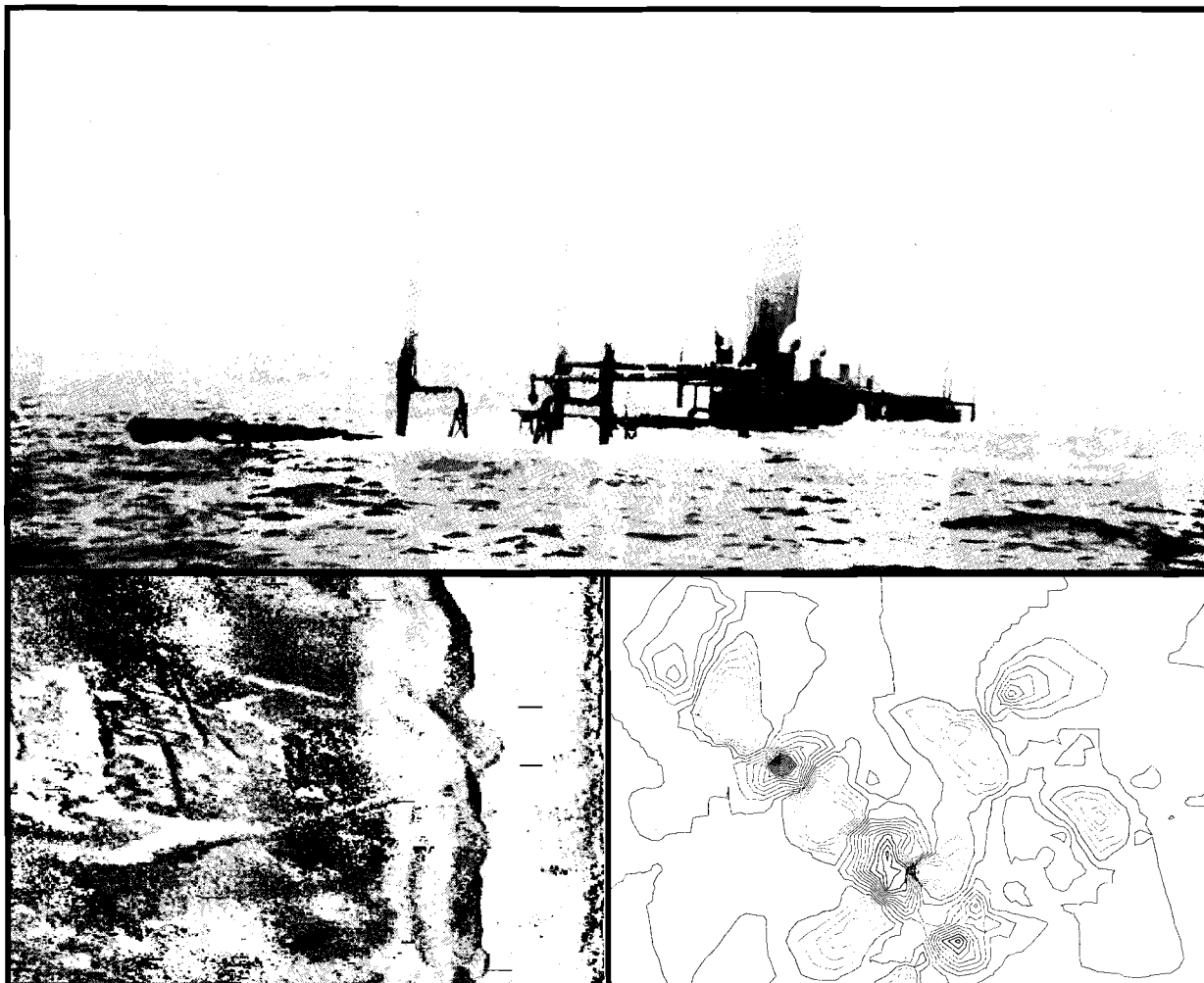


A Management Plan For Known and Potential United States Navy Shipwrecks in South Carolina



**Maritