports, including commodities such as coal, bricks, iron ore, grain, oysters, and numerous other bulk products. By the 1900s these vessels were transporting a majority of the country's material goods:

At the turn of this century (1900), the Atlantic coasters constituted a vast armada. Built mostly in New England, the wooden bottoms carries [sic] every conceivable commodity of their times: coal, ice, lumber, bricks, logwood, phosphate rock, lime, salt, naval stores, locomotives, pins, sewing machines, notions—the list is endless (Burgess 1971:xi).

The earliest form of schooner was the two-master. Developed in the eighteenth century, the two-masted schooner had the greatest longevity. Though the peak period of two-master construction was between 1825 and 1885, these vessels continued to be built into the twentieth century, the last being launched in 1938 (Morris 1973:20). The two-masters were typically small vessels: "originally registering no more than 40 to 50 tons, the schooner has become in course of time a large vessel, the two-masters ranging from 100 to 250 tons" (Hall 1882:94). Following but not supplanting the two-masters were the three-masted schooners. The first three-masted schooners appeared around 1795-1800, though the rig did not gain popularity and widespread use until after the American Civil War. The number of three-masters increased after 1865, but by 1880 these vessels had reached their practical size limit. The *Report on the Ship-Building Industry of the United States* states that "the popular size now for a three-masted schooner on the Atlantic is 550 or 600 tons" (Hall 1882:94).

Two examples of contemporary two-masted schooners are available for comparative analysis for this study. The Mobile-built schooner *Virginia* (1865) and the Pascagoula-built oyster schooner *Governor Stone* (1877) were both shallower-draft coastal vessels similar to *Clotilda*. *Virginia* is preserved ashore in storage at the National Civil War Naval Museum in Columbus, Georgia. *Governor Stone* is an operating historic vessel maintained in Panama City, Florida, by a non-profit organization, the Friends of *Governor Stone*. *Virginia* is a 46-foot-long (14-meter-long) vessel with a 14.7-foot (4.5-meter) beam and a 3.3-foot (1.0-meter) depth of hold (Wittig 2013:19). It is similar in form to *Governor Stone*, with a "classic clipper shape" bow, fantail stern, and shallow draft (Wittig 2013:75-76). Converted to a motor vessel, it remains in that configuration and is no longer rigged as a schooner. Retired in 1989, it awaits restoration. *Governor Stone* is a 39-foot-long, 12.5-foot-wide (12 x 3.8 meters), broad two-masted schooner registered at 14.6 tons (Delgado 1990).

The relatively shallow waters of Southern ports, both in the Gulf and on the Atlantic coast from Florida to tidewater Virginia and Maryland, limited the draft of vessels working in this region until late nineteenth-century harbor and channel improvements. Sikes (2004), in documenting the form of *Governor Stone*, noted that the schooner has a length to breadth ration of 3:1, typical for a merchant vessel of its time:

With a nearly upright stem, the vessel presents a sharp entrance to the waterline. The sternpost is also upright, leading to a raking transom over a full run beneath the waterline. A drag keel allows *Governor Stone* to take full advantage of this hydrodynamic run while maintaining a large cargo hold forward of frame 22. Although the vessel has a full buoyant bow, sometimes referred to as pigeon-breasted or apple-cheeked, marked by very slight

tumblehome, and a broad, boxy appearance above the load waterline, its lines are surprisingly fine throughout the shallow draft below the waterline. This allowed the vessel to carry a large amount of cargo without sacrificing agility (Sikes 2004:303).

These vessels were usually defined in terms of their form as having sharp lines at the bow and stern to facilitate speed, but a wider, fuller midships body to accommodate cargo. While termed "Gulf-built," these variations of the American schooner of the period are defined not only by the draft but more specifically by the choice of timber, which would be regionally or locally sourced. In Mobile, the likely timber would be a softwood, and commonly yellow pine (*Pinus palustris*), which along with cypress, is the timber used in both surviving examples, *Virginia* and *Governor Stone*.

Larger hulls were needed to carry more freight and command better profits. The larger hulls required more sail, and as a result the four-masted schooner was developed. The first four-master built was *William L. White*. *White* was constructed in 1880 at Bath, Maine:

This vessel was rigged as a four-masted schooner because to have fitted her out with three masts would have required such large lower sails that the strain upon the masts would have been destructive, and she was therefore furnished with four. This divided her 5,017 yards of canvas into smaller sails and made her a good schooner, easily handled, and requiring a crew of only five men. This was the first four-masted schooner built for actual ocean service in America (Hall 1882:94).

Four-masted schooners were built throughout the remainder of the nineteenth century and were being constructed well into the twentieth century, some of the last being constructed during and immediately after World War I to offset the deficiency of ships caused by the increased tonnage needs and the sinking of allied vessels. Four-masters increased in size through those decades, some of the largest built being *William Palmer* of 1,805 tons and *Marie Palmer* of 1,904 tons (Morris 1973:32). The hulls of the four-masters became "almost standardized in form:"

It had a strong sheer, nearly vertical post, a short counter and raking, elliptical transom. The entrance was sharp and convex, the floors usually quite flat and the run fairly short and well formed. Most of the four-masters...were built with two decks, though occasionally the 'tween decks were only a tier of beams. Some of the larger four-masters had three decks, which were called the upper, main, and lower decks respectively. In cases where the three decks were used, the lower deck would be completely planked and the main deck was just a tier of beams at the load waterline. This arrangement was...of absolute necessity in helping to strengthen the hull in the very large schooners (Morris 1973:32-33).

The four-masted were the predominant large schooner of the eastern seaboard; in all approximately 450 of these vessels were built on the Atlantic coast and approximately 100 were built on the Pacific coast. All told, West Coast shipbuilders launched “some 540 sailing vessels of 100 tons gross and upward” between 1850 and 1905 (Lyman 1941:3). While the earliest vessels were built of imported wood from the eastern seaboard, after 1870 all vessels were constructed with Douglas Fir, with the majority built in response to the Pacific lumber trade’s boom of the 1880s and 1890s. A resurgence in wooden shipbuilding in World War I to offset losses to German U-boat attacks resulted in the construction of 125 wooden three- and four-masted schooners and barkentines between 1916 and 1919 (Hopkins 1994:18).

CHARACTERISTICS OF *CLOTILDA*

Based on contemporary accounts of *Clotilda*’s design, she was a typical Gulf Coast schooner of the mid-to-late-nineteenth century. Primary sources are available that document characteristics of *Clotilda*. The vessel’s certificate of registry and enrolment is available in the Federal Archives and Records Center of the National Archives in Atlanta (US Customs Service 1855). Also known as a license, the certificate was issued on November 19, 1855 as number 24 in sequence at the Port of Mobile (Figure 4).

Clotilda was built in Mobile in 1855 and registered with an 86-foot (26-meter) length between perpendiculars and a maximum beam of 23 feet (7.0 meters), a depth of hold of 6 feet, 11 inches (2.1 meters), and 120 81/91 tons in measurement (Table 1). The tonnage is a customs admeasurement for cargo capacity (not to be confused with displacement tonnage [weight]) and noted in a contemporary account of ship measurement as “an estimate of the weight of stores and merchandise which a ship can carry” (Dodd 1852:2).

Table 1. *Clotilda* Characteristics.

Feature	Characteristic
Type	Schooner
Rig	Two-Masted Schooner
Material	Oak and Yellow Pine
Length	86 feet
Breadth	1
Depth of Hold	6 feet, 11 inches
Draft (unladen)	30 inches Forward, 42 inches Aft
Draft (laden)	6 feet, 6 inches
Tonnage	120 81/91

The certificate of registry and enrolment notes that a Master Carpenter’s Certificate and a Certificate of Admeasurement completed by the Acting Surveyor “of this port” dated October 26, 1855 were filed with the US Customs Service in Mobile. The certificate further describes *Clotilda* as a two-masted schooner with a single deck, a square stern, no galleries, and a billethead (US Customs Service 1855). Based on the listed characteristics, *Clotilda* was a generic schooner typical of the mid-nineteenth century.

Clotilda was insured and registered with the New York Marine Registry, later known as American Lloyd’s, and appears in the annual listing for 1858, 1859, 1860, and 1861. The registry also noted that the *Clotilda* had a laden (loaded) draft of 6.5 feet (2.0 meters) and was full-modeled, built of oak and yellow pine, and fastened with galvanized iron (New York Marine

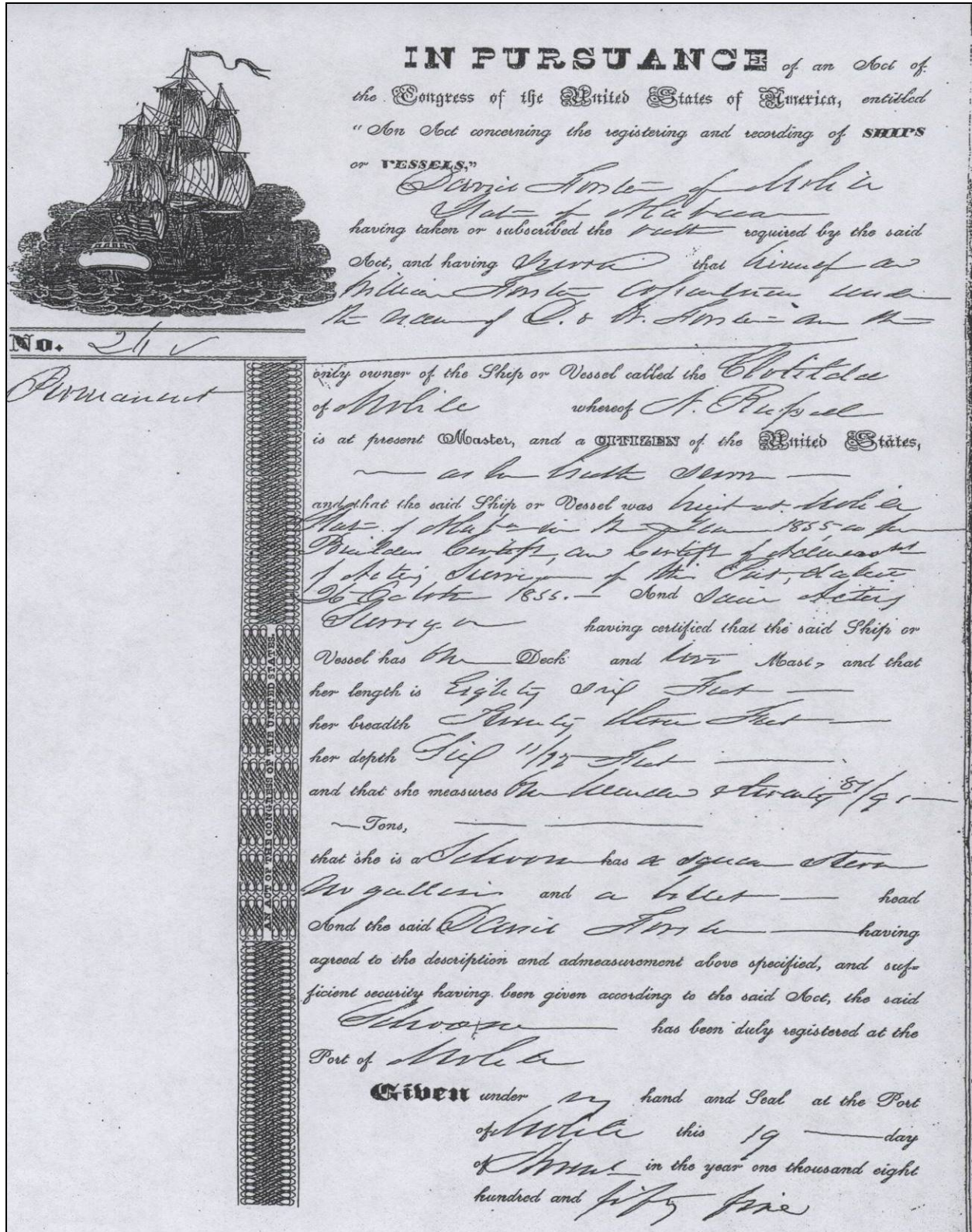


Figure 4. Clotilda's Certificate of Enrolment and Registry, 1855 (US Customs Service 1855).

Registry 1858:225). In 1859, additional details not listed in 1858 include the notation "CB" which indicate the schooner was fitted, as Gulf of Mexico schooners were, with a centerboard with a trunk cabin (American Lloyds' 1859:306). The final listing for *Clotilda* adds the notation that the classification survey for the schooner was performed in Mobile in October 1858 (American Lloyds' 1861:375). The form of *Clotilda*, as described in a Mobile newspaper, was that "she is light and commodious, draws thirty inches forward and forty-two inches aft.... Her model is of that graceful turn which confers assurance that she will prove a fast sailer" (as cited in Diouf 2007:24). The draft, as noted in Lloyd's Register as 6.5 feet (2.0 meters), would be as launched, and hence unladed with ballast, stores, or cargo.

The profile in **Figure 5** is a depiction of a single-decked two-masted vessel, similar to how the *Clotilda* might have looked. The main difference from the vessel is that the *Clotilda* had a square stern rather than the elliptical transom pictured. The profile also provides a clear delineation of how measurements between perpendiculars were determined, with overall length extending to the maximum dimensions of a vessel (i.e., from the tip of the bowsprit to the end of the transom). As previously noted, *Clotilda's* American Lloyd's registry notes the schooner was built of oak and yellow pine. What is likely is that the frames were oak, possibly southern live oak (*Quercus virginiana*), a commonly employed timber used in shipbuilding since colonial times (Wood 1995), while the hull planking were yellow pine.

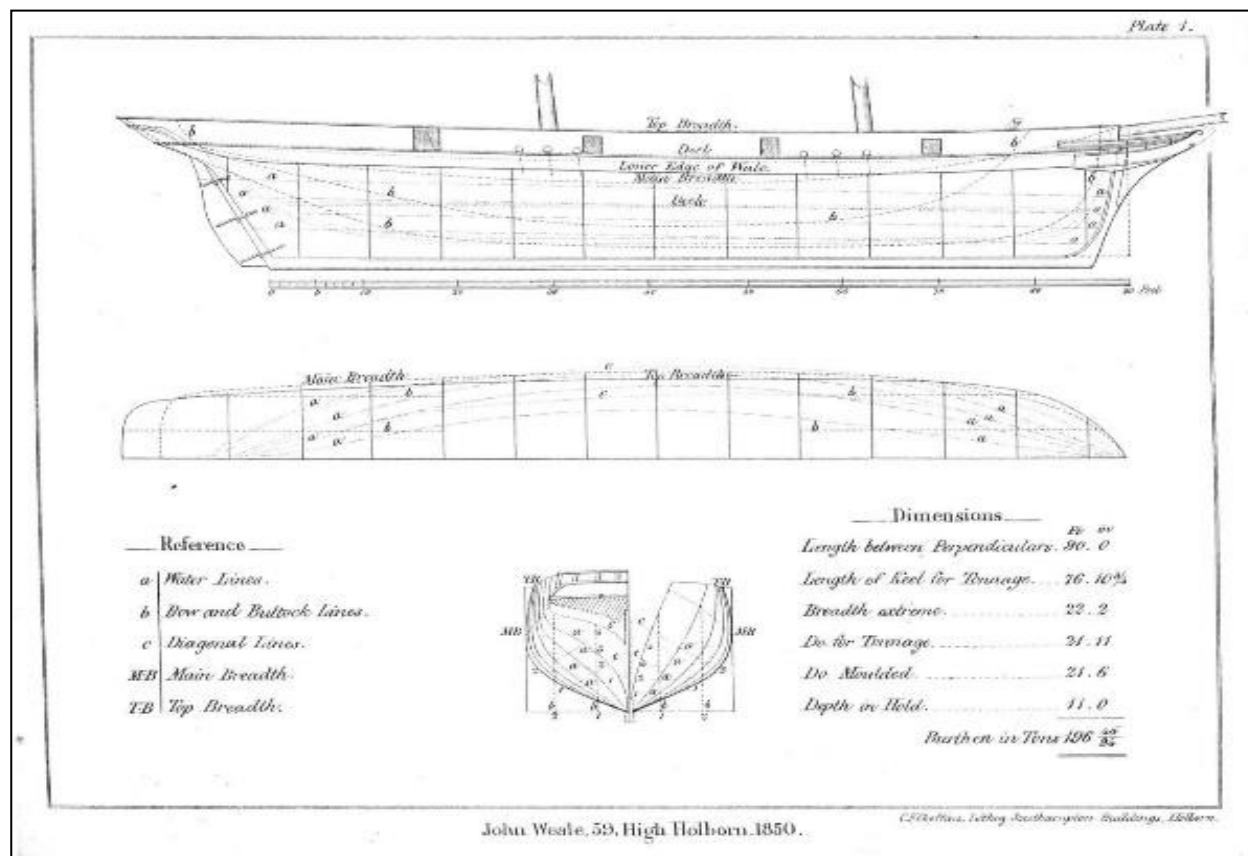


Figure 5. This 1851 Plan from a British shipbuilding treatise indicates what a two-masted vessel similar to *Clotilda* would generally look like in profile (Peake 1851:Plate 1).

PRESUMED SITE FORMATION PROCESSES FOR *CLOTILDA*

To navigate the open ocean, *Clotilda* underwent significant modification transforming the vessel from a schooner to a brigantine for its final voyage. The foremast was reconfigured with a higher spar and the mainmast rigged with yards to make a square-rig. For the slaving voyage, the captain and crew stowed 125 barrels of water in *Clotilda's* hold, and then stacked 25 casks of rice, 30 casks of beef, 40 pounds of pork, 23 barrels of sugar, 25 barrels of flour, 4 barrels of bread, 4 barrels of molasses, and 80 casks of rum on top. The schooner also carried dry goods and sundries for trade, as well as rum and gold to purchase people in Africa (Foster 1890). In order to give the impression of a full hold, slaving goods were covered with lumber.

In Africa, the lumber was removed, and reinstalled by the ship's carpenter as the means by which to house and hold the enslaved persons brought on board: "The tier that covered the compromising goods was covered with lumber that hid it from casual inspection and would be used later on to build platforms and partitions: the Africans' 'beds'" (Diouf 2007:25). In all, 116 people embarked on *Clotilda* from Africa, bound for slavery in Alabama (Lockett 1998:159). Other material evidence of on-board modifications of the schooner for use as a slaver included "mammoth pots" for cooking, and wooden "water tanks" in which the barrels would be emptied. The vessel may have carried a cannon or multiple guns for protection (Diouf 2007:25).

After returning to Alabama, the captain quickly moved to "destroy the evidence, the telling signs of a slaving voyage; the partitions, the platforms, the empty casks of food and water" (Diouf 2007:75). That involved placing "seven cords of lightwood" in "strategic locations" to assist with burning the vessel to the waterline (Diouf 2007:75; Foster 1890).

The physical process of abandonment can be anything as simple as leaving a derelict vessel in an isolated or out-of-way location; partial or complete stripping of equipment or fittings; or a gradual process in which a vessel's condition deteriorates until it sinks due to leaks or mechanical damage (Richards and Seeb 2013). As noted by Diouf (2007), *Clotilda* was scuttled, or deliberately "destroyed" through fire and/or sinking. The site formation process for *Clotilda* would result in a wreck with evidence of burning. There likely would be some level of preservation of material in the hold, as water filling the hold would have vaporized to steam and expedited extinguishment of the fire.

Similar sites that have been scuttled and/or abandoned exist in the archaeological record for comparison. The vessels *Niantic* and *General Harrison* were both "lost" to fire in 1851 on the San Francisco waterfront. In the case of *Niantic* and *General Harrison*, excavation of those sites in 1978 and 2001 found no fire damage in the lower hull. It is likely that partially burned material from the upper hull fell into their steam-filled holds and were extinguished by the steam (Delgado 2009). The level of preservation was such that straw-filled crates of wine, burlap sacks, leather trunks, shoes, clothing, and other flammable materials in the holds of both ships had not burned (Delgado et al. 2007). As such, the *Clotilda* site may likely yield high levels

of preservation due to the potential lack of fire damage to the lower hull, and the anaerobic environment in which the *Clotilda* may be submerged.

TWELVEMILE ISLAND

This section of the Mobile River, while not used for navigation, was nonetheless a key part of the river's use as an industrial area. Beginning in the eighteenth century, flourishing in the nineteenth century, and continuing well into the twentieth century, the timber industry thrived along the Mobile River. This industry produced a number of naval stores, including lumber and products rendered from pine trees, such as resin, tar, and turpentine. In the mid- to late-nineteenth century, these activities were not large-scale industrial enterprises partly due to the undefined channel of the river. While this channel would have provided shallow-draft barge access to small-scale facilities, such as stands of pines being tapped for resin, it was not ideal for larger vessels (Gamble 1921; Outland 2004). By the late nineteenth century, large-scale logging and lumbering, involving railroads and mills, necessitated a well-defined, deep channel, which the USC&GS determined in 1888 should be the western channel around Twelvemile Island.

In 1918, a Congressional report on siting a proposed navy yard discussed Twelvemile Island as a possible location. It noted that "the river channel on either side of the island is used by the river craft with ample water at all seasons" (House of Representatives 1918:190). It clarified that "the channel has never been dredged...so that the approaches are shallow" and recommended the site not be considered given its distance from the city and the "undredged channel ways" (House of Representatives 1918:55).

The western channel, "swampy," as the 1918 report suggests, and without high banks, was navigated by small and shallow draft vessels. These were likely seeking access for fishing, hunting, or the harvesting of the bordering forest as part of Alabama's forest products industry. The wetlands around Twelvemile Island were one of many locales in which these industries operated. Evidence of this is provided in the historic name of the river tributary Bayou Sara, which at one time was known as Sawmill Creek (Alabama Department of Environmental Management 2003:33).

HISTORIC PHOTOGRAPH AND MAP REVIEW OF THE PROJECT AREA

The team collected and reviewed historic maps and charts, aerial imagery, and historic photographs to better understand the historic setting of the area around the Twelvemile Island Wreck (1BA694). The earliest photographic evidence of the shipwreck dates to 1912, while the earliest charted occurrence of the wreck site dates to 1938. What can be inferred from the following discussion is that the Twelvemile Island Wreck (1BA694) appears to be at least 100 years old, which suggests that a nineteenth-century date, or an early twentieth-century date for the vessel is reasonable.

Navigation Charts and Aerials

The area in which the wreck site is located was not surveyed through any comprehensive method until 1888. As early as 1861, the US Coast Survey's staff had noted that, in the context of the very complex system of the Mobile Bay delta, there was one preferred channel of the Mobile River that was most used for navigation between Mobile and Mobile Bay, and the confluence of the Tombigbee and Alabama Rivers. In 1888, the US Coast and Geodetic Survey (USC&GS, previously US Coast Survey) was assigned to map the major navigational channel of the Mobile River system, starting above the lower "main stem" above Mobile, at Twelvemile Island. The assistant in charge of the party was J. Henry Turner. Turner's instructions were to:

Make a rapid survey of that river from the limits of the topographical sheets at Spanish River, near Mobile, up to and including the junction of the Alabama and Tombigbee Rivers. The topography along the river banks only was to be delineated, all the bluffs and their heights being shown, and special attention was to be given to the hydrography (USC&GS 1889:52).

The survey produced nine original hand-drawn H-sheets ("H" for hydrography), numbered 1909 through 1917, with H1918 presenting the footprints of the nine maps, and a Descriptive Report describing the work in greater detail (**Figure 6**). Turner's hand-written Descriptive Report presents very salient data about the commonly frequented portion of the river system and channels, as well as those that were less often utilized. The report provides insight into the challenges, and in particular, demonstrates that only the western channel around Twelvemile Island was hydrographically surveyed. The eastern channel, locally known as a portion of Big Bayou Canot, where the wrecks lie, was not hydrographically surveyed (**Figure 7**).

The participation of USC&GS personnel in mapping the Mobile River system ended with the 1888 mapping project. Often such USC&GS mapping was a prelude to subsequent navigational improvements by the USACE. The USC&GS apparently did not return for additional mapping, and an 1898 Notice to Mariners notes that the Twelvemile Island Chart, No. 491, had been canceled (USC&GS 1898:9). The 1889 survey has apparently since served as the effective base for all subsequent charts. Despite extensive research, the team has located no field surveys or notes post-1889 that provide updated data for this section of the river.

The Twelvemile Island Wreck (1BA694) appears on historic aerials and charts as early as 1938 (**Figure 8**) (University of Alabama 1938). The 1938 aerial appears to have been taken during a higher tide, which has covered the wreck, as well as much of a sandbar on the opposite side of the river. There is, however, an obstruction visible in the lower left corner of the aerial; one hypothesis is that this obstruction may be a barge landing. The barge landing/obstruction visible on the 1938 aerial (see **Figure 8**) is no longer visible in modern aerials after 2011. A November 2013 Google Earth aerial image suggests that the site was dredged away to allow moorage of modern, large steel barges in close proximity to the southern entrance to the Mobile River's west channel.

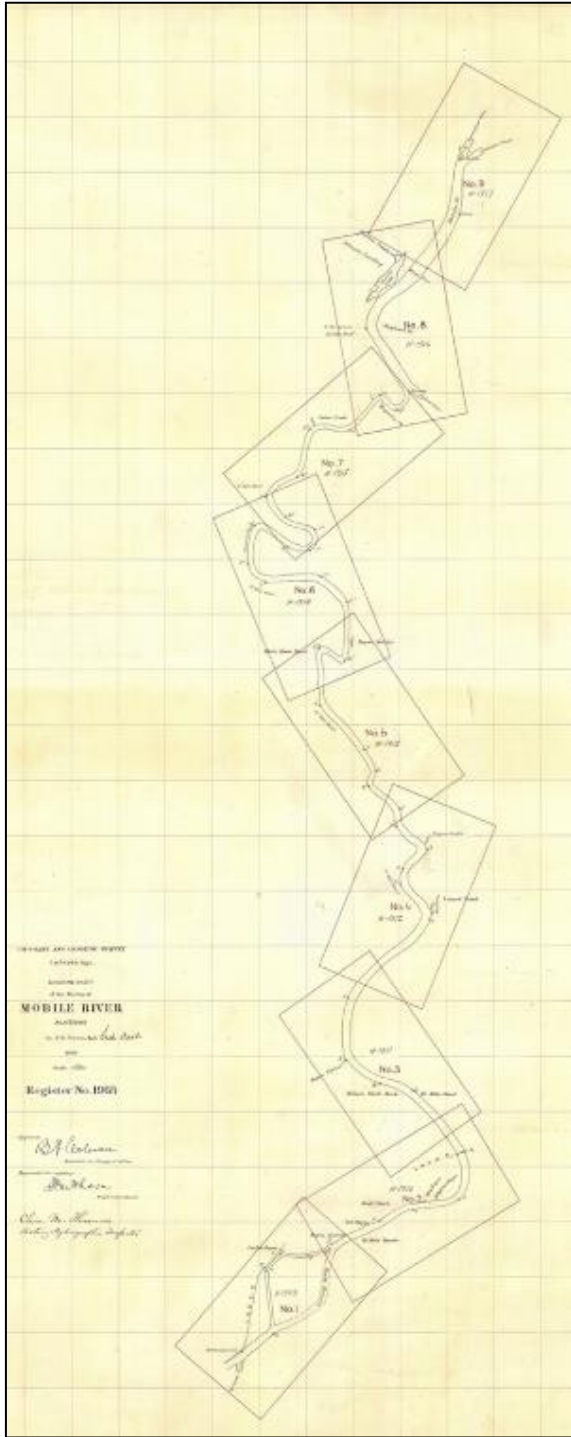


Figure 6. H1918 diagram of the Mobile River Surveys. Source: USC&GS 1889b.

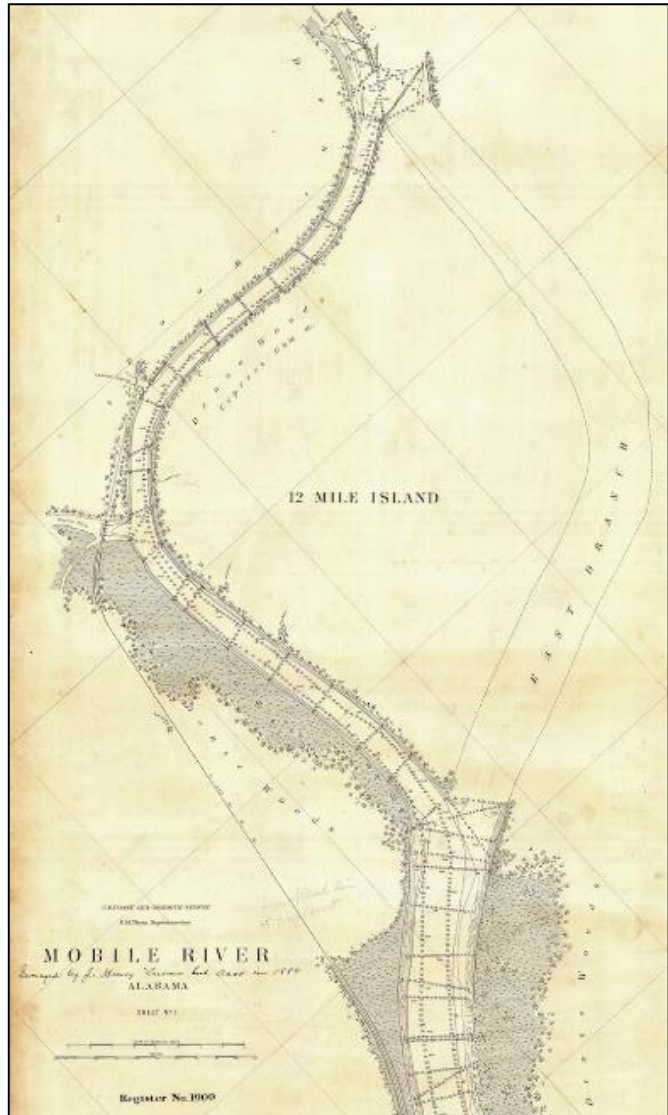


Figure 7. H1909 showing the navigationally-preferred side of Twelvemile Island. Source: USC&GS 1888.

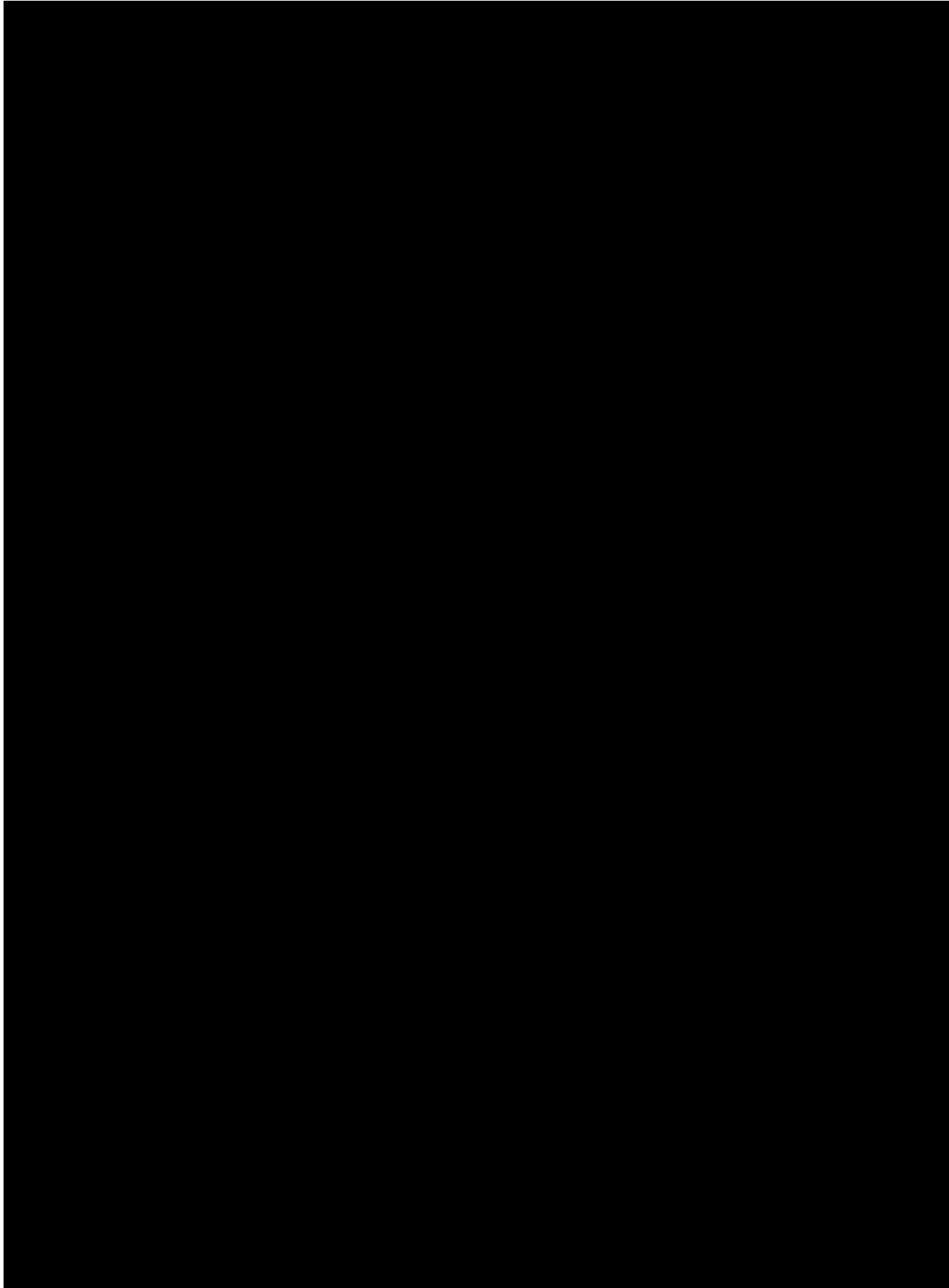


Figure 8. 1938 Historic aerial of the Mobile River with the Twelvemile Island Wreck (1BA694) location.

Historic aerial photographs clearly show the wreck in 1952, with topographic evidence of wrecks and obstructions in the area in 1941/43 (**Figure 9 and 10**) (US Geological Survey [USGS] 1941/43). Interestingly, when this 1952 aerial is georeferenced, the visible hull of the Twelvemile Island Wreck (1BA694) measures approximately 180 feet (55 meters) in length, much longer than *Clotilda* based on her certificate of enrolment and registry (86 feet [26 meters]). A 1958 USC&GS chart marked four wrecks on the east bank of the main channel just below Twelvemile Island, and four wrecks along the east bank of the eastern channel as it passed around the island. One of the wrecks in the east channel is the Twelvemile Island Wreck (1BA694). Nine other wrecks also were delineated on the west bank of the main channel just north of Twelvemile Island. In total, the 1958 chart documents the presence of 17 wrecks near Twelvemile Island (**Figure 11**) (USC&GS 1958). Research has not identified the original source for the wreck symbols noted along the river banks in this chart.

The wreck does not appear on recent National Oceanic and Atmospheric Administration (NOAA) charts, neither as a wreck nor as an obstruction, but is visible on Google Earth. Using the archival feature of Google Earth, it is alternately visible depending on tidal conditions starting in 1997. The 1997 google earth aerial is the first available Google Earth aerial that shows the project area.

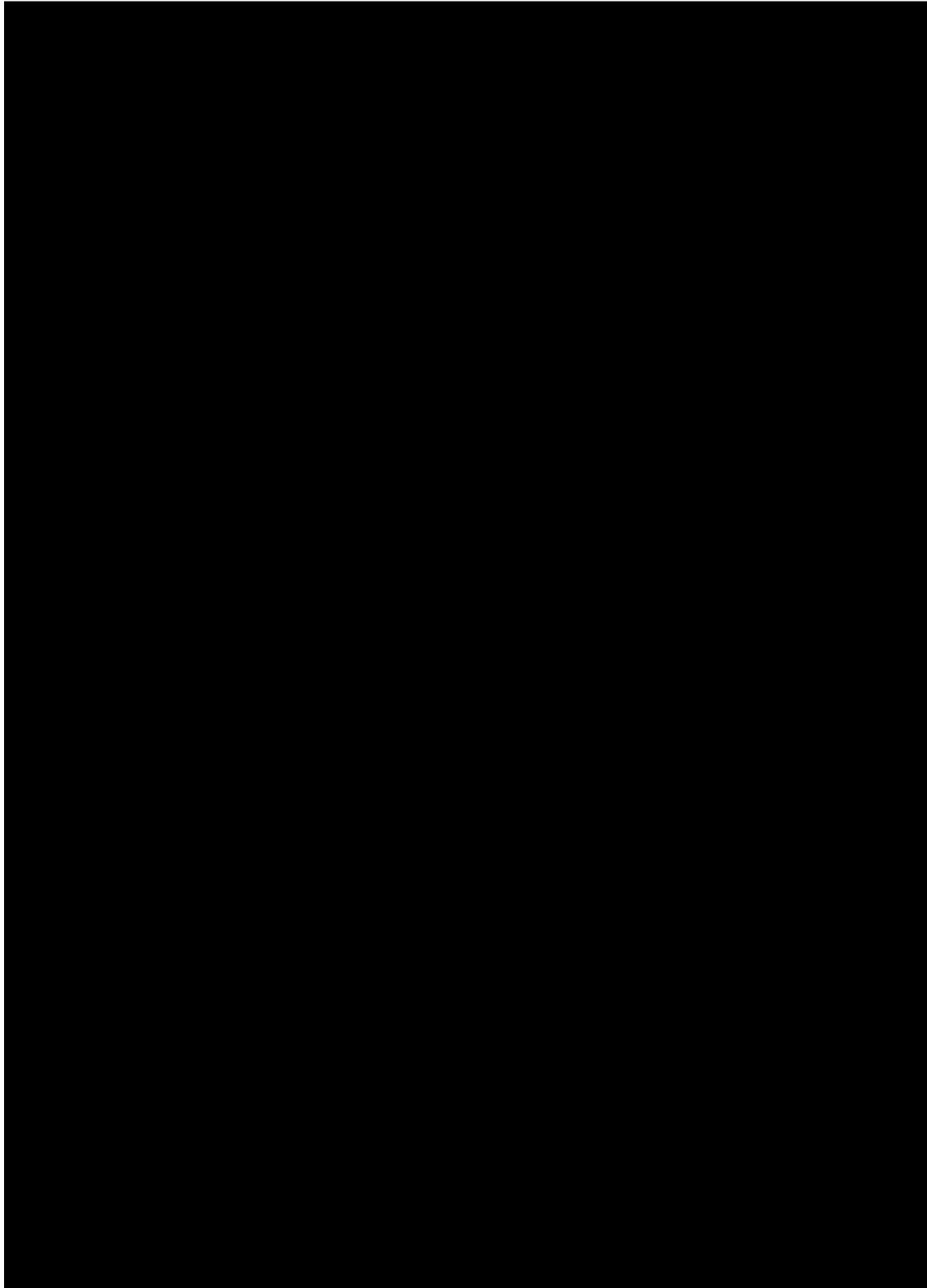


Figure 9. 1952 Historic aerial of the Mobile River with the Twelvemile Island Wreck (1BA694) location.

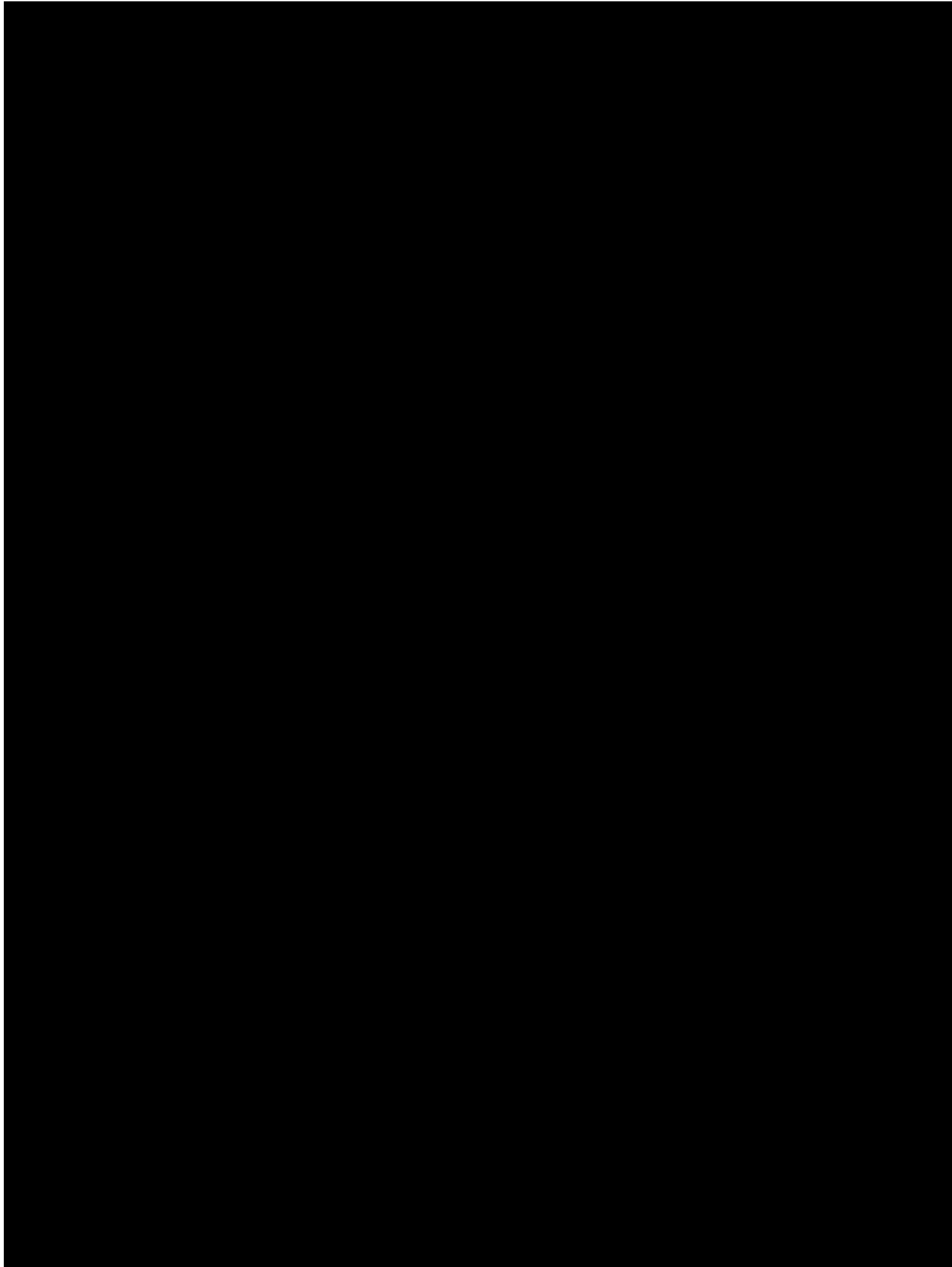


Figure 10. 1941/43 Historic Topo Map of the Mobile River with the Twelvemile Island Wreck (1BA694) location.

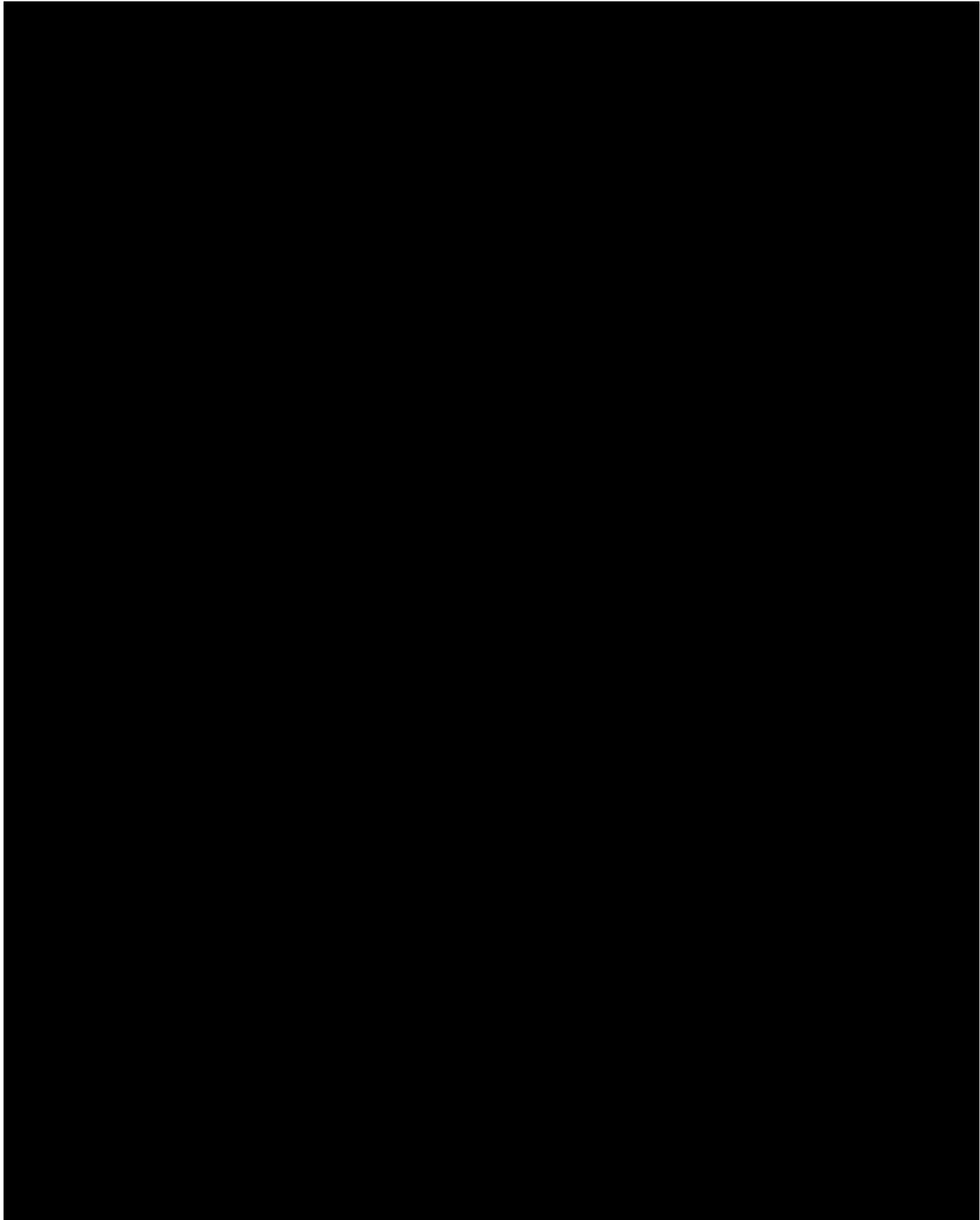


Figure 11. 1958 USC&GS chart showing Twelvemile Island and obstructions along the eastern bank.

Photographic Evidence

The first photographic occurrence of the Twelvemile Island Wreck (1BA694) comes from a ca. 1912 photograph published in 1914 by Emma Langdon Roche (1914:102). This photograph is noted as “showing the remains of *Clotilda*” (Figure 12), although there is no way to confirm the wreck in the photograph is actually that of *Clotilda*. In comparing this historic 1912 photograph with features present in historic aerials, as well as archival imagery from Google Earth from 1997 to 2011, general observations can be made that suggest certain features present in the 1912 photograph are also visible in the historic aerials, such as a filled section of the bank lined by pilings. This may be the same structure present in the background of the 1912 image, which could potentially represent a barge landing on the river south of the wreck. The landscape and environment in the 1912 photograph is comparable with the landscape and environment in which the Twelvemile Island Wreck (1BA694) Site is located. The ca. 1912 photograph depicts what may be a barge just south of the Twelvemile Island Wreck (1BA694), which is supported by the previously discussed aerial imagery of the area. It may have been wrecked in association with the presumed barge landing identified in the 1938 aerial, which is delineated in the photograph by pilings and fill. The exposed pilings are visible on a 1938 historic aerial; and visible in the background of the ca. 1912 photograph labeled as the *Clotilda* wreck (Figure 13). The obstruction/landing is no longer visible in aerials dated after 2011.



Figure 12. Historic photograph (ca. 1912) identified as showing the remains of *Clotilda* (Roche 1914:102).

In addition to the historic 1912 photograph, a 1965 newspaper article identifies the remains of a wooden vessel in a photograph as that of *Clotilda* (Figure 14). The article reports that the “Rotting Hulk of Schooner Clotilde, last “slaver” yields museum piece” (*Alabama on the Go* 1965:29). A comparative analysis between the available historic photographs and historic aerials suggest that the ca.-1912 photograph and the ca.-1965 photograph may potentially be the same wreck site, which was relocated and identified by Raines (2018). The wreck, as discussed by Roche, was said to still lie “in the marsh at the mouth of Bayou Canot and may be seen at low tide” (Roche 1914:97).

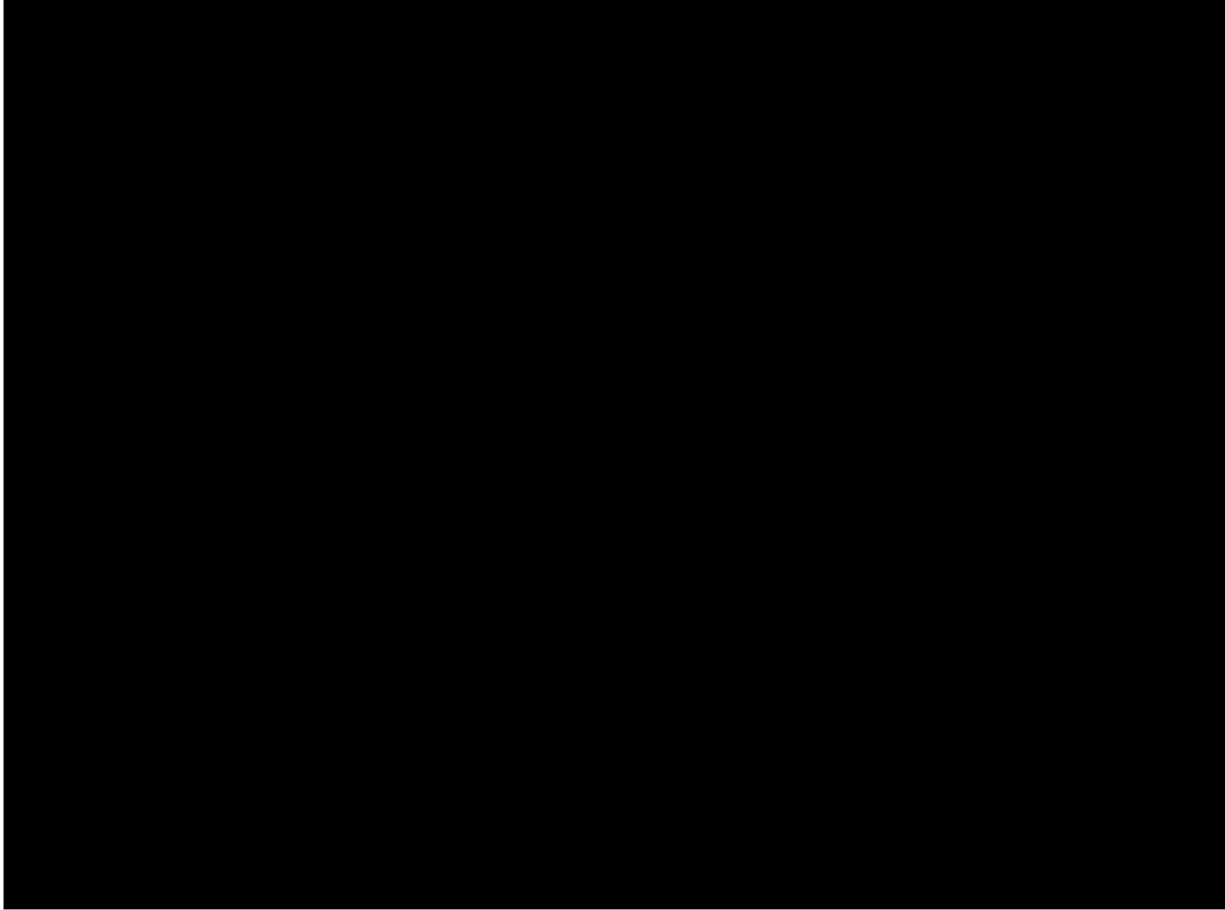


Figure 13. Historic aerials and zoomed-in photograph showing what appears to be exposed pilings near the wreck site.



Figure 14. "Rotting hulk of Schooner *Clotilde*, last 'slaver' yields museum piece" (June 1965). Source: *Alabama on the Go* 1965:29.

METHODS

DIVE OPERATIONS

Dive operations in the Mobile River were conducted using shallow-water archaeological inspection with a combination of wet and dry suits and Self-Contained Underwater Breathing Apparatus (SCUBA) equipment (Figure 15). All dive operations were conducted under standards outlined by the American Academy of Underwater Sciences (AAUS), including the appropriate level of diver's certification; current Cardiopulmonary Resuscitation (CPR), First Aid, and Oxygen Administration certifications; a current diver physical signed by a licensed physician; and the requisite experience and training consistent with AAUS scientific diving standards. All dive equipment utilized by the team during dive operations is maintained according to USACE standards and all diver and equipment certifications were up to date for the duration of the current investigation.

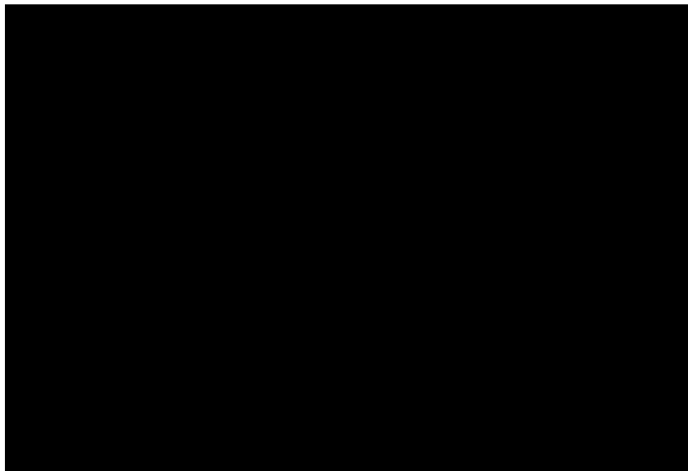


Figure 15. Diver Kyle Lent, equipped with SCUBA and team members, as well as members of the public.

SURVEY/DIVE VESSEL

The team conducted all dive operations from a 21-foot (6.4-meter) aluminum, flat-bottomed Rhino vessel powered by a 90-horsepower outboard motor (Figure 16). This vessel is ideally suited for the project location and environmental conditions. The vessel had ample deck space to conduct safe diving operations and is equipped with all the necessary safety equipment, including the appropriate number of life jackets, marine radio, horn, fire extinguisher, and visual distress signals. The team displayed a diver-down safety flag in order to alert nearby vessels to the presence of divers in the water.



Figure 16. The team used a 21-foot (6.4-meter), flat-bottomed, aluminum vessel for diving operations.

SURVEY EQUIPMENT AND SITE RELOCATION

The team used a Trimble differential Global Positioning System (dGPS) and Hypack Navigation software to relocate the Twelvemile Island Wreck (1BA694) and targets of interest. The dGPS provides sub-meter positional accuracy and Hypack navigation software allowed the survey team to accurately navigate to each target. The team deployed a buoy to guide archaeologists to each target location. The team then anchored the survey vessel upriver from each anomaly so divers could float downstream to the buoy. The Dive Supervisor then deployed a safety line and float, attached to the stern of the vessel. This practice allows surface personnel to easily retrieve divers, rather than require the diver to swim against the current. The Dive Supervisor maintained visual contact with the divers' bubbles on the surface to monitor diver locations. No live boating was conducted during this investigation. A copy of the dive logs is presented in **Appendix A**.

Additional underwater and terrestrial equipment was utilized to assist in relocating, identifying, and delineating the wreck site. The NPS provided a Trimble Model M3 DR 5" total station (**Figure 17**), with total station and GPS data for the recorded wreck sites, with hand probes, and digital photography being provided by the team. Poor visibility limited underwater photography. Diver investigations and shallow-water archaeological inspection included visual and tactile searches along the shoreline where features of the shipwreck were exposed, and

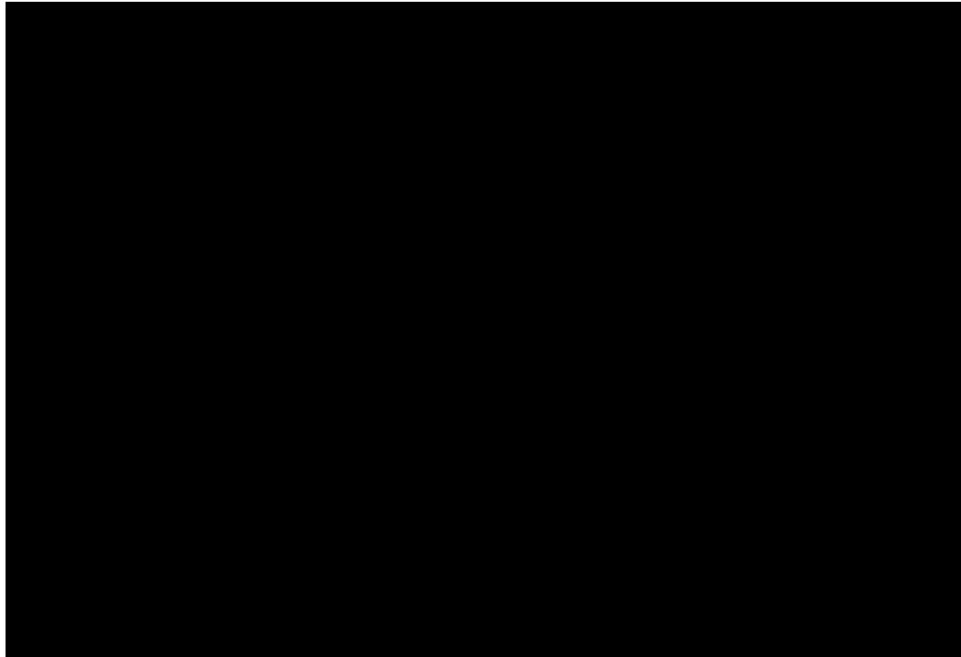


Figure 17. Archaeologists Clete Rooney and Stacye Hathorn using the Trimble Total Station to map features of the Twelvemile Island Wreck (1BA694) site.

along the river bottom working off each buoy drop location.

The team utilized archaeological Illustration to aid in interpretation of the shipwreck site. Illustration was conducted at three locations on the shipwreck site, with Kamau Sadiki and Jim Delgado providing illustrations (Figure 18). Renditions were taken at part of the disarticulated stem feature, the disarticulated iron chain plate/support on the starboard side of the shipwreck site, and the stem feature protruding out of the water. Illustrations were collected in pencil on Mylar paper, using a slate to aid in the process.



Figure 18. Kamau Sadiki drawing the stem feature of the Twelvemile Island Wreck Site (1BA694).

Additionally, total station data was collected to aid in shipwreck documentation (Figure 19). The GPS units used for the survey was a Trimble GeoHX, with real-time satellite-based augmentation systems (SBAS)-corrected data. Accuracy was high, with open areas in view of multiple satellites. Archaeologists had low maximum positional dilution of precision (PDOP) values, and low maximum horizontal dilution of prevision values. Horizontal precision was less than 1.0 foot (>0.3 meter), and often around 2.3 feet (0.7 meters) with low standard deviation values (e.g., less than 0.1). Data was recorded and exported in the GPS's native latitude-longitude unprojected format referenced to the WGS 1984 datum.

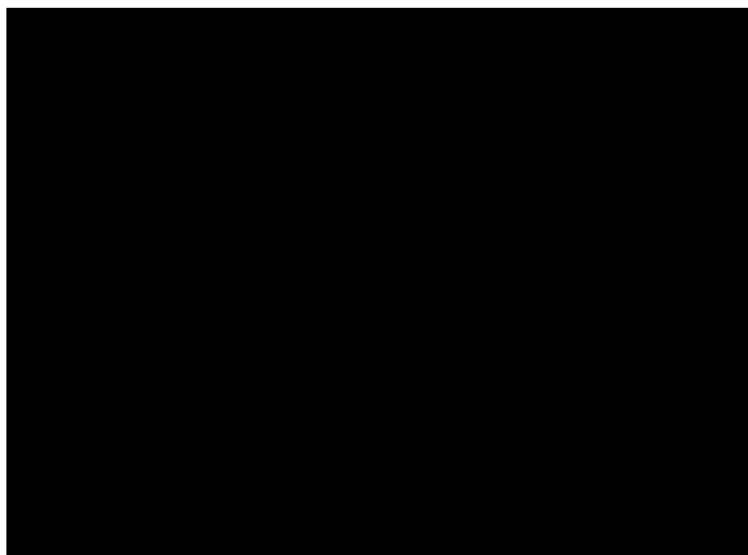


Figure 19. Total Station placement alternate view showing Twelvemile Island Wreck (1BA694). David W. Morgan background with stadia rod, facing northwest.

RESULTS

The Partnership conducted shallow-water archaeological inspection and SCUBA dives from March 1 to March 4, 2018. Intensive investigation was concentrated at the Twelvemile Island Wreck (1BA694) site, with limited shallow-water archaeological inspection conducted at the five additional target areas including the Twelvemile Island Wreck (1BA694), Target 1 (Hicks Wreck), Target 2 (trees), Target 3 (Dobbs Wreck), Target 4 (Harms Wreck), and Target 5 (Kennedy Wreck) (Table 2; Figure 20). The results of each target area location investigation are discussed below.

Table 2. Twelvemile Island Wreck (1BA694) Site and Additional Target Areas Location.

Target Identifier	Provisional Name	Coordinates					
		Native GPS 1984 WGS Datum		State Plane, Alabama, W. Zone NAD83 (ft)		UTM, Zone 16N, NAD83 (m)	
		Longitude	Latitude	X Coordinate	Y Coordinate	Easting	Northing
1BA695	Hicks Site						
Target 2	none assigned						
1BA696	Dobbs Site						
1BA697	Harms Site						
1BA698	Kennedy Site						
1BA694	Twelvemile Island Wreck						

TWELVEMILE ISLAND WRECK (1BA694)

The Twelvemile Island Wreck (1BA694) is located along the eastern shoreline the Mobile River, [REDACTED], with its bow pointed upriver (facing east). The wreck is [REDACTED]. Based off exposed construction elements, the Twelvemile Island Wreck (1BA694) vessel appears to represent that of a late nineteenth-century schooner, a common type of vessel employed in the region’s maritime trade. The wreck is oriented roughly northeast to southwest (Table 3; Figure 21). Water depth at the end of the measurable extent of the wreck site was approximately [REDACTED]. Working toward shore (west-bank descending), archaeologists reported a substantial amount of vessel remains, including exposed hull features, ship timbers, and both exterior and interior hull planking, extending up the riverbank toward the shoreline. Exposed hard-mud river bottom was observed working outside the boundaries of the shipwreck, while the loose silt comprised the sediments inside the hull.

Table 3. Twelvemile Island Wreck (1BA694) Location (State Plane, Alabama, W. Zone NAD83 [ft]).

Name	Site Number	X Coordinate	Y Coordinate	Type
Twelvemile Island Wreck (1BA694)	1BA694	[REDACTED]	[REDACTED]	Later 19 th or early 20 th century probable schooner wreck

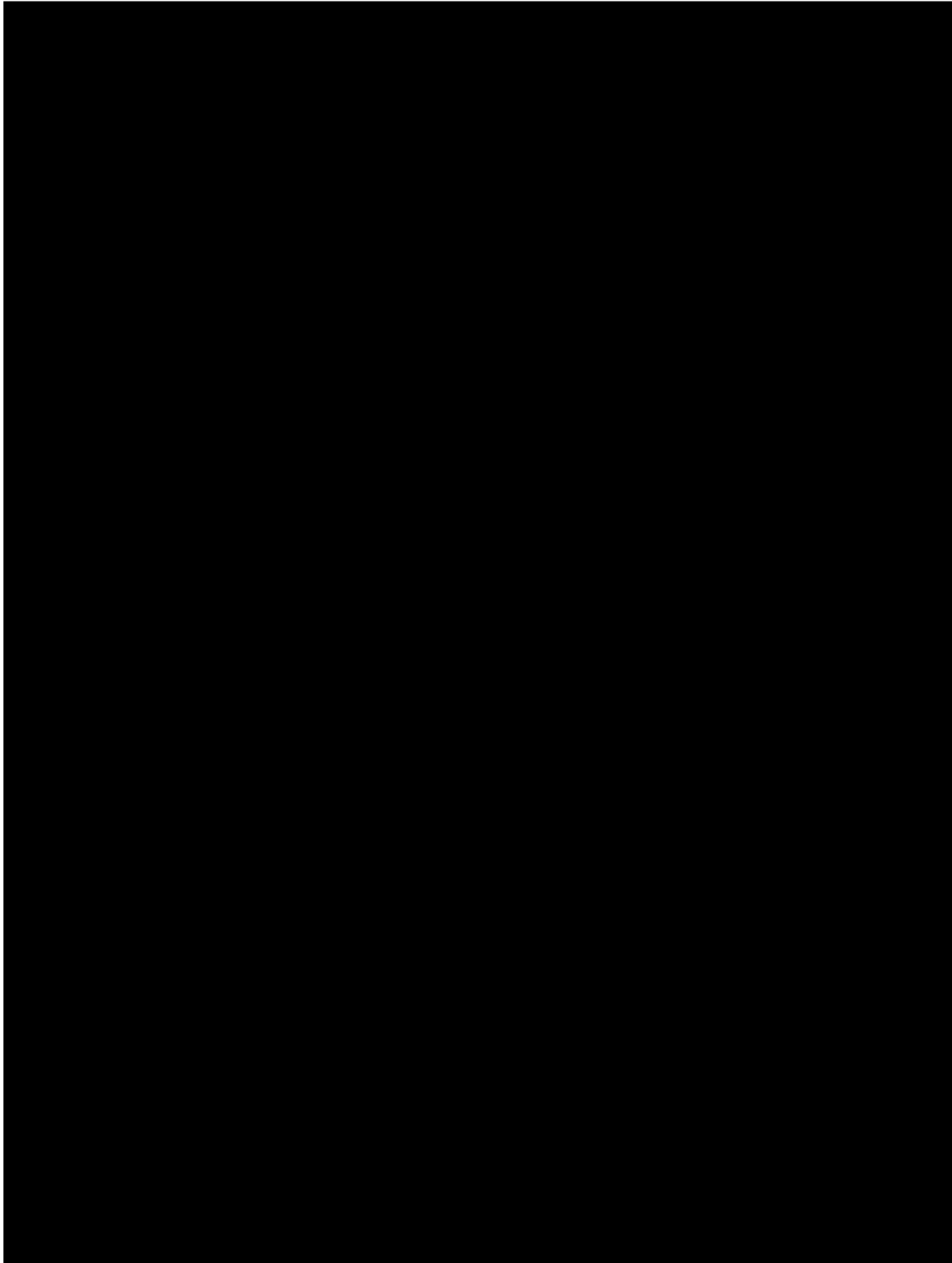


Figure 20. Twelvemile Island Wreck (1BA694) site and additional five target areas, Mobile River, Alabama.

The dimensions of the Twelvemile Island Wreck (1BA694), are approximately 183 feet (56 meters) in length with a beam of approximately 35 feet (11 meters). The January 2018 measurements of the wreck with dimensions of 124 x 23 feet (38 x 7.0 meters) initially suggested that some of the wreck had either been buried or is gone, reducing it by some 60 feet (18 meters). During field investigation, archeologists traced out articulated ship elements to 157.3 feet (48 meters), while Total Station data recorded a maximum articulated length of 158.5 feet (48 meters). At approximate midships, the beam was measured to be 33 feet (10 meters) across on the exterior edges of the hull.



Figure 21. Historic aerial showing the Twelvemile Island Wreck (1BA694). Source: University of Alabama 1952.

Examination of the wreck began at the bow of the vessel and proceeded past the frames along the sides of the hull toward the stern. The stern of the vessel was not encountered or noted. The wreck lists approximately 20 degrees to port, with the majority of the hull being buried in soft silty mud. The wreck's visible remains indicate that it is intact to a level above the original waterline (Figure 22).

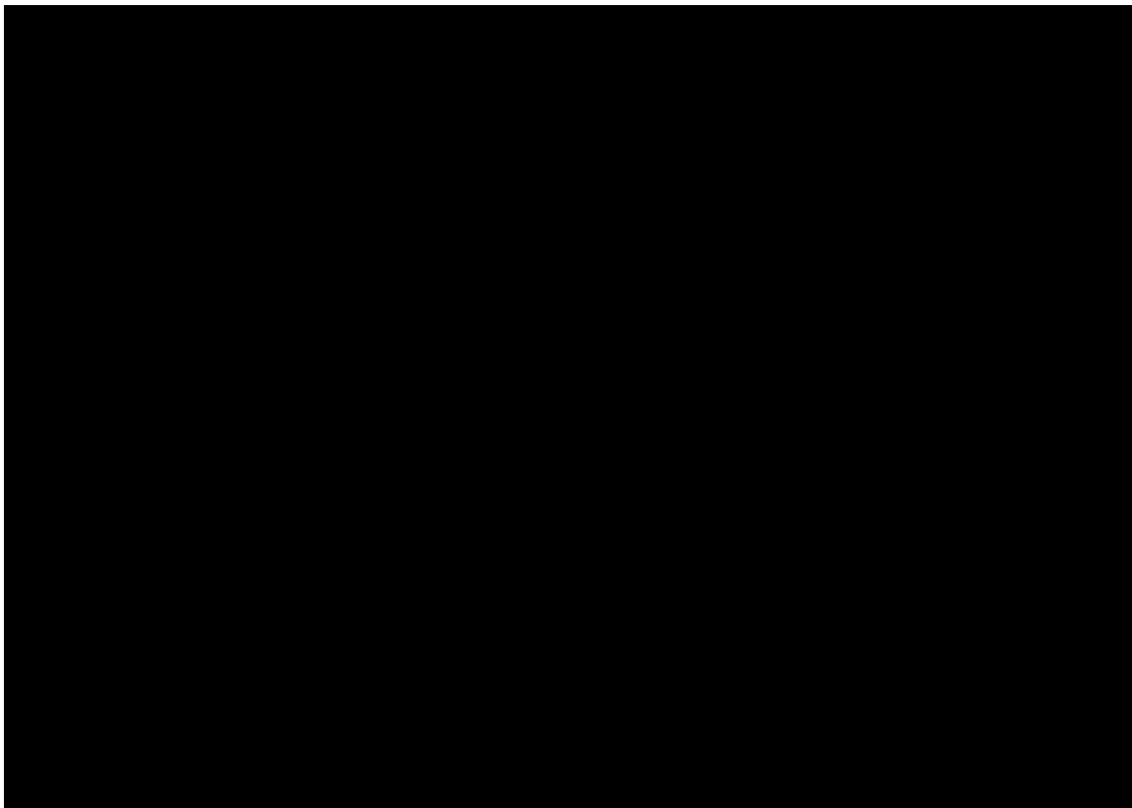


Figure 22. Exposed elements of the wreck during a January 2018 site visit. Source: Raines 2018.

In discussing the characteristics of the Twelvemile Island Wreck (1BA694), a variety of nineteenth-century shipbuilding terms will be used to describe the visible features of the vessel. The terms used will be described in detail below. For a more thorough understanding of ship terminology and construction, readers are referred to Paasch (1885).

Ship Components

Bow

The bow of a vessel is the forward part of the hull of a ship or boat. Visible features of the bow were limited during the March 2018 field investigation; but photographs from the January 2018 site visit aided identification of various portions of the vessel (**Figure 23**). Identifiable features of the bow include structural elements related to the stem and stempost, and the apron, attached with structural components such as fastener straps for holding the bobstay (a rope used to hold down the bowsprit of the vessel). The stem is the most forward part of a ship's bow and is an extension of the keel itself. The stem of the Twelvemile Island Wreck (1BA694), defined by its various elements, is in two parts: the lower portion is extant and rises above the mud from just above its original waterline and the upper portion, comprised of articulated stem timbers, rests on the shore off the starboard bow of the wreck.

Visible elements of the Twelvemile Island Wreck (1BA694) associated around the stem include iron straps on the fore-most portion of the stem, which would have been bobstay fasteners to connect the bobstay to the top of the stem and apron; two large iron drift bolt fasteners; and the first few starboard and port cant frames aft of the stem. Along the hull, only two flat metal straps were observed protruding from the water, which appear to represent either iron fasteners or chainplates. The Twelvemile Island Wreck (1BA694) has a pair of fastener straps for the bobstay on the stem, which is consistent with period vessels of the later nineteenth century (Underhill 1946:76).

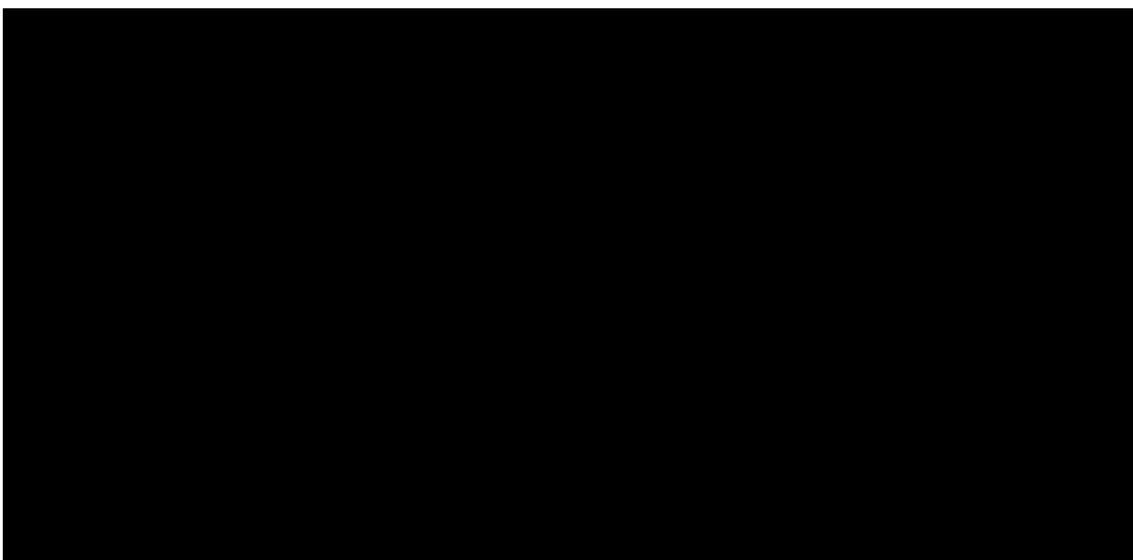


Figure 23. Bow of the Twelvemile Island Wreck (1BA694) in January 2018. Source: Raines 2018.

Plans from the Historic American Engineering Record (HAER) of the historic 1895-built three-masted schooner *C.A. Thayer* show the placement and characteristics of the bowsprit and foremast rig on the type of vessel which may be similar to that of the Twelvemile Island Wreck (1BA694) (Figure 24). In addition, Heinrich Paash's "From Keel to Truck" *Marine Dictionary* provides a description of the basic hull structure and framing of a wooden vessel from the Twelvemile Island Wreck (1BA694) time period (Figure 25).

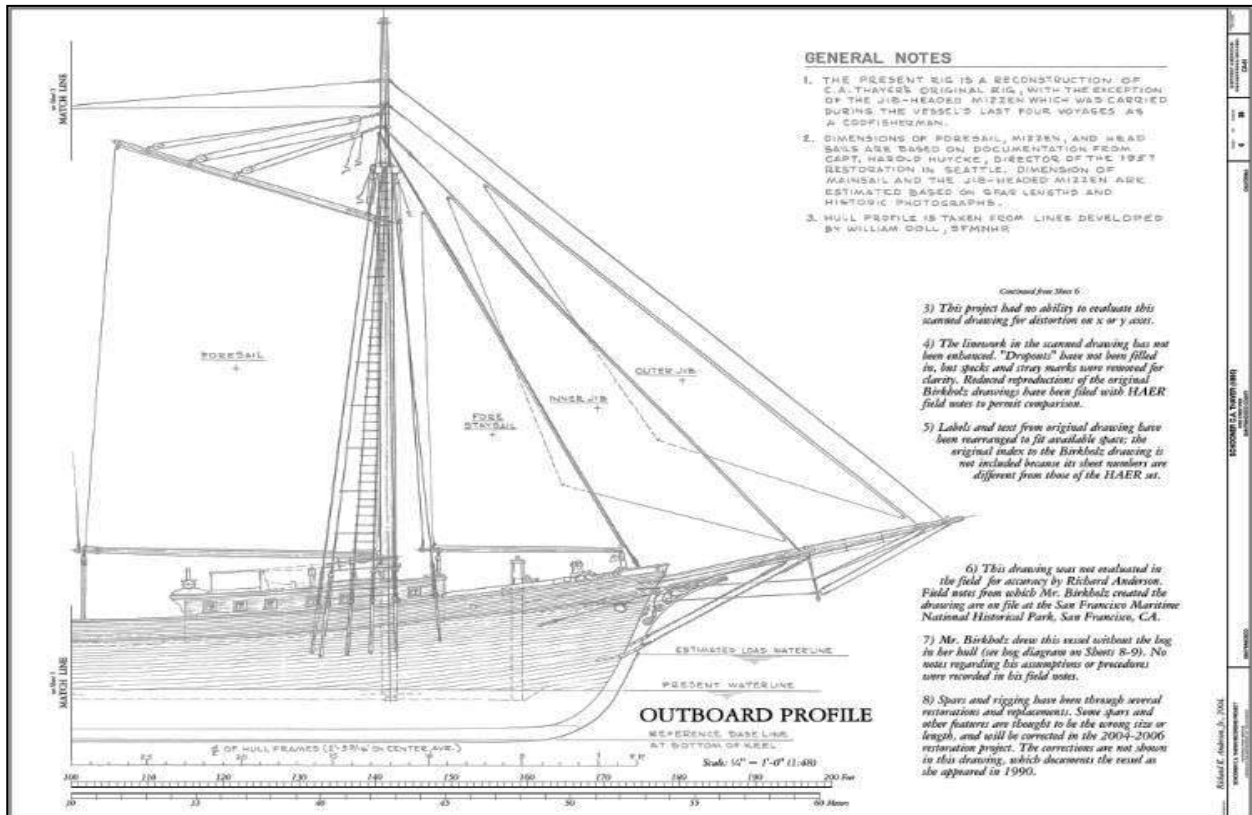


Figure 24. Outboard Profile of *C.A. Thayer* showing the placement and characteristic of the bowsprit, bobstays, and foremast. Source: Library of Congress.

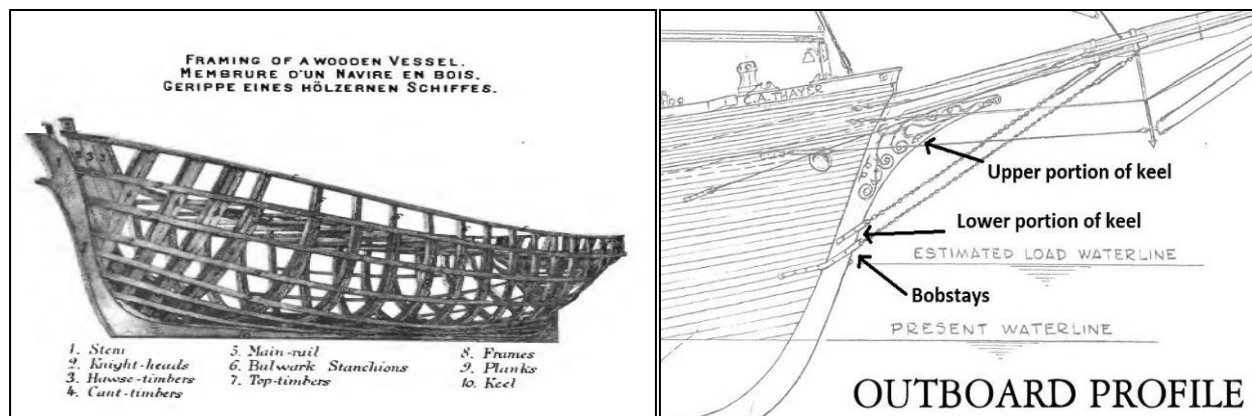


Figure 25. Left: The basic form of a nineteenth-century wooden hull (Paasch 1885). Right: the location of visible elements on the stem of the Twelvemile Island Wreck (1BA694). Profile example of *C.A. Thayer*. Source: Library of Congress.

Articulated and Disarticulated Stem

The same timbers that comprise the stem are present on both articulated and disarticulated sections, including the stem and apron. Additional timbers extant on only the articulated section include the stemson, which runs aft atop the keelson. The articulated and disarticulated sections of the stem comprise the length of the stem as fitted to the vessel, implying that the forward section of the bow was intact when the vessel was abandoned. The stem has been exposed to river current for some period of time, as evidenced by wear on the timbers exposing drift bolt heads several centimeters beyond the existing timber surface (Figure 26). Hand excavation inside the disarticulated portion of the stem suggests that the erosional wearing took place before the stem detached.



Figure 26. Erosional wear on the fallen stem piece; visible after hand excavation.

Originally, the bolt heads would have been flush with the timber, indicating that moving water and sediment over time wore away the surface of the stem. In addition, the repeated drying and rewetting process likely added to the wood warping process. In essence, the stem was weakened over time by numerous factors including erosion, marine borer damage, and probable dry rot. The stem likely detached from the hull as the result of higher water pulling on the structure or from a strike by a snag. The stem piece attached to the hull is partially wrenched free of the apron, and is angled to starboard, suggesting that a significant force was required to displace the upper portions of the stem (Figure 27).



Figure 27. Left: The stem attached to the hull (note bobstays), looking aft and along the starboard side. Right: The upper stem, laying off the starboard bow.

Bobstay Fasteners

The bobstay fasteners that are visible on the Twelvemile Island Wreck (1BA694) Site are angled, which was typical. The straps, which can be seen above water during two different field visits, show the amount of tidal fluctuation within the river (**Figure 28**). The bobstay fasteners are located above the waterline on the stem at the Twelvemile Island Wreck (1BA694). The visible frames above the mudline on the starboard side of the hull indicate that they are likely the fourth frame futtocks above the waterline, based on their orientation (**Figure 29**).

For reference, **Figure 30** shows an example of a similar type of iron strap on the 1885 schooner yacht *Coronet*, during its 2009 restoration. The bobstays attached to the bowsprit and bow of the vessel were part of the dynamic tension of the rigging of the vessel that linked all of the spars to the hull. The bobstay fasteners at the bow were the only conclusively-identified rigging elements noted on the wreck.

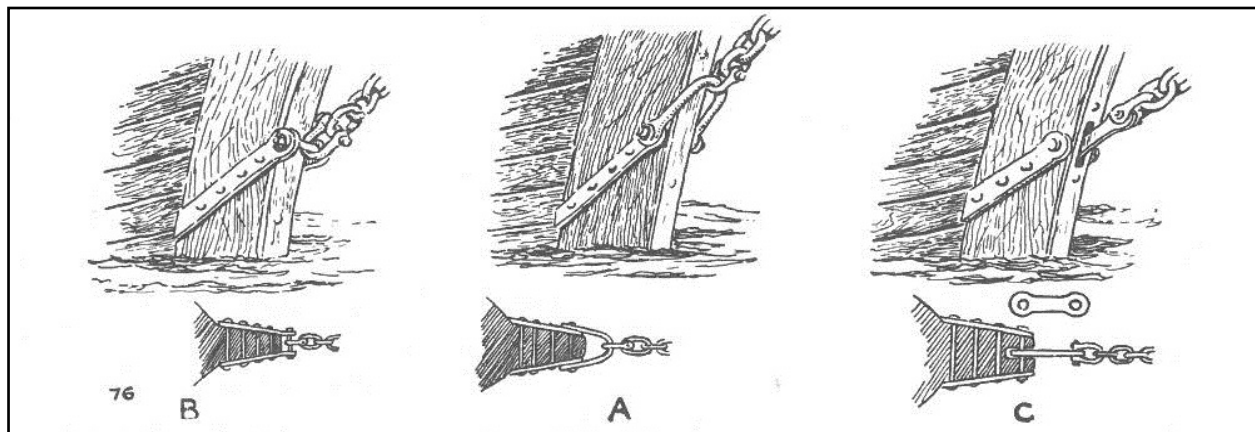


Figure 28. Examples of bobstay fasteners on wooden vessels (Underhill 1946).



Figure 29. Iron strap for securing bobstays on the starboard side of the stem, as exposed in January 2018 (left) and March 2018 (right).



Figure 30. Bow of *Coronet* (1885) showing the bobstay fasteners on the stem. Source: Daniels 2010.

Cant Frames

Cant frames are visible on the Twelvemile Island Wreck (1BA694). Cant frames are any of several frames bracketed aft of the bow of a ship and delineate the full form of the bow. The cant frames at the Twelvemile Island Wreck (1BA694) are heavily eroded and show evidence of marine borer infestation. The infestation is indicative of the height of the surviving vessel remains above the keel, and demonstrates that the hull has survived to at least the level of the original waterline at the bow. The cant frames and the bow timbers, as observed in January 2018, are fitted into the stem and delineate a sharp, flared bow (Figure 31).



Figure 31. Collapsed upper hull inside the bow. Source: Raines 2018.

One distinctive feature of the wreck at the bow is a section of fallen hull from the juncture of the hull above the waterline where the flare of the bow meets the full body of the vessel. This portion of the vessel is comprised of a section of frames sandwiched between the exterior hull and ceiling planking. The exposed portion was subjected to attack and partial consumption by marine organisms. It is no longer in its original orientation and lies more or less athwart or across the breadth of the bow with broken and eroded planks rising out of the mud at an acute angle (Figure 32).



Figure 32. The partial separation of the stem and apron timbers still attached to the wreck, with the stem twisted to starboard and toward shore.

Hull

A tool for evaluating length of a vessel is the length-to-beam ratio, which gives an indication of how long a vessel is relative to its beam. This measurement allows you to compare two boats of different sizes. By utilizing Total Station data, the partnership determined that the length-to-beam ratio for the Twelvemile Island Wreck (1BA694) is 5:1. Full-form freighters and packets of the 1850s, for example, are shown to have ratios ranging from 4.0:5.6, averaging at 4.9:5.2 (Crothers 2013:43-45). The ratio of 5:1 suggests the vessel was much larger than that of *Clotilda*.

The full body of the wreck was observed in January 2018 and “hand felt,” and mapped in March 2018 with Total Station. The cant frames sweep aft to join the fuller body of the hull as it trends toward midships. The measurements taken in both the January 2018 and the March 2018 site visits show a full-formed vessel with the right proportions for a wooden sailing vessel of the mid-nineteenth to early twentieth century.

The interior “depth” of the Twelvemile Island Wreck (1BA694) is too deeply buried in the mud to measure completely with hand probing, but is at least 5 feet (1.5 meters) deep. A likely original depth of the hold for the wreck is approximately 10 feet (3.0 meters), based on the scale of the wreck, and the proportions of similarly sized vessels of the period. The 1895-built *C.A. Thayer*, for example, is 156 feet long with a 37-foot beam and an 11-foot depth (48 x 11 x 3.4 meters) of hold (Delgado 1978). For comparison, note the midship section of *C.A. Thayer* (Figure 33). This is comparable to the measured dimensions of the Twelvemile Island Wreck (1BA694), and based on the wreck dimensions as scaled from the 1952 aerial (see Figure 9), the Twelvemile Island Wreck (1BA694) may be larger, both in length and beam. The measurements

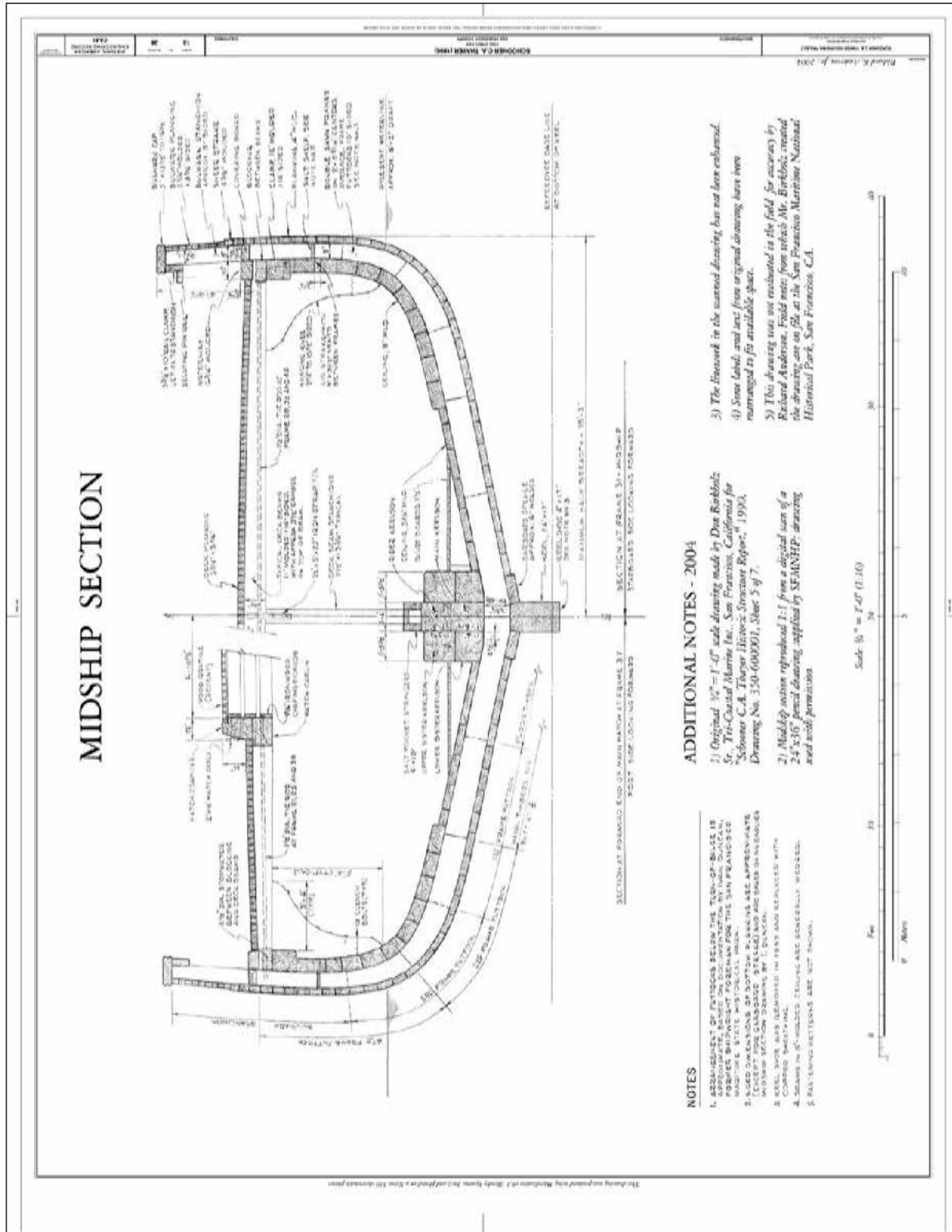


Figure 33. Midship section of the C.A. Thayer. Source: Library of Congress

would suggest a deeper hold. Limited hand excavation of the wreck's starboard side and midships revealed a thicker strake or wale of ceiling planking just below the mudline that may represent a hold-beam shelf, with the remains of a wooden knee. A hold-beam shelf would be consistent with a 'tween deck in the hold. Captain H. Paasch's (1885) illustrated marine dictionary provides a cross-section view of a period wooden ship while depicting a three-decked vessel, and illustrates and labels the requisite pieces of a wooden ship, including the hold-beam shelf and knees (Figure 34).

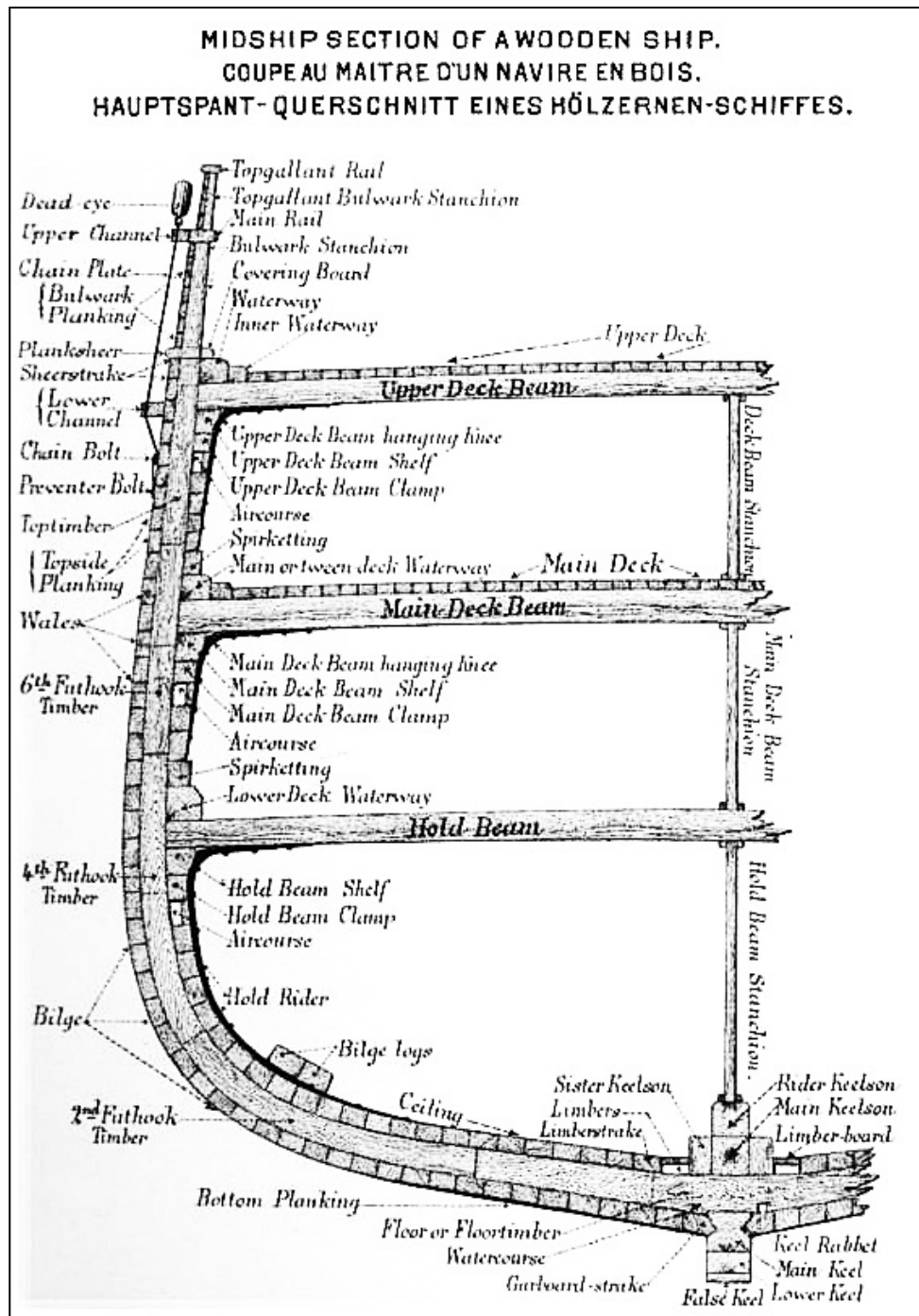


Figure 34. Midship cross-section with nomenclature. Source: Paasch 1885.

Iron Strapping or Chainplates

A second section of upper hull has detached and fallen into the inner hull of the vessel. This section of the structure is located on the starboard side of the vessel. This piece, upside-down from its original orientation, has two iron straps attached to it. Initially thought to be strap iron chainplates for rigging the foremast, they may be, based on their dimensions, iron or steel reinforcing straps (Figure 35). By the early twentieth century, "arch strapping" replaced mid-nineteenth-century diagonal strapping with iron. This essentially tied together a wooden hull that would carry heavy weight, usually early ocean steamers, or warships with multiple gun decks, to keep them from working apart in heavy seas. By the mid-nineteenth century, American shipyards built wooden vessels whose size "exceeded the ability of wood to support the weight of the hull" (Thiesen 2006:61). The solution for strengthening larger wooden sailing vessels was the adoption of iron reinforcing after 1850.

Iron and steel arch strapping provided longitudinal support for ships, and was widely employed in the construction of large wooden-hulled sailing and motor vessels built during World War I with soft wood (Estep 1918:41, 45). This was described in 1918 as a "greatly improved method" of diagonal framing:

This method calls for the use of flat steel straps on the outside of frames, the straps being let in flush and laced to cross the frames and each other at an inclination of about 45° from the perpendicular. In addition to this, steel plate riders and a steel arch are worked on the inside of frames, the arch extending from near deadwood forward up to main deck beams amidships and to stern post near deadwood aft. This arch is securely fastened to all the frames it crosses (Davis 1918:44-45).

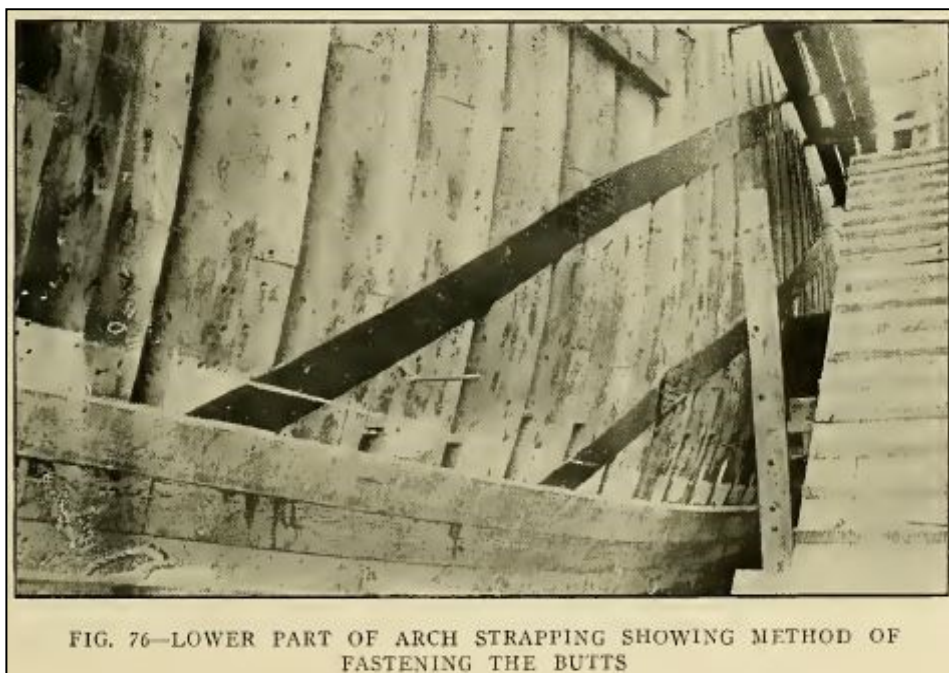


Figure 35. Example of steel arch strapping. Source: Estep 1918.

During the early twentieth century, Davis explained that diagonal framing “was brought into use to prevent ships hogging through the unequal vertical pressures of the weights downwards, and of water upwards, in different parts of a ship’s length” (Davis 1918:44). Known as “hogging,” this phenomenon is common for wooden ships and is pronounced in larger vessels.

Archaeologists believe that the three artifacts protruding from the water, represented at the Twelvemile Island Wreck (1BA694), are the remains of diagonal or arch strapping (**Figure 36**). All three pieces of iron strapping were photodocumented, while the one disarticulated strap was removed for archaeological illustration (**Figure 37**) and then returned to its position lying outside the starboard hull midships. Furthermore, there is the lesser possibility that they are fragments of flat-bar iron or steel chainplates. Chainplates, fastened to the outer hull, anchor the standing rigging that supports each mast. The shape and form of chainplates evolved from what essentially began as enlarged “chains” attached to the side of the hull to single strops with a “deadeye” at the terminal end. An example chainplate is found on the 1895-built three-masted schooner *C.A. Thayer* (see **Figure 24**).



Figure 36. Archaeologist Stacye Hathorn measuring steel reinforcing straps along the starboard side of the vessel.

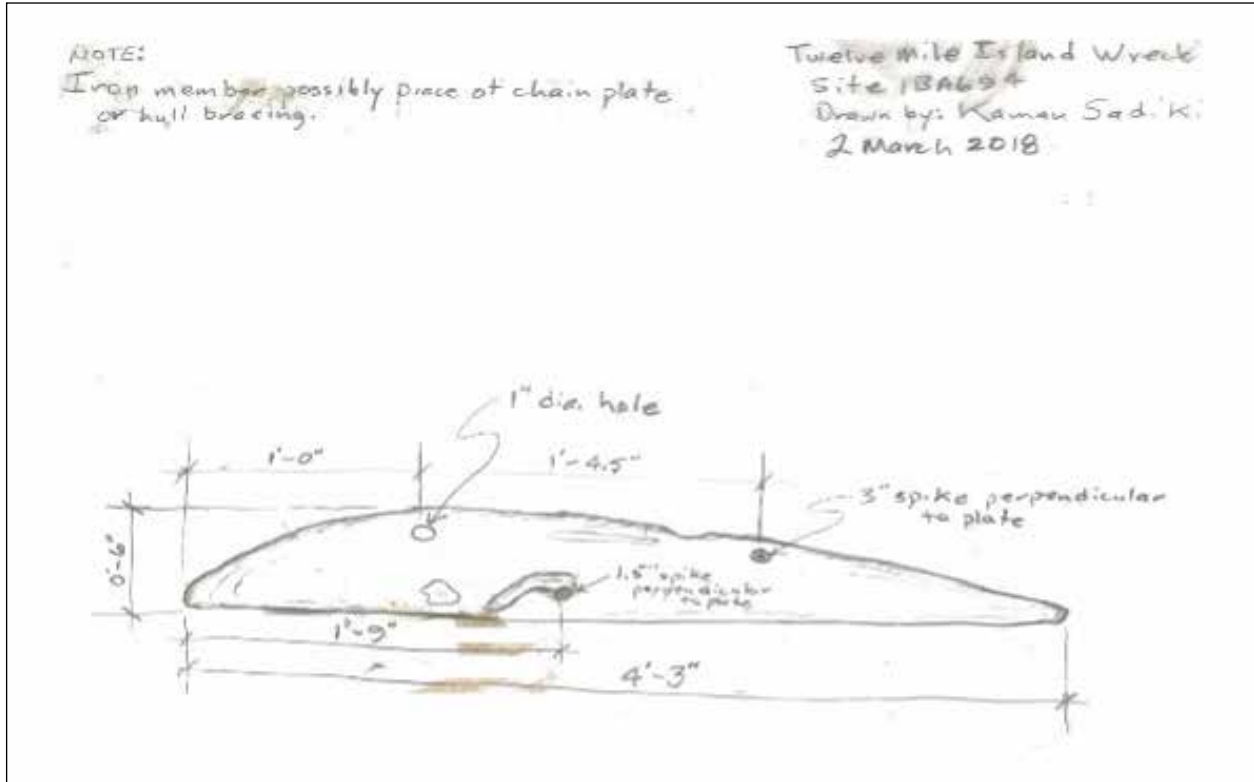


Figure 37. Probable iron reinforcing strap from the Twelvemile Island Wreck Site (1BA694). Illustration by Kamau Sadiki.

Chainplates were described by Underhill (1946) as the “most common arrangement for the modern wooden ship,” which, while published in 1946, described the last half-century of shipbuilding (Figure 38). Underhill provides a definition of chainplates as being “made of flat iron bar and fitted outside the hull below the deck lines...extend[ing] to the level of the topgallant-rail where they bolt to the strap of the lower dead-eye” (Underhill 1946:81, 118).



Figure 38. Port hull of *Wawona* showing the mainmast chainplates. Source: Library of Congress.

Frames

The higher water conditions of the March 2018 investigation of the wreck precluded visual inspection and measurement of the exposed frame ends, outer hull, and ceiling planking; however, much of the framework was visible and photographed during the January 2018 site visit. The hull of the vessel is heavily built. It is fastened with through bolts and iron or steel fasteners, with spikes, and with outer hull and ceiling planking midships that are 3.0 inches (7.6 centimeters) thick. The frames are double-sawn, a method employed from the mid-nineteenth through the early twentieth century, with large frame dimensions of 14 inches (36 centimeters) molded, and 10 inches (25 centimeters) sided. Ceiling planking is the timber inside the hull (on the right side of the image in **Figure 39** and **Figure 40**) with the thicker wale or strake that is believed to be a hold-beam shelf for the support of a hold or 'tween deck.

The measurements of individual ship timbers aid in determining the overall size of the ship's tonnage. From the last quarter of the nineteenth century through World War II, both Lloyd's and American Lloyd's established rules for the size of timber used in ships. These rules, if not conformed to by shipbuilders, would lead to a vessel not being insured. With these rules in mind, the sided dimensions of the frames, at 10 inches (25 centimeters), conform to the rules for a 500-ton vessel, as does the ceiling planking. Measured frames from the Twelvemile Island Wreck (1BA694) are consistent with the tonnage of *C.A. Thayer*, which was registered at 453 gross tons, with a length of 156 feet, and a beam of 36 feet (48 x 11 meters). With a measured hull length and beam that closely approximates the *C.A. Thayer's*, with the possibility based on the 1952 aerial photograph with a scaled length of 183 feet (56 meters), all of the construction features of the Twelvemile Island Wreck (1BA694) are consistent with a large, late nineteenth- to early twentieth-century, probably steel-strapped vessel.

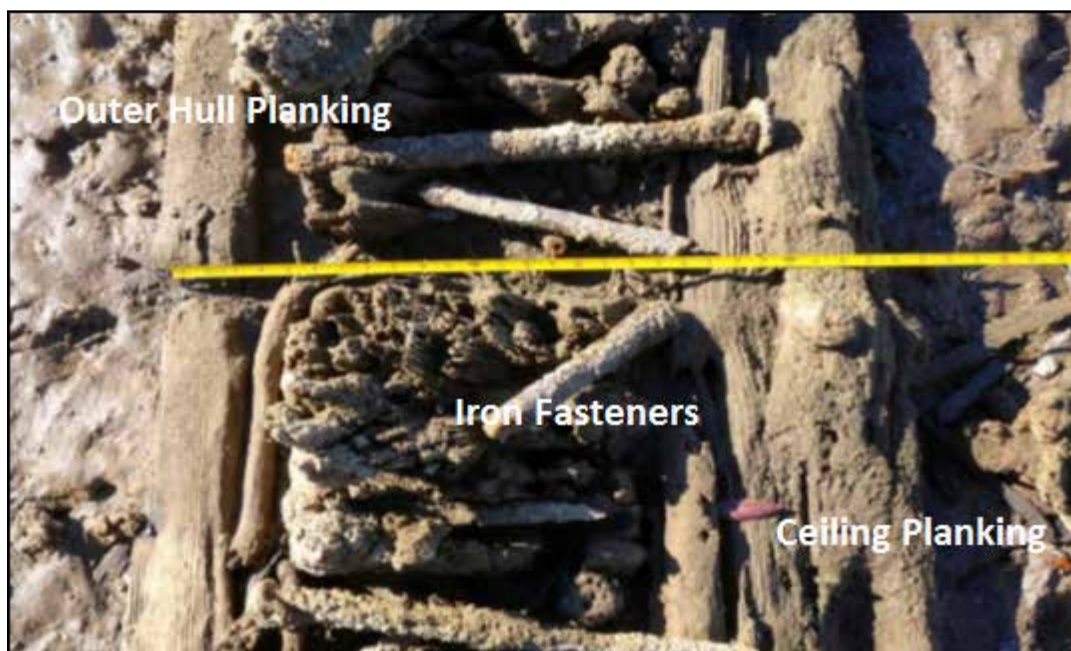


Figure 39. UWF measurement of a section of midships hull showing outer hull planking, the butt-ends of frames, likely at the third or fourth frame futtock level, and ceiling planking with the likely hold-beam shelf. Source: Raines 2018.

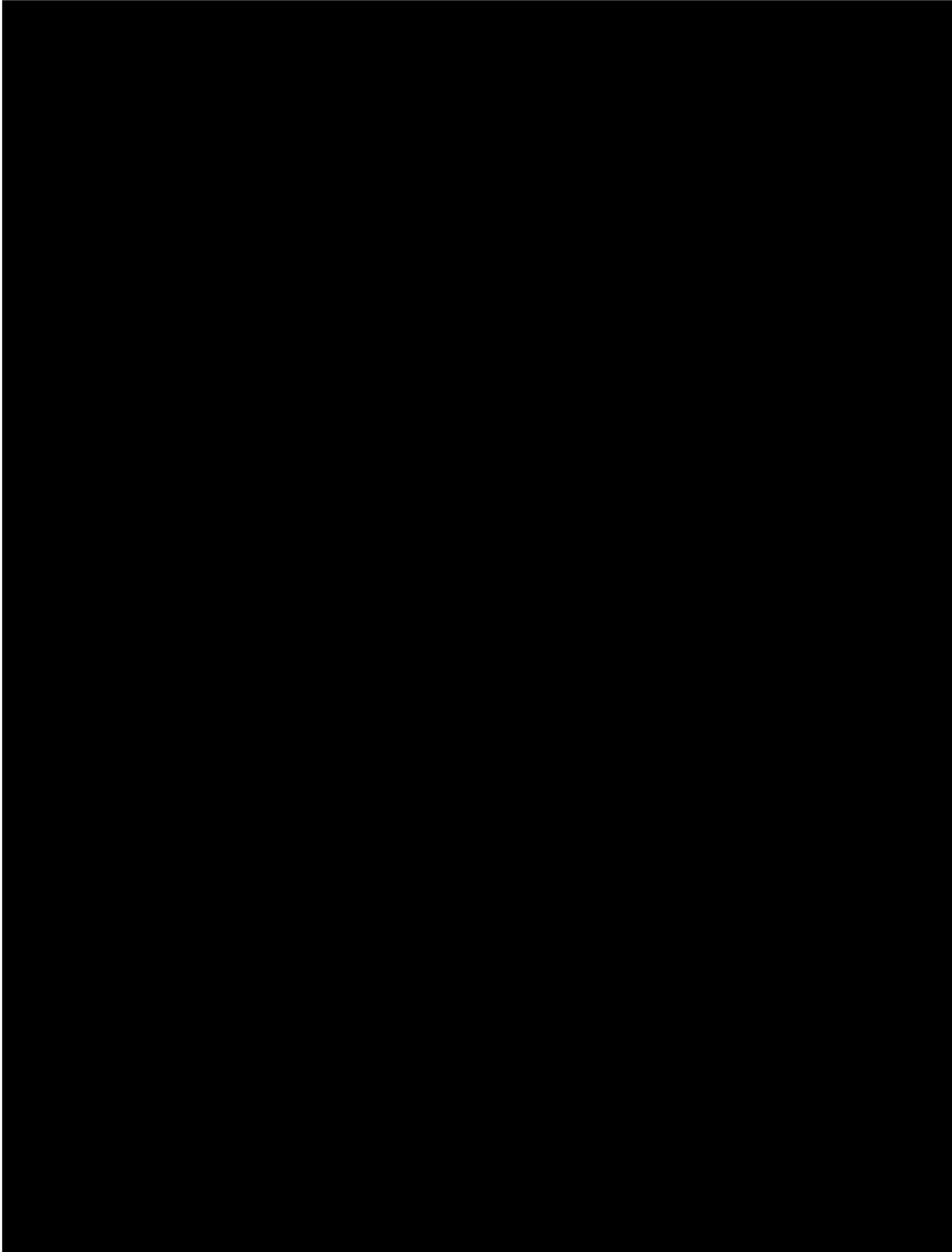


Figure 40. The exposed line of the starboard hull, midships, heading aft toward the stern during the January 2018 site visit, showing the frame ends, fasteners, outer and ceiling planking, and large size of the exposed frames. Source: Raines 2018.

Analysis

Wood Samples

A total of nine wood samples were collected and sent for basic microscopic identification. The samples were thin-sectioned with a razor blade and the sections were placed under a microscope for visual identification. Each sample was identified using keys for identification found in the *Textbook of Wood Technology* (Panshin and de Zeeuw 1980). Amy Mitchell-Cook at the UWF identified all of the samples. Six of the samples were identified as Douglas Fir (*Pseudotsuga menziesii*), two were identified as Southern Hard Pine (*Pinus spp.*), and one was identified as Larch (*Larix Laricina*). Wood samples identified include the hull planking, stempost, and frames. **Table 4** displays the results of the wood samples.

Table 4. Wood Samples Taken at the Twelvemile Island Wreck (1BA694) Site.

FS	Location	Type of Wood
1	Disarticulated Stem	Larch (<i>Larix laricina</i>)
2	Articulated Stem	Southern Hard Pine (<i>Pinus spp</i>)
3	Starboard Frame	Douglas Fir (<i>Pseudotsuga menziessi</i>)
4	Starboard Frame	Douglas Fir (<i>Pseudotsuga menziessi</i>)
5	Starboard Frame	Douglas Fir (<i>Pseudotsuga menziessi</i>)
6	Starboard Frame	Douglas Fir (<i>Pseudotsuga menziessi</i>)
7	Starboard Outer Hull Planking	Douglas Fir (<i>Pseudotsuga menziessi</i>)
8	Starboard Inner Hull Planking	Douglas Fir (<i>Pseudotsuga menziessi</i>)
9	Starboard Inner Hull Planking	Southern Hard Pine (<i>Pinus spp</i>)

The majority of ship's architectural components were constructed of wood native to the Pacific Northwest. The identification of Douglas Fir (*Pseudotsuga menziesii*) as the wood used in the construction of the Twelvemile Island Wreck (1BA694) suggests that it was built on the West Coast of North America. Commonly used in West Coast shipbuilding, Douglas Fir was uniformly used in all aspects from the hull, decks, and masts. It was the second most important wood in American timber production after Southern Pine (Estep 1918:8). Extant historic West Coast sailing vessels, including the hulk of the four-masted schooner *La Merced*, and the floating three-masted schooner *C.A. Thayer*, are built entirely of Douglas Fir (Delgado 1978, 1988). The archaeological study of the 1885 two-masted schooner *Neptune*, also West Coast-built and wrecked in 1900, revealed it was also built entirely of Douglas Fir, as did the study of the wreck of the 1886 three-masted schooner *Comet*, lost in 1911 (Russell 2004).

All told, West Coast shipbuilders launched "some 540 sailing vessels of 100 tons gross and upward" between 1850 and 1905 (Lyman 1941:3). While the earliest vessels were built of imported wood from the eastern seaboard, after 1870 all vessels were constructed with Douglas Fir, with the majority built in response to the Pacific lumber trade's boom of the 1880s and 1890s. A resurgence in wooden shipbuilding in World War I to offset losses to German U-boat attacks resulted in the construction of 125 wooden three- and four-masted schooners and barkentines between 1916 and 1919 (Hopkins 1994:18). Given the identification of the wood in the Twelvemile Island Wreck (1BA694) as Douglas Fir, it is most likely a three-, or

perhaps a four-masted schooner built on the West Coast in the late nineteenth century, and subsequently sold to Gulf, and perhaps even Mobile-based, maritime interests.

Lyman (1941) lists 21 Pacific Coast-built sailing vessels which had a Mobile registry, including three- and four-masted schooners. A number of these were wrecked beyond Mobile, but a few simply are noted as having their registry cancelled, suggesting they were laid up. The most common Mobile owner of these vessels was the Whitney-Bodden Shipping Company, incorporated in 1917 to “engage in the buying and selling of vessels of all kinds” (*The Lumber Trade Journal* 1917:33).

The use of Douglas Fir in ship construction for historic vessels of scale in the area has been previously documented (Holland 2006). In her Master’s thesis, *Maritime Technology in Transition: Historical and Archaeological Investigations of the Schooner Barge Geo T. Lock (8R1491)*, Holland’s investigatory work on the Pensacola wreck of the schooner barge identifies that the main mast of the shipwrecked vessel *Geo T. Lock* was constructed of Douglas Fir (Holland 2006:60). Holland notes that while Douglas Fir is not native to the region, it may have been readily available in western Louisiana. The current investigation suggests that the Douglas Fir would have been available in the Mobile area as well.

Site Formation Processes

As previously noted, the detached stem, the fallen fragments of upper hull, and the exposed frame ends suggest that the vessel, while intact, was either moored or scuttled in place at the site. Over time, a variety of biological and perhaps anthropogenic factors resulted in the vessel, as it settled to the waterline in mud, shifted to port, rolling in the mud to list some 15 to 20 degrees to port. At some stage, either through deliberate action or neglect, the hold flooded and filled with silt. The area between the mud-line and those portions of the hull that remained more or less immersed in the river began to decay as marine organisms colonized the timbers.

The salinity of the Mobile River at Twelvemile Island is sufficient to support colonization of timber by small marine borers such as *Bankia* and *Limnoria*, from within a genus of isopods from the family *Limnoriidae*. Algal and bacteriological colonization lead to decay, while freshwater can introduce dry rot. Bird droppings on exposed timbers also hasten decay. The cumulative effect of these impacts on the timbers of the wreck resulted in the eventual failure of the hull at the waterline just above the mud. The upper portions of the wreck either collapsed or were dislodged, some of it falling into the hull, or alongside the wreck on the bank, as is seen with the detached stern.

The condition of the exposed frames indicates only biological and mechanical forces at work, with no evidence of burning. The consumption of the wood by natural factors can mimic burning, and the corrosion of the metal fasteners will deposit a black residue, staining wood which can be mistaken as evidence of burning. The survival of upper ship structure, including the two hull sections and the stem, also show that this wreck did not burn.

The likely scenario for the deposition of the Twelvemile Island Wreck (1BA694) at this site may have been abandonment of a no-longer-needed, but intact vessel in a back channel of the river that was used as both a ship graveyard and as a staging area for barges. One possibility is not abandonment, but rather the reuse of an older sailing vessel, dismantled, and moored alongside the bank as a wooden barge or landing.

[REDACTED]. While it may be isolated, or a later feature, it may also be evidence that the wreck [REDACTED] (Figure 41).



Figure 41. Shackle and wire rope identified at the site during the March 2018 field visit.

Additional Fieldwork Photos and Total Station Results

Documentation below shows investigation at the Twelvemile Island Wreck (1BA694) site. **Figures 42-47** show some of the fieldwork conducted at the site. **Figures 48 and 49** show two archaeological illustrations of identifiable features on the Twelvemile Island Wreck (1BA694) site, and **Figures 50-53** and **Table 5** depict the results of the Total Station survey led by David W. Morgan.



Figure 42. Clete Rooney (left) gathers GPS data over forward starboard iron strap.



Figure 43. Kyle Lent measuring possible beam on the Twelvemile Island Wreck (1BA694) site.



Figure 44. View of forward portion of the Twelvemile Island Wreck (1BA694) site showing bobstay fastener, stem, and the cant frames (image facing roughly north-northwest). David W. Morgan holding stadia rod atop cant frame.

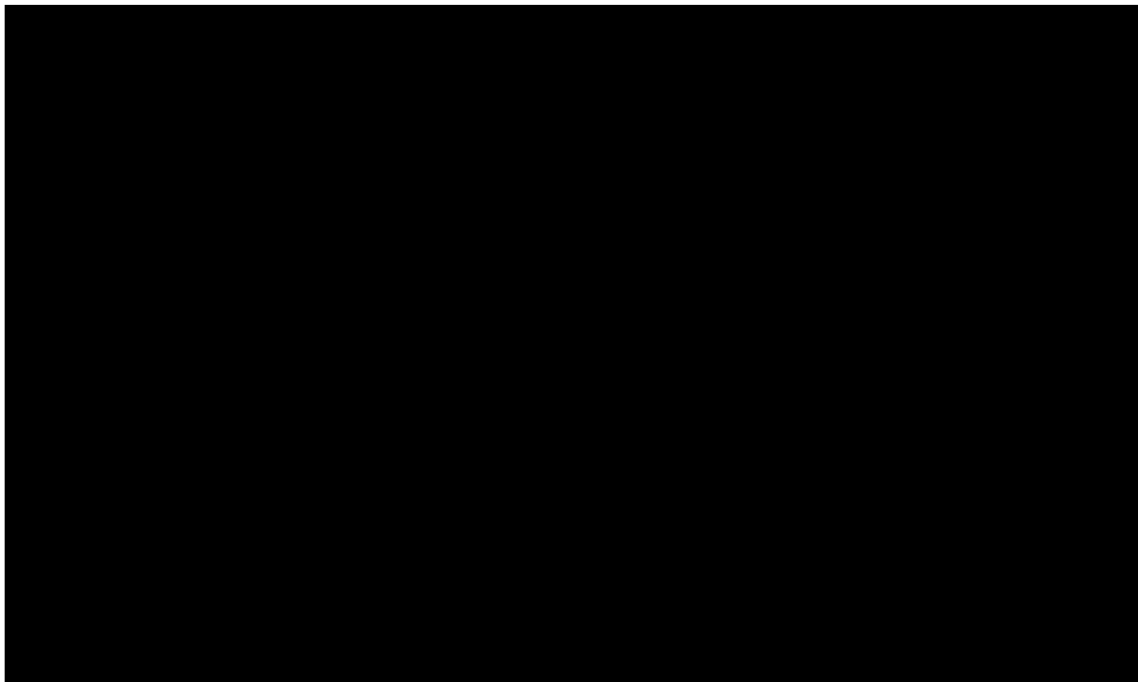


Figure 45. View of aft to midships section of the Twelvemile Island Wreck (1BA694) site showing frames, image facing northeast.



Figure 46. View of Twelvemile Island Wreck (1BA694) site from forward cant frames down starboard side; Joe Grinnan measuring drift bolt fastener; David W. Morgan in background with stadia rod; image facing west.

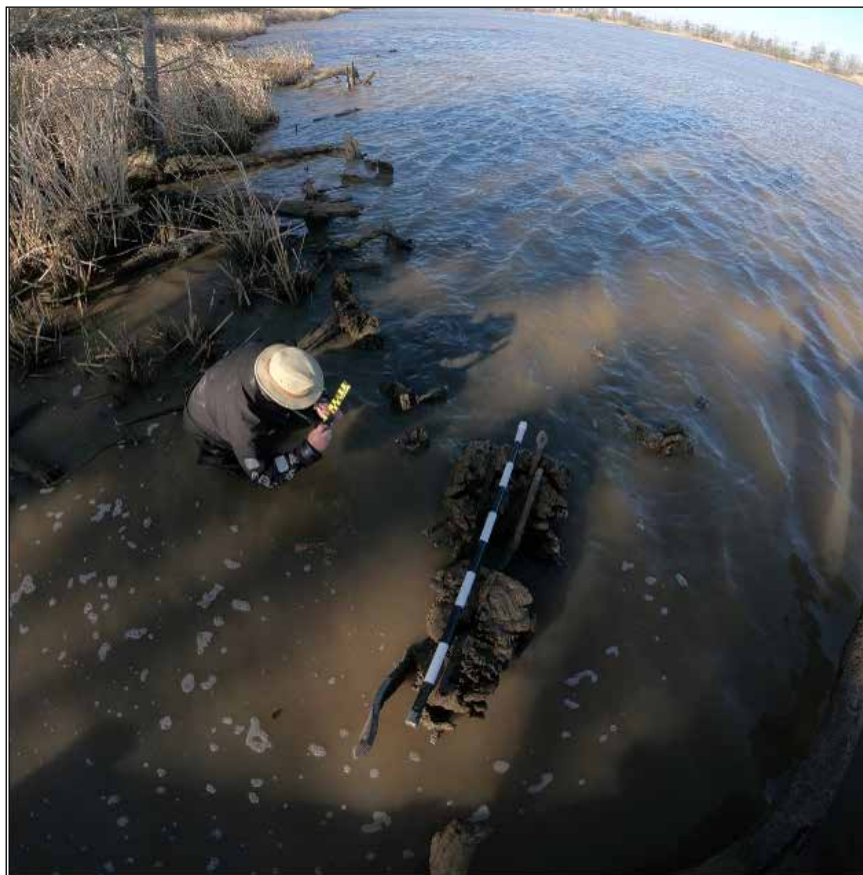


Figure 47. View of Twelvemile Island Wreck (1BA694) site as seen at low tide on March 2, 2018. Jim Delgado in foreground, image facing west, with scale in 6-inch units atop the stem feature.

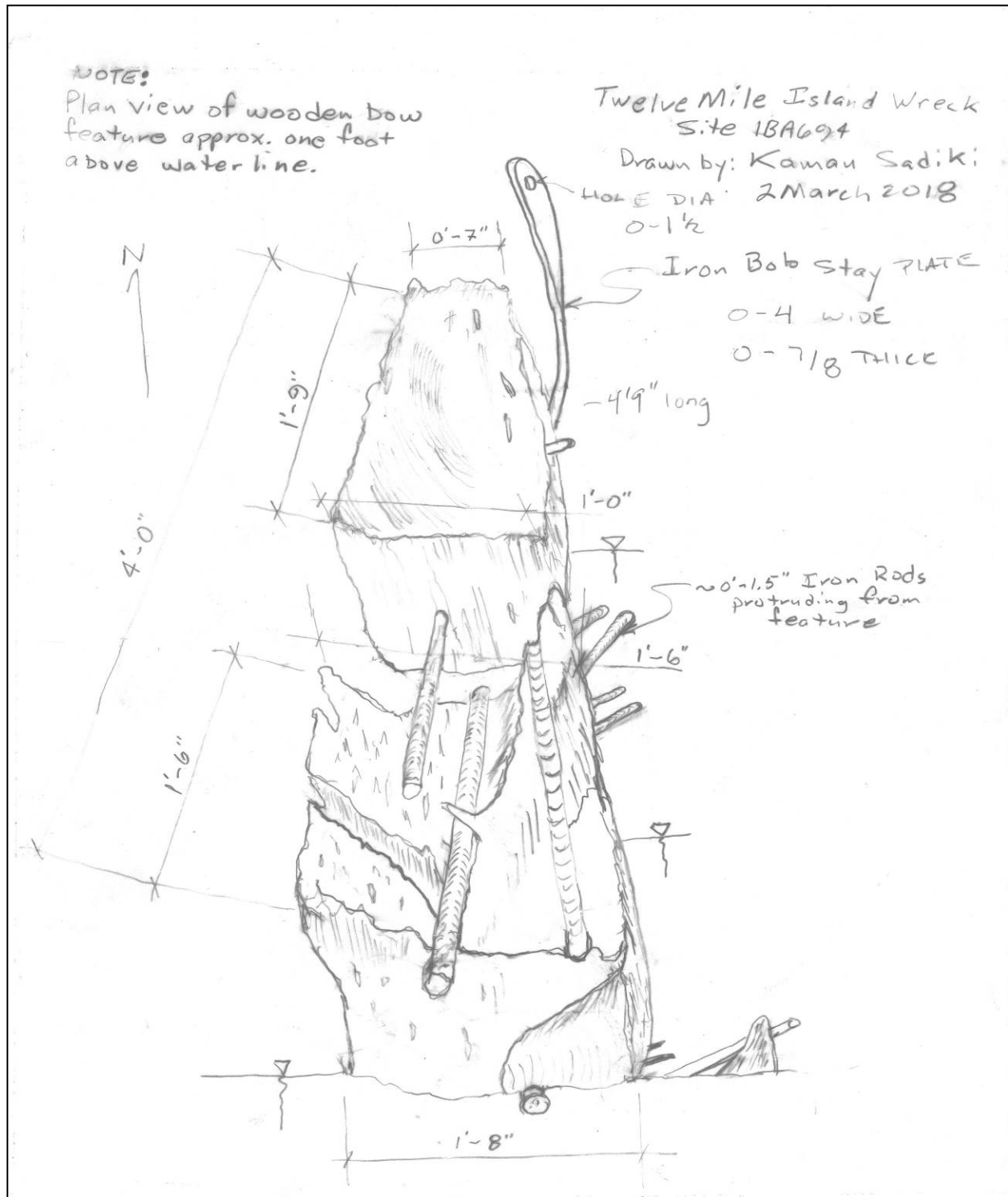


Figure 48. Plan view of wooden bow/stem feature at the Twelvemile Island Wreck (1BA694) site. Illustration by Kamau Sadiki.

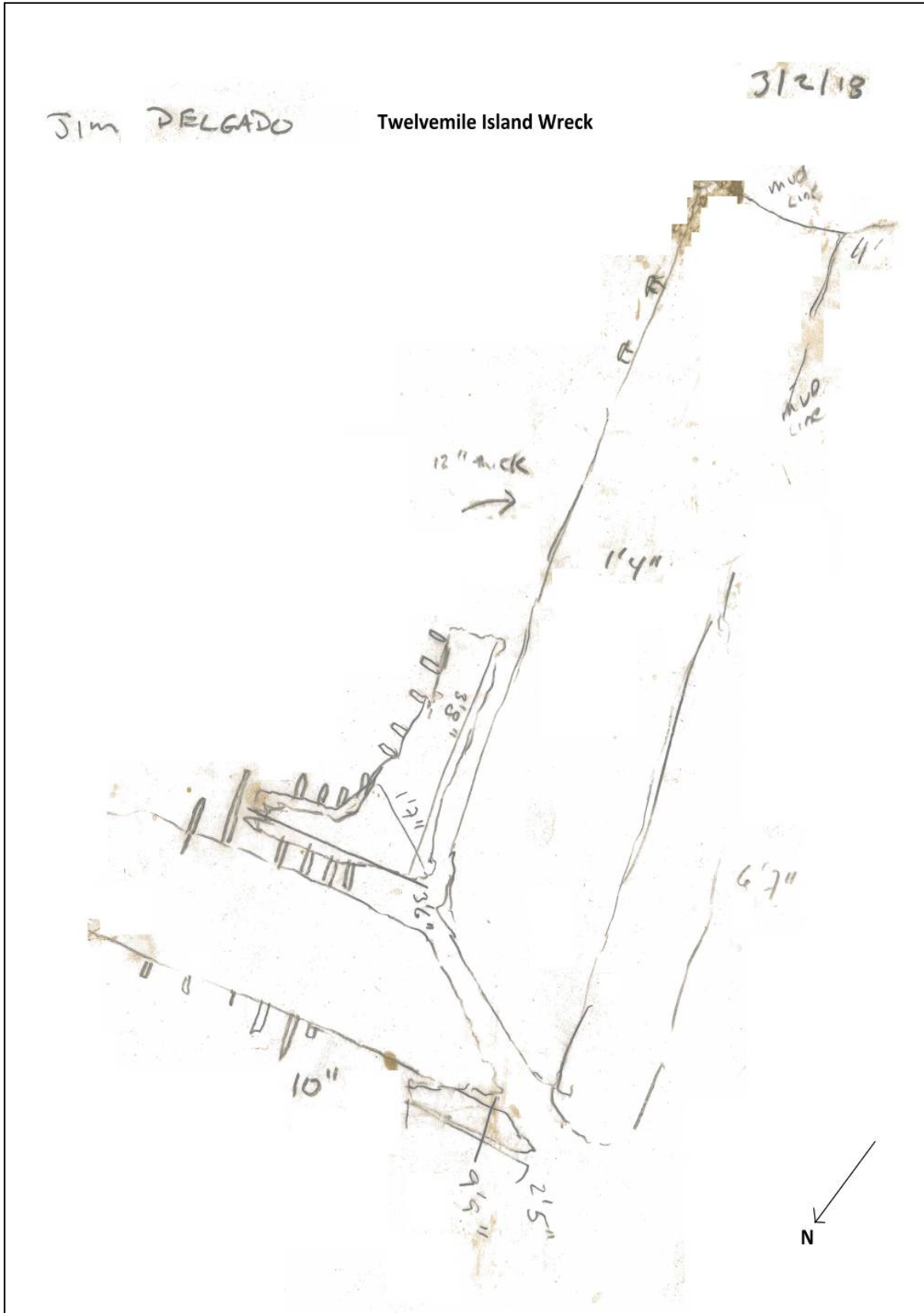


Figure 49. Disarticulated stempost feature at the Twelvemile Island Wreck (1BA694). Illustration by James Delgado.

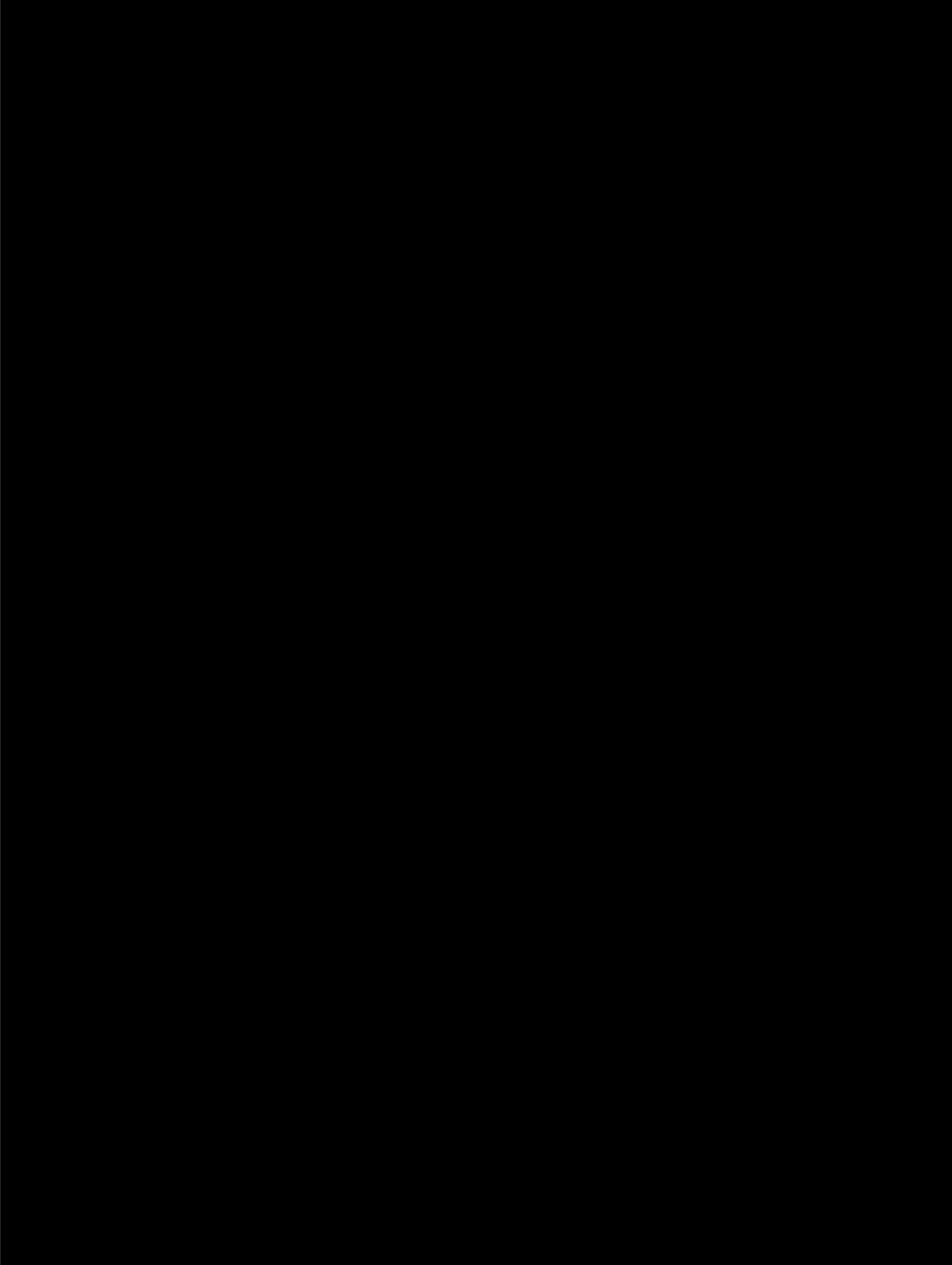


Figure 50. Total Station Map of the Twelvemile Island Wreck (1BA694). Details shown in Figures 51-53. Map by David W. Morgan.

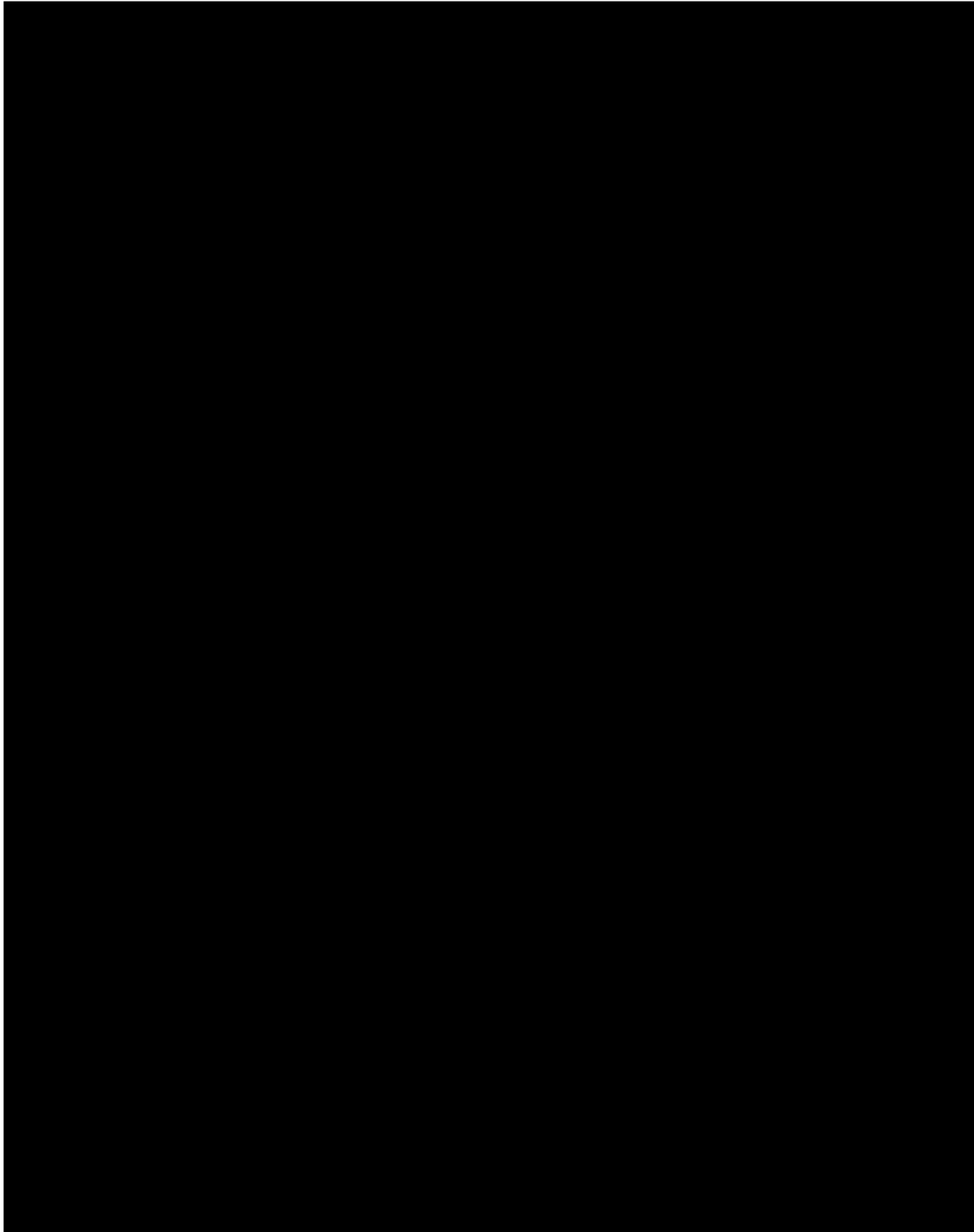


Figure 51. Total Station map of forward portion of the Twelvemile Island Wreck (1BA694) site showing disarticulated stem element. Map by David W. Morgan.

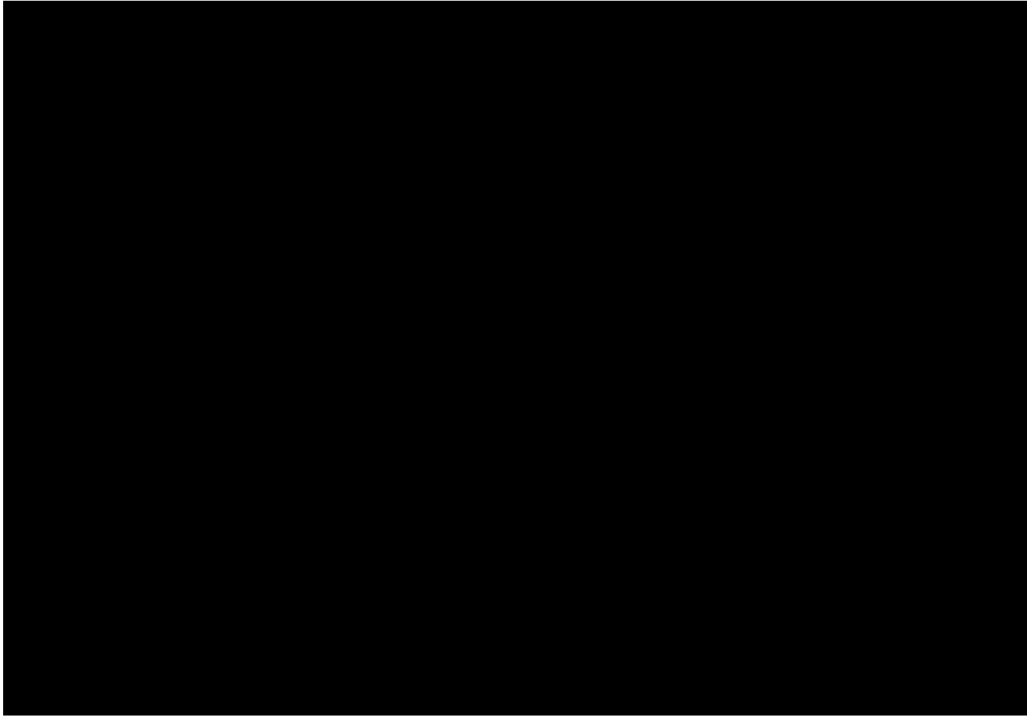


Figure 52. Total Station map of the Twelvemile Island Wreck (1BA694) showing forward section. Map by David W. Morgan.

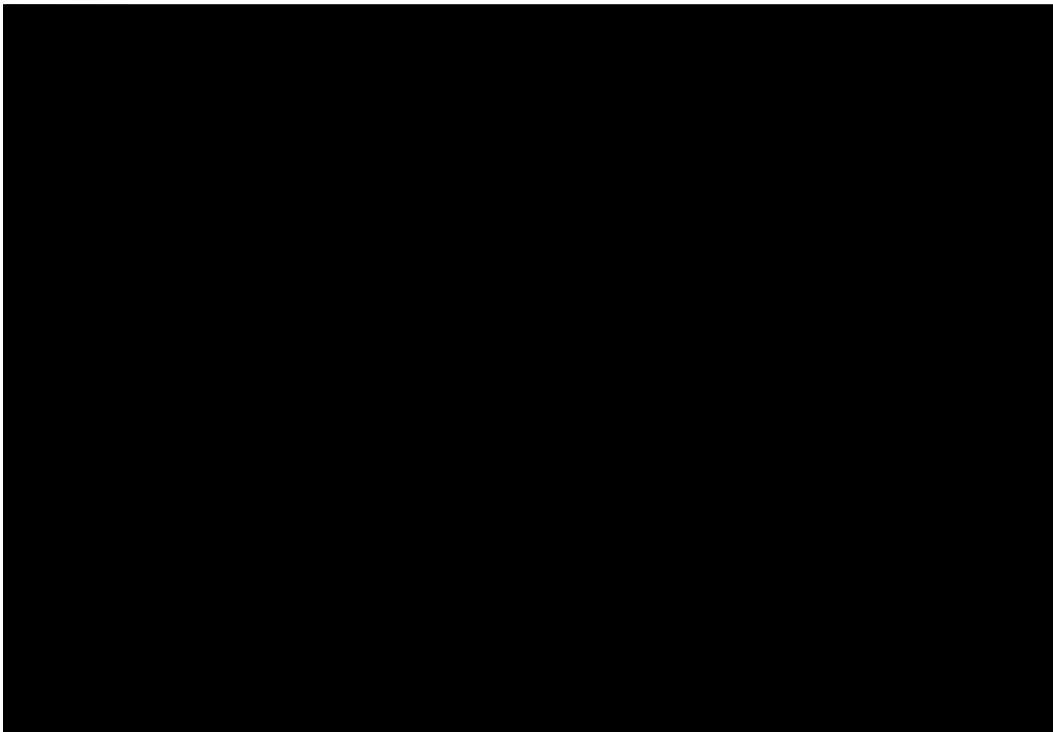


Figure 53. Total Station map of the Twelvemile Island Wreck (1BA694) showing aft section. Map by David W. Morgan.

Table 5. Codes Assigned to Survey Points and Their Explanations.

Twelvemile Island Wreck (1BA694)	
Coordinate system	A submeter Trimble GPS was used to collect real world coordinates for the datum. These points were not post-processed in time to begin the Total Station survey on 3/2/18. Therefore, a temporary, arbitrary system was created to suffice for 3/2/18. In terms of northing, easting, and elevation, the following were assigned respectively: 1,000 survey feet (sft), 1,000 sft, and 200 sft. US survey feet were selected as the unit of measure, in accordance with custom for recording ships constructed with reference to English distance units.
Point Name	Description of Shots
Starboard Edge	Frames along the starboard side of the vessel, from the maximum SW extent to the point where frames were visible above water. All points were identified by feel and were submerged, so occasional error may be possible. Point was taken along the most exterior point of the frame (i.e., towards the hull planking), in about the middle of the frame's edge.
Starboard Frame	Frames along the starboard side of the vessel, from the maximum SW extent to the point where frames were visible above water. All points were identified by feel and were submerged, so occasional error may be possible. Point was taken along the most exterior point of the frame (i.e., towards the hull planking), in about the middle of the frame's edge.
Star Fra Viz	Frames along the starboard side of the vessel that were visible above the water, which began roughly amidships and continued forward (NE) to the stem. Some frames were missing. Some could not be identified as singles or doubles, so adjacent frames may have been misidentified as single frames. Point was taken along the most exterior point of the frame (i.e., towards the hull planking), in about the middle of the frame's edge.
Stem	Points taken atop the four corners of the two large timber elements forming together what is referred to as the stem (no effort to identify or sort stem components, like a stemson). These points are on the articulated and <i>in situ</i> stem, not the portion of the stem found aft and starboard of it, out of place and broken. Together Stem 1-4 should outline the shape of the aft timber of the stem, and Stem 5-8 should do the same for the fore timber of the stem.
FS2	Wood sample taken from the articulated stem.
FS1	Wood sample taken from the disarticulated stem.
FS3	Wood sample off starboard frame.
FS7	Wood sample from starboard outer hull planking.
FS8	Wood sample from the starboard inner hull planking.
Shackle bolt	Roughly 3.0-inch (< 0.1-m) shackle bolt emerging from a downed, horizontal cypress, which subsequently grew a vertical offshoot that stands roughly 15 feet (4.6 m) tall; cypress tree is aft of and adjacent to the disarticulated stem.
FS9	Wood sample of starboard inner hull planking.
FS4	Wood sample from starboard frame.
Star E Sup	Point taken to the interior edge of a flat, iron starboard hull support, previously termed chainplate in notes. Two such supports are within roughly 3.3 feet (1.0 m) of each other, and this point is for the NE (forward) support.
Star aft sup	Point taken to the interior edge of a flat, iron starboard hull support, previously termed chainplate in notes. Two such supports are within roughly 3.3 feet (1.0 m) of each other, and this point is for the SW (aft) support.
FS5	Wood sample off starboard frame.
FS6	Wood sample off starboard frame.
Far W Extent	Furthest extent (SW) of articulated ship structure. Position marked with orange Norwegian buoy and tied to timber element.
Aft Bot	Marker buoy (bottle) tied to an aft section of submerged starboard hull.
Bot 2	Marker buoy (bottle) tied to a submerged hull structure.
Bot 3	Marker buoy (bottle) tied to a submerged hull structure. It is possible it is debris. Planks are 0.5" (1.27cm) thick, which may suggest debris that floated onto site.

Table 5. Codes Assigned to Survey Points and Their Explanations.

Point Name	Description of Shots
Bobstay starboard	Most forward portion of the intact and <i>in situ</i> bobstay on the starboard side of the stem.
Port bobstay	Most forward portion of the broken but <i>in situ</i> bobstay on the port side of the stem.
Port frame	Frames along the port side of the vessel, from the maximum NE extent (cant frames beginning at the stem) to the point where frames and structure could no longer be felt or identified from debris with any certainty. All points were identified by feel and were submerged, so occasional error may be possible. Point was taken along the most exterior point of the frame (i.e., towards the hull planking), in about the middle of the frame's edge.
Hard contact	Generic point taken in the middle to port portion of the ship, where feeling the bottom produced a hard contact likely representing some portion of ship structure. All points were identified by feel and were submerged, so occasional error may be possible.
Grass water	Series of points taken at the high-water mark of 3/2/18 also denoting the limit of the stands of grass, reeds, and cottontails.
Veg line	Series of points taken at the approximate point where land elevation increased noticeably and coincided with the replacement of grass, reeds, and cottontails with palmettos and trees.
Dis stem	Series of points taken around the largest extent of the disarticulated portion of the stem, which lays perpendicular to the hull on the starboard side, just NE (forward) of the cypress tree that has overgrown the shackle bolt. The width of the disarticulated stem portion was variable, and some of the centers of the timber had been lost; however, this series ignored the missing interior portions and focused on the outside perimeter in an effort to show where it had broken. Long fasteners were present at regular (but unmeasured) intervals down the length of the disarticulated stem.

Probable Context

Shallow-water archaeological inspection and diver identification at the Twelvemile Island Wreck Site (1BA694) indicate a wreck that is much larger in size than that of the *Clotilda*. The length of the Twelvemile Island Wreck (1BA694), based on applying a scale to the more exposed hull in the historic aerials, indicates a length from bow to stern, with the hull degraded to its approximate waterline, is 183 feet (56 meters). The vessel appears to be a West Coast-built vessel of the last quarter of the nineteenth century or at its youngest, the start of the twentieth century. The vessel likely had outlived its usefulness, or had been damaged sufficiently to not warrant repair just prior to 1912, the date of the earliest known photograph of the wreck (see **Figure 12**).

Given the length of the wreck, it is likely not a two- but, a three-masted vessel. A review of vessel lengths in American Lloyd's 1870 and 1880 registers place the length of the Twelvemile Island Wreck (1BA694) within the average for ships of that period, which were generally between 170 and 190 feet (52 and 58 meters) (American Lloyd's 1870; Meyers and Salter 1880). The seemingly sole use of Douglas Fir in the construction of the wreck is at variance with the documented use of oak and yellow pine in *Clotilda*. Douglas Fir is associated with West Coast-built vessels, as the material naturally grows in the Pacific Northwest. In addition, the Twelvemile Island Wreck (1BA694)'s site formation process is markedly different; there is no evidence of fire, and this vessel may not have been scuttled, but rather left to slowly fall apart on the banks of the river at this site.

A historic 1909 panorama of the Mobile riverfront includes a three-masted schooner which may be similar to the type of vessel now known as the Twelvemile Island Wreck (1BA694) (**Figure 54**). The vessel in **Figure 54** is likely not the Twelvemile Island Wreck (1BA694), but rather represents the type, and likely the original context, of the Twelvemile Island Wreck (1BA694) as a vessel working in and out of Mobile. The timber analysis indicates that it was built of Pacific Coast lumber, and hence, likely was built on the Pacific Coast. A number of Pacific Coast-built schooners were ultimately employed in the Gulf, and in Mobile, during their careers. At the end of its career, the owners of the Twelvemile Island Wreck (1BA694) either sold the vessel for use as barge or landing off Twelvemile Island, or abandoned it there.



Figure 54. Three-masted schooner on the Mobile waterfront, ca. 1909.
Source: Library of Congress.

ADDITIONAL SHIPWRECKS INVESTIGATED

The archaeological assessment of the Twelvemile Island Wreck (1BA694) extended to four other sites which were also noted as shipwrecks (see **Table 2** and **Figure 20**). A summary of the results of the examination for each of these sites follows. It should be noted that these were a preliminary reconnaissance in each case, and did not completely document these sites. Collectively, they suggest, along with the Twelvemile Island Wreck (1BA694), a larger context in which all of these wrecks are associated with the industrial, perhaps logging, use of the river, as a back channel “parking lot” for river barges, and as a disposal site for obsolete, worn-out, or damaged barges and other craft—essentially, a “ship graveyard.” Each site has been given a State Site designation by the Alabama State Site File, Office of Archaeological Research.

Target 1: Hicks Wreck (1BA695)

Located approximately [REDACTED] (Figure 55; Table 6), Hicks Wreck (Target 1) was considered a high probability

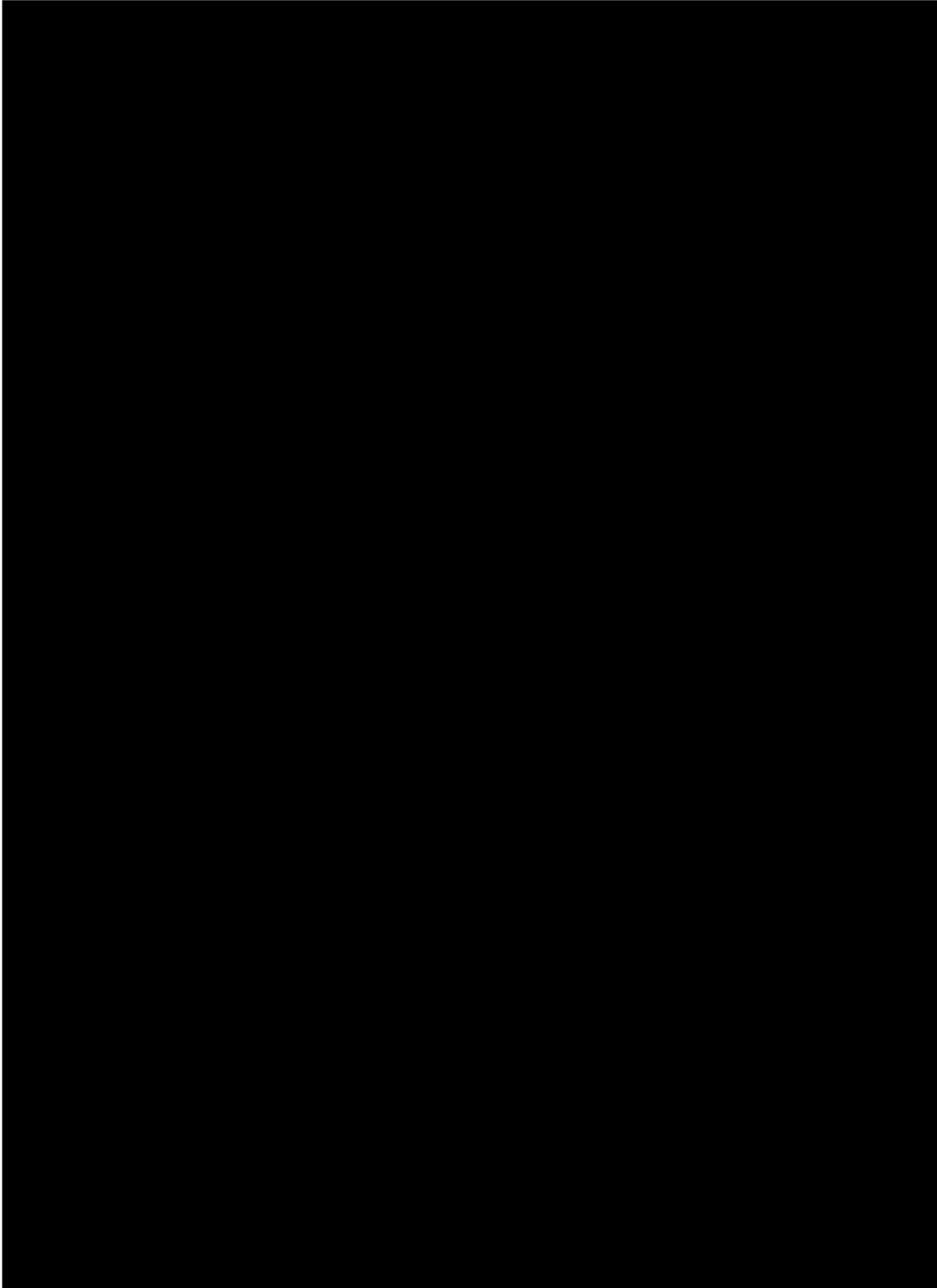


Figure 55. GPS locations of the corner points of the Hicks wreck barge discovered at Target 1 area.

target based historic aerials reviewed by the team, which suggested a shipwreck may be present [REDACTED]. During field investigation, archaeologists identified the iron remains of a small barge that had presumably been beached (Figure 56). The extent of the barge was mapped with Trimble GPS, and identifiable features such as the southeast bollard and southwest corner of the vessel were observed. The frames of the barge are still visible, despite being partly overgrown and sediment-filled. Hand probing was conducted around the southwest corner of the wreck site to verify the team’s initial impression (Figures 57 and 58). The probes were negative in areas thought to be outside the barge boundary. All four corners of the barge were documented with sub-meter GPS. Overall, the GPS coordinates suggest the barge is roughly 30 feet x 40 feet (9.1 x 12 meters) in size, with approximately half of the barge being submerged in the water, extending into the Mobile River.

Table 6. Hicks Wreck Location (State Plane, Alabama, W. Zone NAD83 [ft]).

Name	Site Number	X Coordinate	Y Coordinate	Type
Hicks Wreck	1BA695	[REDACTED]	[REDACTED]	20 th century barge

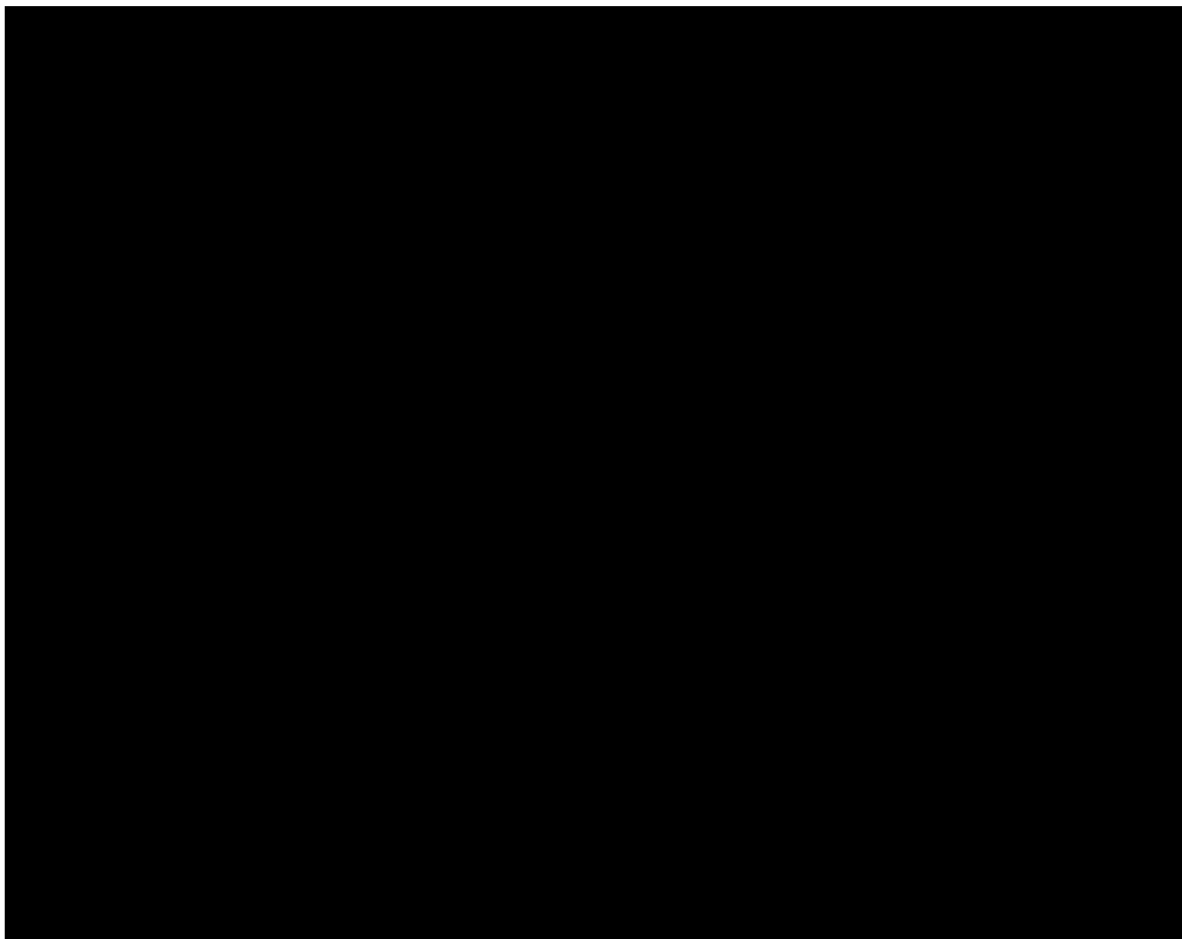


Figure 56. GPS-based schematic of the Hicks barge wreck site discovered at Target 1, showing photo points.



Figure 57. Probable bollard at southeast corner of Target 1, facing southwest.



Figure 58. Southwest corner of Target 1, facing northeast.

Target 2: Trees

Target 2 is located [REDACTED] (Table 7, Figure 59). The area was selected as a target because it appears to be a linear feature approximately 100 feet (30 meters) in length on previously reviewed historic aerials. A team deployed to the target location to conduct pedestrian survey and hand probing of the area, which produced no cultural resources. The target is likely an elevated tree island that is seasonally submerged depending on water levels within the river, and is not believed to be associated with any cultural remains.

Table 7. Target 2 Trees Locational Information (State Plane, Alabama, W. Zone NAD83 [ft]).

Name	Site Number	X Coordinate	Y Coordinate	Type
Trees	N/A	[REDACTED]	[REDACTED]	natural feature

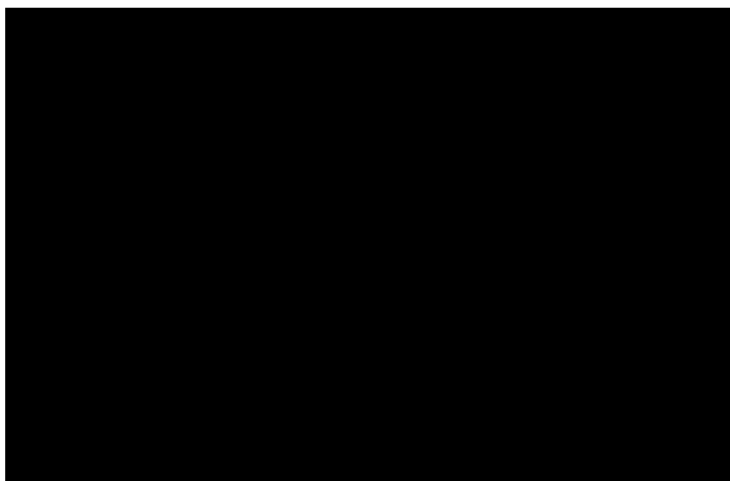


Figure 59. Target 2, as shown on 2002 Google Earth Imagery, which appears to be a linear feature approximately 100 feet (30 meters) in length. Google Earth aerial.

Target 3: Dobbs Wreck (1BA696)

Dobbs Wreck (Target 3) is located [REDACTED] (Table 8, Figure 60). The target consists of the remains of a riveted iron barge, [REDACTED]. The barge appears to contain structural elements representative of early twentieth-century barge construction. GPS coordinates were obtained at the wreck location. Identifiable features include a vent shaft protruding above the water's surface. Archaeologists reported a substantial amount of cement poured into the iron barge (Figure 61). Soils were observed as a dense muck and canebrake surrounding barge.

Table 8. Dobbs Wreck Locational Information (State Plane, Alabama, W. Zone NAD83 [ft]).

Name	Site Number	X Coordinate	Y Coordinate	Type
Dobbs Wreck	1BA696	[REDACTED]	[REDACTED]	Barge

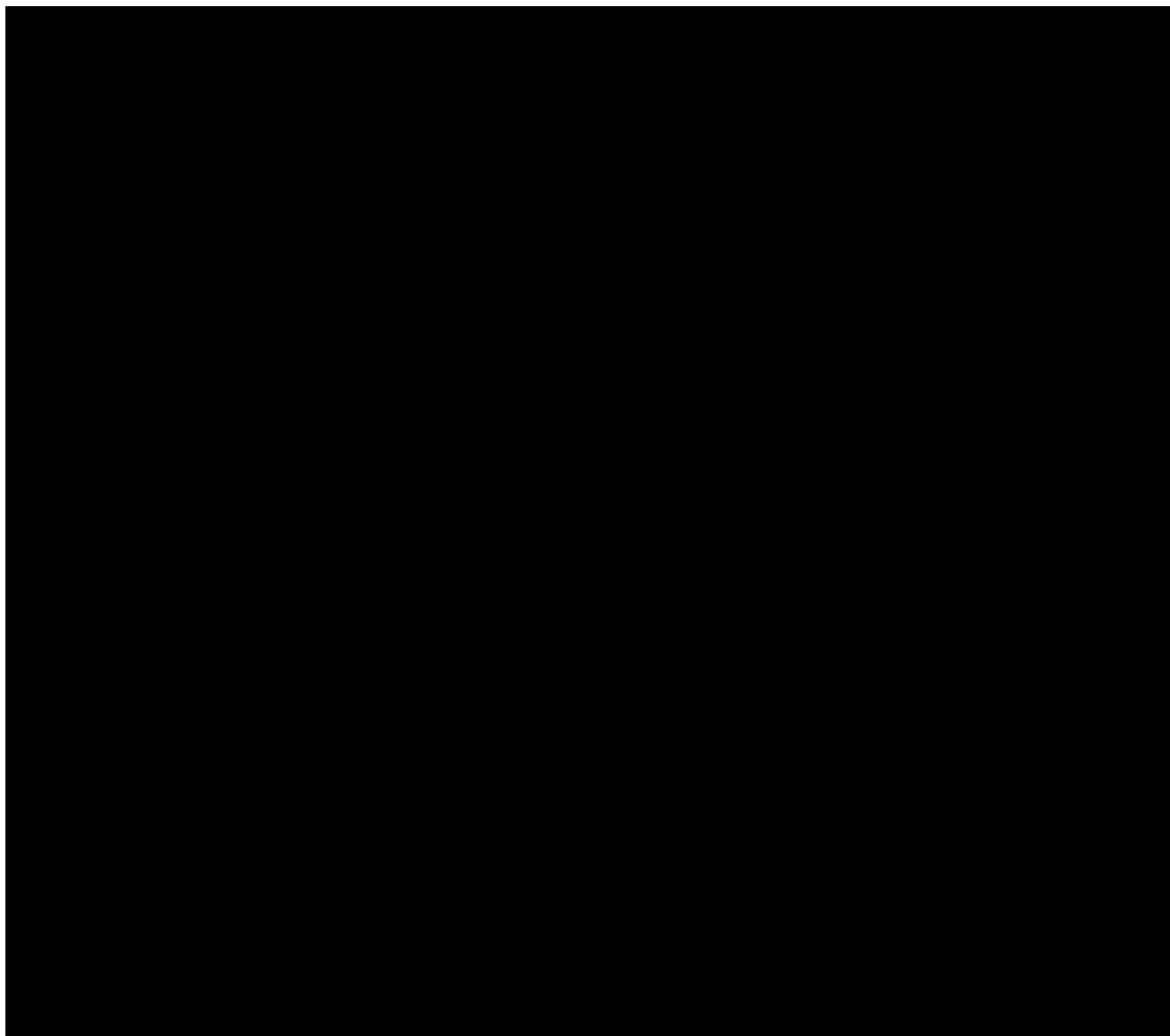


Figure 60. GPS locations of the southern and eastern edges of the barge and visible features at the Dobbs site.



Figure 61. Photographs of the Dobbs Site. Top Left: Southeast corner, facing west. Top Right: Southeast corner, facing southwest. Bottom Left: Vent shaft, plan view. Bottom Right: Vent shaft in profile view, facing west.

Target 4: Harms Wreck (1BA697)

Harms Wreck (Target 4) is located [REDACTED] and consists of what appears to be a composite wood and iron shipwreck, [REDACTED] (Table 9, Figure 62).

[REDACTED]. Archaeologists were unable to relocate the bow or stern of the vessel, and the wreck did not appear to be barge-like, but archaeologists noted the presence of cultural features such as iron and fabricated wood.

Table 9. Harms Wreck Locational Information (State Plane, Alabama, W. Zone NAD83 [ft]).

Name	Site Number	X Coordinate	Y Coordinate	Type
Harms Wreck	1BA697	[REDACTED]	[REDACTED]	Unidentified Shipwreck

Target 5: Kennedy Wreck (1BA698)



Figure 62. What appears to be a shipwreck visible at the Target 4 location. Source: University of Alabama 1952.

Kennedy Wreck (Target 5) is located [REDACTED]. The target appears to represent a shipwreck on a historic aerial (USC&GS 1958) (Table 10, Figure 63). The wreck consists of two portions of a semi-submerged iron-riveted barge. Archaeologists used hand probes to define the boundaries of the wreck site, and found numerous hard contacts that were judged to be of wood, metal, and gravel. A total of 18 GPS points were taken at various points of the Kennedy Wreck. The iron framework of the barge was followed toward shore until archaeologists could see the riveted iron remains of what appears to be a barge. Exposed features along the southwestern-most portion of the barge appear to be a reinforced feature that looks to be a potential push point. The iron frameworks were filled with concrete rubble. Probing along the visible flat iron protruding above the ground surface suggested the area was the southern edge of the barge, and the near-terminus point was recorded (Figure 64 and 65).

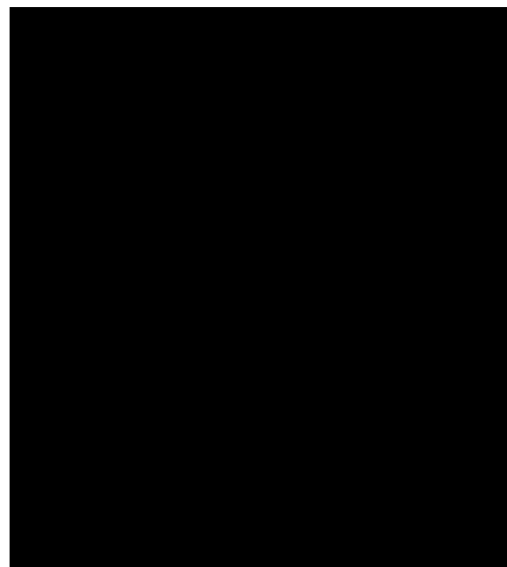


Figure 63. Shipwreck visible at the Target 5 location. Source: University of Alabama 1952.

Table 10. Kennedy Wreck (Target 5) Locational Information (State Plane, Alabama, W. Zone NAD83 [ft]).

Name	Site Number	X Coordinate	Y Coordinate	Type
Kennedy Wreck	1BA698	[REDACTED]	[REDACTED]	Barge (potentially two wrecks)

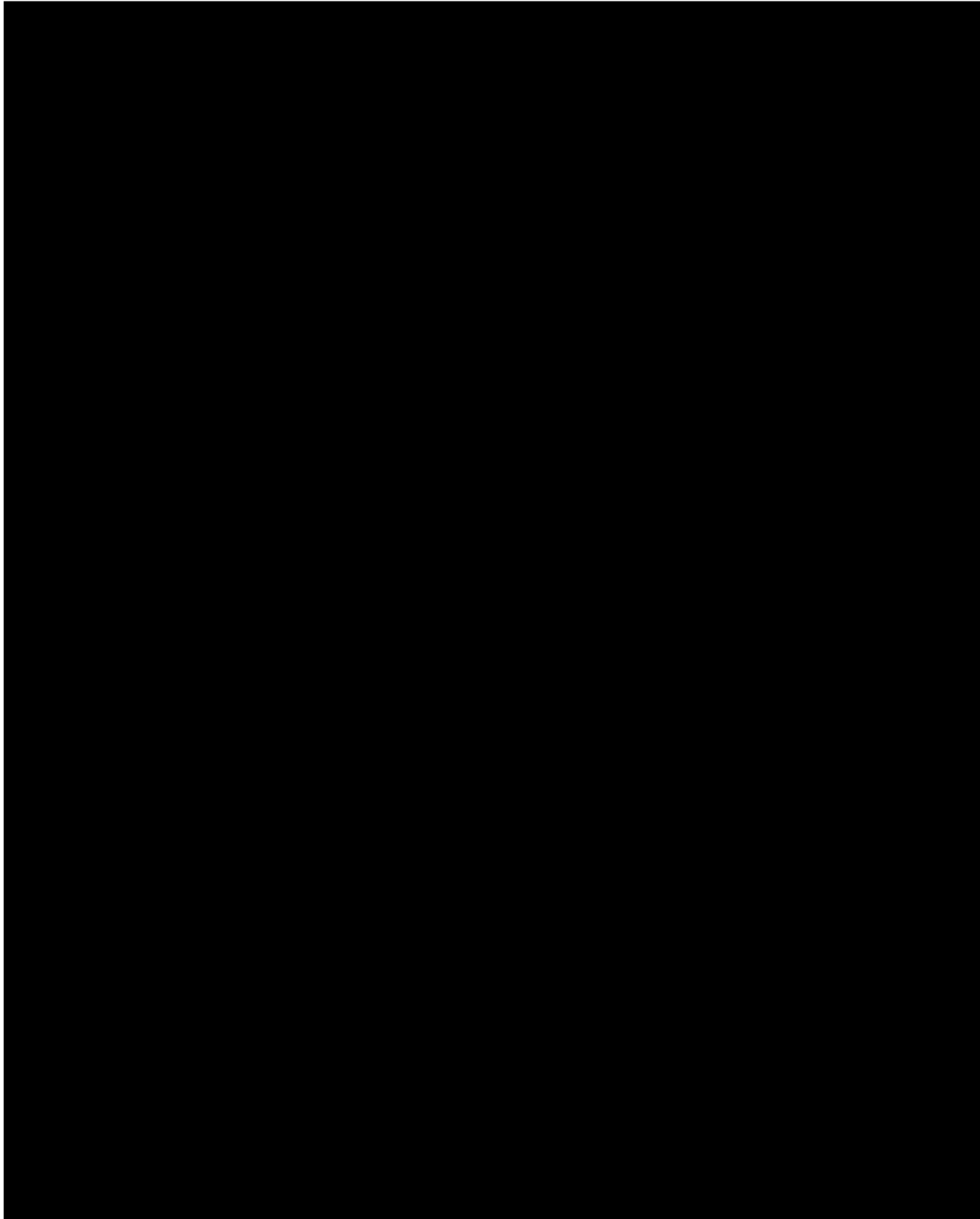


Figure 64. GPS locations of the corner points of the potential barge and second wreck discovered at Target 5 and named the Kennedy site.

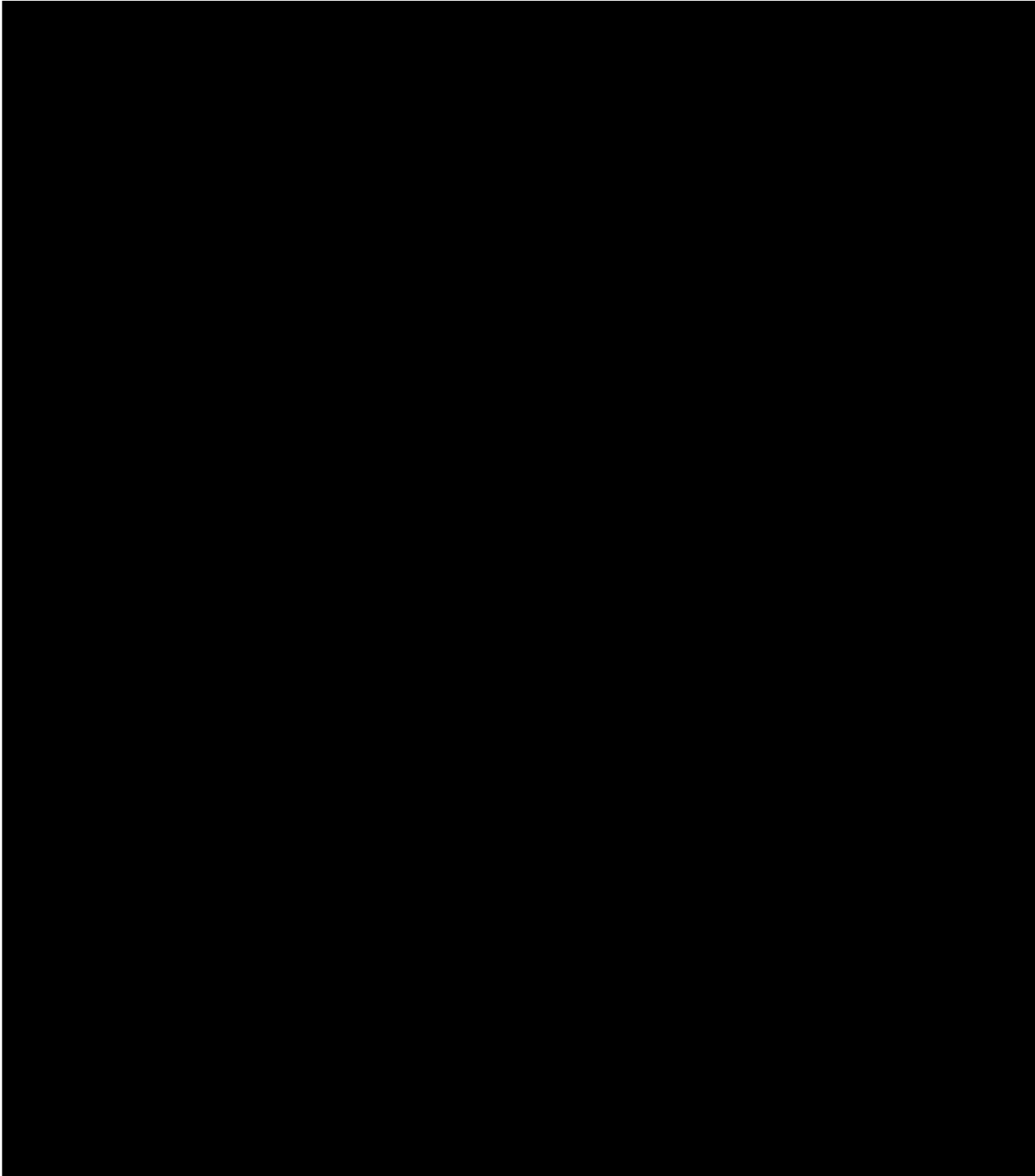


Figure 65. GPS locations of the southern edge of the barge and visible features at the Kennedy site.

More documentation is necessary to fully understand the nature and boundaries of the site. It is estimated from probe contacts that archaeologists have not yet discovered the target seen in historic imagery. It is possible that the original vessel in the historic aerials is buried below the mudline, and there may be in this vicinity two, possibly three, separate vessels, the ship being overlain by the barge (Figures 66-68).



Figure 66. Close-up image of barge push-point feature at the Kennedy site showing rivets.



Figure 67. Southern edge of barge at the Kennedy site, facing northeast.

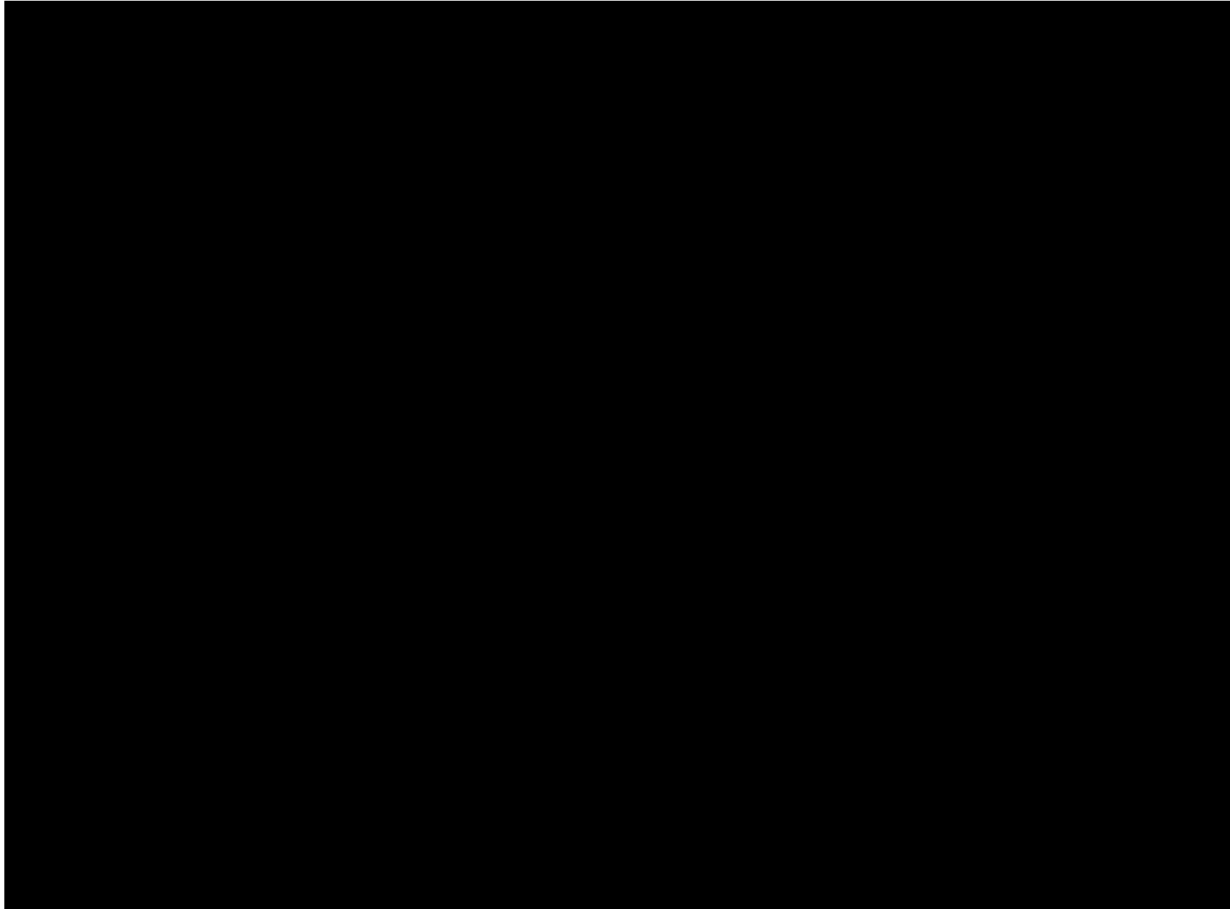


Figure 68. David W. Morgan (left) and Kyle Lent (right) inspecting push-point barge feature at the Kennedy site, facing northeast.

NRHP EVALUATION

The Development of the American Barge

Barges have played an important role in the shipment of bulk cargoes throughout history. In the United States, barges hauled goods on rivers and canals, as well as other inland waters including inlets and sounds. In Alabama, barges were vital in the rapid growth of transportation along the rivers of the state. Barges were prevalent in the Mobile Area Bay and associated waterways. Alabama's abundance of navigable rivers allowed the barges to quickly transport large quantities of goods throughout the state, many of which passed through Mobile and near the area of the Twelvemile River Wreck.

In addition to bulk shipment, barges play an important role in harbor operations. Tank barges specifically built to transport liquids are an essential part of the functionality for US barges, especially when transporting fuel. Tank barges also transport crude oil to refineries and ports along inland waterways where larger tankers, rail, or pipelines do not exist or are inadequate.

The history of petroleum transport in the United States began with horse-drawn wagons carrying wooden barrels of oil by road. Inefficient, especially as production increased, horse-drawn wagons gave way to barges and flatboats around 1860. Transport by water was the primary method of shipping oil from the pioneering Pennsylvania fields even after the arrival of the first railroad into the region in 1862 and the completion of the first pipeline in 1865 (Knowles 1983:9).

The demand for petroleum products such as diesel, asphalt, and refined products such as gasoline led to the expansion of oil wells throughout the United States, especially in Oklahoma, Texas, and the Gulf Coast. With the expansion of oil wells, refineries also sprang up, primarily on waterfronts, as ships became the principal means of shipping petroleum to market. Sailing ships carrying barrels gave way to sailing "tankers," then coal and diesel-fired steamships.

While tankers carried cargoes of increasing capacity by sea, inland transport by water focused on tank barges, which began to emerge in the first oil fields in 1862. This design included segregated tanks inside a larger hull (Chisholm 1911:320). The first tank barges were wooden "bulk boats" developed by Captain John Jay Vandergrift, who towed two coal barges up the Allegheny, loaded with 4,000 empty barrels to Pennsylvania's Oil City. Vandergrift purchased 5,000 barrels of oil for the return trip with his steamboat *Red Fox*. As a waterman, Vandergrift recognized that flat-bottomed barges were ideal for this type of transport. Vandergrift contracted with a local boat builder who constructed 12 individual 80-foot-long, 14-foot-wide, and 3-foot-deep (24-x-4.3-x-0.9-meter) barges, each capable of holding 400 barrels (Giddens 1938:109-110). The first bulk boats gave way to wooden barges, compartmentalized and decked over to keep the oil from sloshing out into the water. By 1885, however, a more consistently designed and stronger wooden tank barge had emerged on the rivers:

They are made 130 by 22 by 16 feet, in eight compartments, with water-tight bulkheads, and hold 2,200 barrels. They are still used to convey oil on the Allegheny to the refineries at Mingo, Wheeling, Marietta, and Parkersburg (Peckham 1885:92).

In 1892, the Standard Oil Company of New Jersey put the first steel-built oil barges into service. Standard Oil built a fleet capable of transatlantic shipment with its oceangoing four-masted schooners. With its machinery stripped, the former tanker became barge *Standard Oil Company No. 56* in 1891. It was followed the next year by the first purposely-built transatlantic tank barge, *Standard Oil Company No. 57*. Built by John Roach at his Delaware River Iron Shipbuilding & Engine Company in Chester, Pennsylvania, the 241-foot-long, 37-foot-wide, 18-foot-deep (73-x-11-x-5.5-meter), 1381-ton *Standard Oil Company No. 57* carried 15,000 barrels, or 750,000 gallons of oil (*American Manufacturer and Iron World* 1896:517).

Tank barges for petroleum grew in number and size after 1900. A 1920 account noted that the new fleet, all steel and carrying up to 250,000 gallons of oil, "do not operate on any waters other than the Barge Canal, but are loaded with oil or gasoline at Albany and Troy" (*Oil Trade Journal* 1920:48). In successive decades, barges both self-propelled and "dumb" (towed and

pushed) were built in increasing sizes with riveted construction through World War II when production shifted to welded construction. Tank barges today remain a major means of petroleum transport, with thousands used in ports and inland waterways.

Understanding and Assessing a Ship Graveyard

While initially assessed as a solitary site, it was quickly determined that the Twelvemile Island Wreck Site (1BA694) exists as one element of a larger maritime cultural landscape that exists along the Mobile River in and around Twelvemile Island. When reviewing historical and aerial photographs, archaeologists noted what appeared to be several additional shipwreck targets within the vicinity of the Twelvemile Island Wreck (1BA694). As such, the wreck is one of a group within close proximity that, due to environmental characteristics, this portion of river was as a convenient location to lay up and abandon vessels; a term referred to as a “ship graveyard.”

This ship graveyard phenomena is not unique to the Mobile River. A number of waterways in the United States and abroad also reflect this type of maritime activity. In some circumstances, ship-breakers also have used both industrial, non-public areas of urban ports as well as “rural” settings for the partial or near-complete dismantling and recycling of vessels. The archaeology of watercraft abandonment has emerged as an active area of research within the larger discipline of maritime archaeology (Richards and Seeb 2013). A more direct analogy for this section of the Mobile River may be seen with a series of sites on North Carolina’s Pamlico River (Babits 2013), Cape Fear River (Seeb 2013), and the Pasquotank River (Smith 2013). In the case of the Cape Fear River site, it was nominated to and listed on the NRHP as part of the Wilmington Historic and Archaeological District (National Register Reference Number 74001364), with 37 separate watercraft including barges, steamboats, tugs, launches, and ferries (Lawrence 1985).

It is now understood that the area surrounding Twelvemile Island became a convenient place to abandon vessels once their serviceable careers ended. For example, the 168-foot-long, 35-foot-wide, 4.9-foot-deep (51-x-11-x-1.5-meter) sternwheel “steam packet” *John Quill*, built in 1907, is said to have been towed to Twelvemile Island in February 1928 on its “last trip.” This vessel is recorded sunk at Twelvemile Island in 1929 (Neville 1962:21). An undated photograph in the Alabama Archives shows the partially sunk vessel “at the lower end of Twelvemile Island” (Figure 69). It reportedly was “dismantled,” which may have been complete, but might also have been a selective removal of the superstructure and machinery, leaving only the lower hull (Alabama Department of Archives and History 1928).

A 1983 reconnaissance survey of cultural resources noted “the remains of a number of unidentified, abandoned barges and steamboats...in the lower Mobile River and in Bayou Sara. Other vessels are known to be present” (Wilson et al. 1983:viii). The report also noted:

Photographs in the University of South Alabama Photographic Archives further indicate the litter of river, bay and ocean vessels and various materials along the

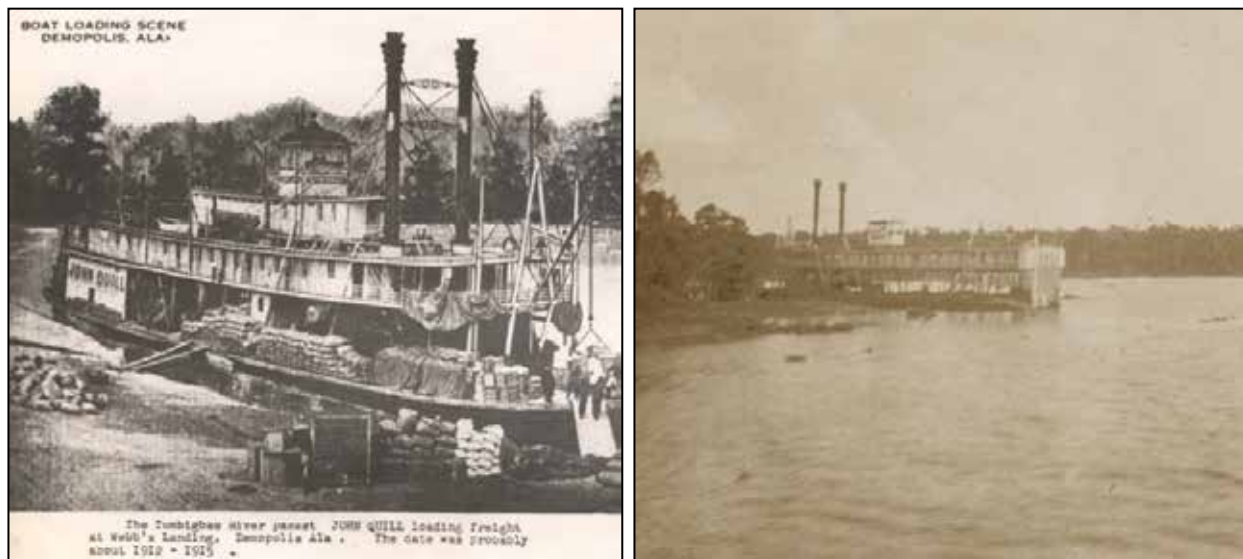


Figure 69. Historic Photographs of the steamboat *John Quill* (left), loading freight; ca. 1912-1915 (right) steamer at the lower end of Twelvemile Island on the Mobile River. Source: Alabama Department of Archives and History 2018.

sides of the Mobile River.... There is probably so much discarded material it will be very difficult to sort it all out, although the remains of some important historic vessels are present (Wilson et al. 1983:34).

The report does not indicate where these abandoned vessels were observed, nor does it provide a map. What it does show, however, is that the river, and in particular less active parts of the river and its surrounding watershed, were utilized for the laying up or abandonment of vessels (Wilson et al. 1983). Historic aerials (see **Figures 8-9**) depict what appear to be additional shipwrecks along the riverbank. These targets are consistent in appearance and dimensions of linear features that may represent shipwrecked vessels, and are protruding from the water's edge and along the shoreline of the river bank (**Figure 70**). During field operations, the team investigated five additional target areas of interest outside the boundaries of the

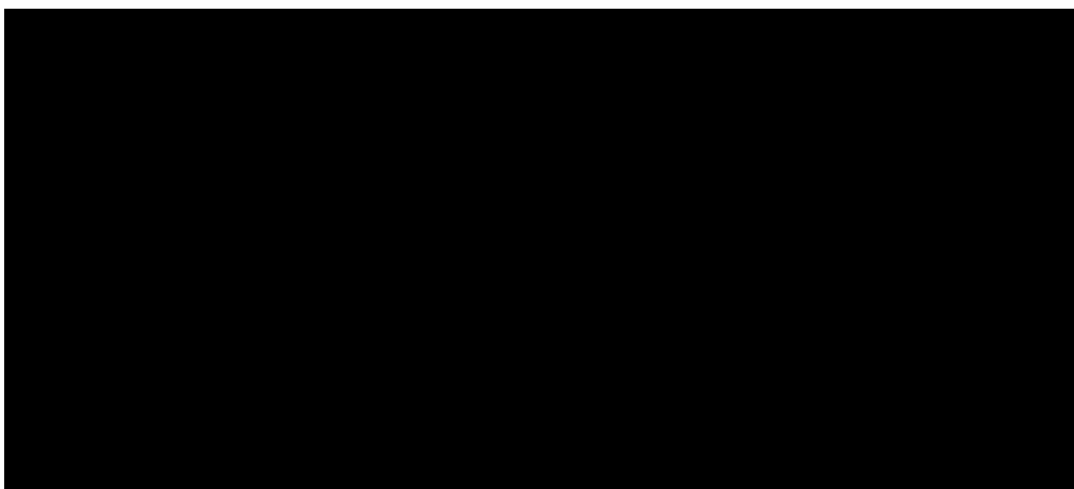


Figure 70. Historic aerial dated 1958 showing multiple shipwrecks in the Mobile River.

Twelvemile Island Wreck Site (1BA694). Each target area was investigated using shallow-water archaeological inspection and all but one were determined to be watercraft used along the Mobile waterfront.

NRHP Eligibility

Given the length of the Twelvemile Island Wreck (1BA694), it is likely at least a three-masted vessel. A review of vessel lengths in American Lloyd's 1870 and 1880 registers places the length of the Twelvemile Island Wreck (1BA694) within the average for ships, which were generally between 170 and 190 feet (52 x 58 meters) long, while schooners such as *Clotilda* were on average no more than 100 feet (30 meters) long (American Lloyd's 1870; Meyers and Salter 1880).

While initially assessed as a solitary site, the Twelvemile Island Wreck (1BA694) is one element in the larger maritime cultural landscape of the Mobile River in and around Twelvemile Island. It is one wreck in a group that reflect the use of this section of the river as a convenient location to lay up and abandon vessels. In some circumstances, ship-breakers also have used both industrial, non-public areas of urban ports as well as "rural" settings for the partial or near-complete dismantling and recycling of vessels. This practice is not unique to the Mobile River. A number of waterways in the United States and abroad also reflect this type of maritime activity.

The current investigation and the historical research conducted by the Partnership both corrects and augments earlier investigations and claims that the shipwreck identified as the Twelvemile Island Wreck (1BA694) was that of the *Clotilda*. While the 2018 rediscovery of the Twelvemile Island Wreck (1BA694) has proved to not be *Clotilda*, the site is significant and worthy of study. The subsequent identification of multiple shipwrecks within the area suggest that the Twelvemile Island Wreck (1BA694) site belongs to a larger maritime landscape of what is known as a ship graveyard.

The archaeology of watercraft abandonment has emerged as an active area of research within the larger discipline of maritime archaeology (Richards and Seeb 2013). A more direct analogy for this section of the Mobile River may be seen with a series of sites on North Carolina's Pamlico River (Babits 2013), Cape Fear River (Seeb 2013), and the Pasquotank River (Smith 2013). In the case of the Cape Fear River site, it was nominated to and listed on the NRHP as part of the Wilmington Historic and Archaeological District (National Register Reference Number 74001364), with 37 separate watercraft including barges, steamboats, tugs, launches, and ferries (Lawrence 1985).

As such, NRHP eligibility should not only be focused on the Twelvemile Island Wreck (1BA694) but should include the additional wreck sites that comprise the ship graveyard. As stated in National Register Bulletin No. 15, *How to Apply the National Register Criteria for Evaluation*, a property must meet one or more of the four National Register criteria:

- A. Be associated with events that have made a significant contribution to the broad patterns of our history; or
- B. Be associated with the lives of persons significant in our past; or
- C. Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- D. Yield, or likely to yield, information important in prehistory or history (NPS 2002).

It is the opinion of the team that the Twelvemile Island Wreck Site (1BA694) is eligible for nomination to the NRHP under Criteria A and D as a contributing resource to a larger Twelvemile Island archaeological district that includes the waters near Twelvemile Island and the additional four wrecks discovered during the current investigation. The portion of the Mobile River near Twelvemile Island remains a part of the ongoing industrial use of the river, and as a “back lot” for the port. In essence, the area around the wreck is a maritime cultural landscape in which further research will likely show that the area played a vital role in shaping Mobile River commerce. That may be as a staging area for barge traffic, or as an area used to load barges during periods when this section of the river and Twelvemile Island were being logged as part of Alabama’s lumber industry.

The five wrecks investigated under the current project, and others noted on historic charts but not assessed during this survey, strongly suggest that this area was and is a “ship graveyard” for the abandonment of vessels that outlived their usefulness. Other ship graveyards have been assessed, listed, or determined eligible for the NRHP. These include the ship graveyard off Wilmington, North Carolina, and the ship graveyard at Mallows Bay, in the Potomac River, Maryland. Following an assessment of this section of the Mobile River, and concurrent and follow-up archival research, the team believes a nomination for this ship graveyard under Criteria A and D would result in a determination of eligibility and/or a listing in the NRHP.

Additionally, it is the opinion of the team that the Twelvemile Island Wreck (1BA694) can be separately nominated under Criteria A, C, and D. The examination of the wreck suggests that it is intact to the waterline, and perhaps higher on the more submerged and mud-buried port side, meaning that the form of the hull and portions of its interior may be preserved. That would mean that as much as 50 to 60 percent of the original vessel has survived and lies beneath the mud and water of this portion of the Mobile River. It is similar, in this, to *Rachel*, a locally-built three-masted schooner which wrecked off Fort Morgan in 1923. Stranded on the beach, that vessel broke down to the bottom of the hull. Those remains, exposed after storm activity, were archaeologically documented, and determined by the AHC to be eligible for the NRHP (Figure 71).

It would follow that the Twelvemile Island Wreck (1BA694), as another, and likely earlier, schooner, with preservation of the hull to a greater extent, would offer considerable



Figure 71. *Rachel*, as exposed on the beach after storm erosion, September 5, 2012. Source: Raines 2018.

information about the construction and use of these vessels (Criteria A and D). As a substantively extant example of the type, it is also potentially eligible under Criterion C.

A singular nomination for the wreck may not be needed if a larger nomination of the area as an historical and archaeological district is pursued. While the primary period of significance as it relates to the Twelvemile Island Wreck (1BA694) is that of the late nineteenth to the early twentieth century, a strong case can be made for its continued significance. In addition, the same can be said for the other working craft sunk on this section of the river. Beginning in the eighteenth century and continuing through the modern era, these sites represent reuse, selective repair, and ongoing adaptation and scuttling of additional vessels in the area as the portion of the river appears to have been subject to more marine traffic as developments along the waterway progressed.

The shipwrecks that remain in the Mobile River are substantial physical evidence capable of yielding significant information about the industry that Mobile supported, as well as the events that took place during the mid-nineteenth century, as it relates to the *Clotilda* story (Figure 72). *Clotilda* may well rest in this area of the river, but may be deeper in the mud and water. In addition, artifacts that remain submerged and protected by the soft mud anaerobic environment lining the Mobile River may yield, or are likely to yield, significant preservation characteristics that may lead to information important to Mobile's history. Such an extended

set of sites, as part of a larger district within the maritime cultural landscape of this section of the Mobile River would also be a significant resource to be located, assessed, and documented.



Figure 72. Waterfront, Mobile, Alabama (1909). Note three-masted schooner in foreground.
Source: Library of Congress.

CONCLUSIONS AND RECOMMENDATIONS

From March 1 to March 4, 2018, the Partnership investigated the Twelvemile Island Wreck Site (1BA694) and an additional five target areas, four of which proved to be historic shipwrecks (1BA695, 1BA696, 1BA697, and 1BA698). Shallow-water archaeological investigation was conducted at all targets. The Twelvemile Island Wreck Site (1BA694) appears to be a West Coast-built vessel of the last quarter of the nineteenth or, at its youngest, the start of the twentieth century and is not *Clotilda*. The vessel had outlived its usefulness, or had been damaged sufficiently to not warrant repair just prior to 1912, the suggested date of the earliest photograph of the wreck (Roche 1914).

The Twelvemile Island Wreck (1BA694) Site and the four additional previously unrecorded wreck locations, are an important, tangible, and NRHP-eligible element of maritime commerce in Mobile during the nineteenth and early twentieth centuries. Like other ship graveyards across the country, the overall maritime landscape is of national significance and merits a comprehensive evaluation for inclusion in the NRHP. Such a nomination, with boundaries extending the length of the Mobile River to incorporate the submerged and buried features and artifacts suspected and known to be there, is key not only for recognizing the significance, but also providing a tool for legal protection and asserting that what lies in the Mobile River is important and should be seen as archaeological resources that can and will add to a more detailed understanding of the activities and people who worked there. In doing so, this zone may assist in protecting the currently unidentified location of the remains of the vessel *Clotilda*, which, from historic and archival research, suggests that it may exist within close proximity to the Twelvemile Island Wreck (1BA694).

Additional work that would add to an understanding of the resource includes:

1. Additional Phase I archaeological investigation in the river. One possibility is to conduct an intensive remote-sensing survey of the area, using a magnetometer, side-scan sonar, and subbottom profiler.
2. A detailed, archive-focused research project on the pre-Civil War era, and commerce and trade along the Mobile River waterway near the location of the shipwreck sites to better understand the maritime landscape that encompasses the area.
3. A comprehensive NRHP nomination or determination of eligibility for the archaeological sites located in the Mobile River.

The team recommends additional research to provide more context to the sites and may offer additional perspectives from primary source documents in archives that speak to issues such as the workforce, which (as noted previously) included the community members of Africatown, which included local African American men, women, and children, increasing our understanding of these sites and their significance while adding a more nuanced understanding of the roles of the people involved.

REFERENCES CITED

Alabama Department of Archives and History

1928 Steamboat "John Quill" at the lower end of Twelve-Mile Island on the Mobile River in Alabama. Electronic document, <http://digital.archives.alabama.gov/cdm/singleitem/collection/photo/id/7953/rec/31>, accessed April 26, 2018.

Alabama Department of Environmental Management

2003 Technical Report: A Survey of the Bayou Sara Watershed. Electronic document, <http://www.adem.state.al.us/programs/water/wqsurvey/2003BayouSaraWatershed.pdf>, accessed April 26, 2018.

Alabama on the Go

1965 Fort Gaines Museum Acquires "Anchor Eye" of Last Slave Schooner. Jun. 1965, p. 29.

American Lloyd's

1859 *American Lloyd's Register of American and Foreign Shipping*. Clayton & Ferris, Printers to the Board of American Lloyds', New York.

1861 *American Lloyd's Register of American and Foreign Shipping*. Ferris Pratt, Printers to the Board of American Lloyds', New York.

1870 *American Lloyd's Standard Record of Shipping, From March 1, 1870, to February 28, 1871*. Charles Vogt, Printer, New York.

American Manufacturer and Iron World

1896 April 10:517.

Babits, Lawrence E.

2013 The Rural Vessel Abandonment Areas of North Creek, North Carolina. In *The Archaeology of Watercraft Abandonment*, edited by Richards and Seeb, pp. 175-192. Springer, New York.

Burgess, Robert

1971 *Coasting Schooner: The Four-Masted Albert F. Paul*. University of Virginia Press and The Mariners' Museum, Charlottesville.

Byers, S.H.M.

1906 The Last Slave-Ship. *Harper's Magazine*. 19 March:742-746.

Chisholm, Hugh

1911 Petroleum, *Encyclopedia Britannica*, Vol. 19, pp. 316-322.

Crothers, William L.

2013 *American-Built Packets and Freighters of the 1850s: An Illustrated Study of Their Characteristics and Construction*. McFarland & Company, Jefferson, North Carolina and London.

Daniels, Tom

2010 Why the bow of the boat looks so rough. Electronic document, <http://coronet1885.com/?p=124>, accessed April 5, 2018.

Davis, Charles G.

1918 *The Building of a Wooden Ship*. US Shipping Board, Emergency Fleet Corporation, Philadelphia, Pennsylvania.

Delgado, James P.

1978 National Register of Historic Places Inventory-Nomination Form, *C.A. Thayer* (Schooner). Electronic document, <https://npgallery.nps.gov/pdfhost/docs/NHLS/Text/66000229.pdf>, accessed March 19, 2018.

1988 National Register Inventory/Nomination Form, 4-Masted Schooner *La Merced*, Anacortes, Washington. Electronic document, <https://npgallery.nps.gov/GetAsset/014c4092-2d6b-4e19-8878-d0e2d507f4e3>, accessed March 19, 2018.

1990 National Historic Landmark Study, *Governor Stone* (1877), Maritime Heritage of the US NHL Theme Study – Large Vessels. Electronic document, <https://npgallery.nps.gov/pdfhost/docs/NHLS/Text/91002063.pdf>, accessed March 19, 2018.

2009 *Gold Rush Port: The Maritime Archaeology of San Francisco's Waterfront*. University of California Press, Berkeley and Los Angeles.

Delgado, J.P., A.G. Pastron, and R.K. Robichaud

2007 *This Fine and Commodious Vessel: Archaeological Investigations of the Gold Rush Storeship General Harrison. Final Archaeological Report of the Battery Street Hotel Project*. Archeotec, Oakland, California.

Diouf, Sylviane

2007 *Dreams of Africa in Alabama: The Slave Ship Clotilda and the Story of the Last Africans Brought to America*. Oxford University Press, New York.

Dodd, George

1852 *The Curiosities of Industry and the Applied Sciences*. George Routledge & Co., London.

Estep, H. Cole

1918 *How Wooden Ships Are Built – A Practical Treatise on Modern American Wooden Ship Construction*. The Penton Publishing Company, Cleveland, Ohio.

Foster, William

1860 Last Slaver from U.S. to Africa. A.D. 1860. Mobile Public Library Digital Collections, available at <http://digital.mobilepubliclibrary.org/items/show/1802>, accessed April 27, 2018.

Gamble, Thomas, editor

1921 *Naval Stores: History, Production, Distribution and Consumption*. Review Publishing and Printing Company, Savannah, Georgia.

Giddens, Paul H.

1938 *The Birth of the Oil Industry*. MacMillan Company, New York.

Hall, Henry

1882 *Report on the Ship-Building Industry of the United States*. US Government Printing Office, Washington, DC.

Holland, Lora Kathleen

2006 Maritime Technology in Transition: Historical and Archaeological Investigations of The Schooner Barge *Geo T. Lock* (8SR1491). Unpublished Master's Thesis. University of West Florida. Pensacola, Florida.

Hopkins, Fred

1994 Emergency Fleet Corporation Ship Construction in World War I in the Pacific Northwest, *The Northern Mariner*, IV(4): 15-22.

Knowles, Ruth Sheldon

1983 *The First Pictorial History of the American Oil and Gas Industry, 1859-1983*. Ohio University Press, Athens, Ohio.

Lawrence, Richard

1985 Underwater Archaeological Sites in the Wilmington Historical District. North Carolina Division of Archives and History, Kure Beach. Electronic document, https://files.nc.gov/dncr-arch/PDF/Wilmington_Historic_District_Addendum.pdf, accessed February 7, 2018.

Lockett, J.D.

1998 The Last Ship That Brought Slaves from Africa: The landing of the *Clotilde* at Mobile in the Autumn of 1859, *Western Journal of Black Studies*, 22(3):159-163.

The Lumber Trade Journal

1917 Volume 71, no. 11, June 1:33.

Lyman, John

1941 Pacific Coast-Built Sailers, *The Marine Digest*, February 1-October 4 (Weekly Installments), 3-63.

Meyers, Captain H.F.A. and C. Frederick A. Salter, Compilers

1880 *The Original American Lloyd's Register of American and Foreign Shipping*. Charles Vogt, printer, New York.

Morris, E.P.

1927 *The Fore-and-Aft Rig in America*. Yale University Press, New Haven.

Morris, Paul C.

1973 *American Coasters of the North Atlantic*. Bloch and Osbourne Publishing Co., Chardon, Ohio.

National Park Service (NPS)

2002 *National Register Bulletin 15: How to Apply the National Register Criteria for Evaluation*. US Department of the Interior, National Park Service, Cultural Resources. US Government Printing Office, Washington, DC.

Neville, Bert

1962 *Directory of River Packets in the Mobile-Alabama-Warrior-Tombigbee Trades, 1818-1932*. Coffee Printing Co., Selma.

New York Marine Registry

1858 New York Marine Register, A Standard of Classification of American Vessels, and of Such Other vessels as Visit America. R.C. Root, Anthony & Co., Printers to the Board of Underwriters, New York.

Oil Trade Journal

1920 June, Vol. 2, No. 6:48.

Outland, Robert B. III,

2004 *Tapping The Pines: The Naval Stores Industry in the American South*. Louisiana State University Press, Baton Rouge.

Paasch, H.

1885 *"From Keel to Truck:" A Marine Dictionary in English, French and German*. Ratinckx Freres, Antwerp.

Panshin, A.J., and Carl de Zeeuw

1980 *Textbook of Wood Technology*, 4th edition. McGraw-Hill Publishing, New York.

Peake, James

1851 *Rudiments of Naval Architecture, Or, An Exposition of the Practical Principles of the Science in its Application to Naval Construction; Compiled for the Use of Beginners*. John Weale, London.

Peckham, S.F.

1885 *Report on the Production, Technology, and Uses of Petroleum and Its Products*. Department of the Interior, Census Office, Government Printing Office, Washington, DC.

Raines, Ben

2018 Wreck found by reporter may be last American slave ship, archaeologists say. *AL.com*. Electronic document, http://www.al.com/news/mobile/index.ssf/2018/01/alcom_reporter_may_have_found.html, accessed January 30, 2018.

Richards, Nathan and Sami Kay Seeb, editors

2013 *The Archaeology of Watercraft Abandonment*. Springer, New York.

Roche, Emma Landgon

1914 *Historic Sketches of the New South*. The Knickerbocker Press, New York.

Robertson, Natalie S.

2008 *The Slave Ship Clotilda and the Making of AfricaTown, USA: Spirit of our Ancestors*. Praeger, Westport, CT.

Russell, Matthew A.

2004 *Comet: Submerged Cultural Resources Site Report, Channel Islands National Park. Submerged resources Center Professional Reports, Number 17*. Submerged Resources Center, National Park Service, Santa Fe, New Mexico.

Seeb, Sami Kay

2013 Cape Fear's Forgotten Fleet: The Eagles Island Ship Graveyard, Wilmington, North Carolina. In *The Archaeology of Watercraft Abandonment*, edited by Richards and Seeb, pp. 215-238. Springer, New York.

Sikes, Kathryn

2004 *Governor Stone: Analysis of an 1877 Two-Masted Schooner from the Gulf of Mexico*. *The International Journal of Nautical Archaeology*, 33(2):297-314.

Smith, Lindsay S.

2013 Annales School and the Elizabeth City Ships' Graveyard: A New Theoretical Approach to Ship Abandonment Studies. In *The Archaeology of Watercraft Abandonment*, edited by Richards and Seeb, pp. 239-258. Springer, New York.

Thiesen, William H.

2006 *Industrialized American Shipbuilding: The Transformation of Ship Design and Construction, 1820-1920*. University Press of Florida, Gainesville.

Underhill, Harold A.

1946 *Masting and Rigging: The Clipper Ship and Ocean Carrier*. Brown, Son and Ferguson, Ltd., Glasgow.

University of Alabama

1938 Twelvemile Island 1938. Electronic document, http://alabamamaps.ua.edu/aerials/Counties/Mobile/Mobile_Twelvemile_Island_1938.html, accessed March 02, 2018.

1952 Twelvemile Island 1952. Electronic document, http://alabamamaps.ua.edu/aerials/Counties/Mobile/Mobile_Twelvemile_Island_1952.html, accessed March 02, 2018

US Coast and Geodetic Survey (USC&GS)

1888 Historical Image Display: Mobile River: Twelve Mile Island. Electronic document, <https://historicalcharts.noaa.gov/historicals/preview/image/3NUM491>, accessed April 2018.

1889a *Report of the Superintendent of the US Coast and Geodetic Survey, Showing the Progress of the Work, During the Fiscal Year Ending with June, 1888*. Government Printing Office, Washington, DC.

1889b Manuscript Hydrographic Chart H-1918, from Records of the Charts Division (23.3.6), National Archives Records Group 23, Records of the Coast and Geodetic Survey, National Archives, College Park, Maryland.

1898 *Notice to Mariners, No. 240*. Government Printing Office, Washington, DC.

1958 Historical Image Display: Mobile Bay. Electronic document, <https://historicalcharts.noaa.gov/historicals/preview/image/1266-5-1958>, accessed April 2018.

US Customs Service

1855 Vessel License for Schooner Clotilda, 1855, License #24. US Customs Service, Mobile, AL. *Coasting Licenses over 20 Tons, v. 9, 1848 – 1859*, Collector of Customs, S.O. 157.

US Geological Survey (USGS)

1941/43 USGS Historical Topographic Map Explorer. Electronic document, <http://historicalmaps.arcgis.com/usgs/>, accessed March 02, 2018.

1982 Historic Aerial Imagery: Chickasaw, AL. Electronic document, <https://earthexplorer.usgs.gov/>, accessed March 02, 2018.

1982 Historic Aerial Imagery: Hurricane, AL. Electronic document, <https://earthexplorer.usgs.gov/>, accessed March 02, 2018.

US House of Representatives

1918 *Preliminary Report No. 6 of the Commission on Navy Yards and Naval Stations: Navy Yards, Submarine, and Aviation Bases on the Atlantic Coast South of Cape Hatteras and on the Gulf of Mexico, House Document No. 1946, Part 6, 64th Congress, 2nd Session.* Government Printing Office, Washington, DC.

Wilson, Eugene M., Philippe Osziscik, Cailup B. Curren, Jr., and JoAnn Luker

1983 *Cultural Resources Reconnaissance Study of the Black warrior-Tombigbee System Corridor, Alabama, Volume IV, Special Topics.* Report Submitted to the US Army Corps of Engineers, Mobile District, Contract DACW01-81-C-001, electronic document, <http://www.dtic.mil/dtic/tr/fulltext/u2/a133020.pdf>, accessed February 7, 2018.

Wittig, Nicole E.

2013 "A 19th Century Fishing Schooner in the 21st Century: Preserving *Virginia* for the Next Hundred Years," Unpublished MA Thesis, Department of History, East Carolina University.

Wood, Virginia S.

1995 *Live Oaking: Southern Timber for Tall Ships.* Naval Institute Press, Annapolis, Maryland.

APPENDIX A:

DIVE LOGS

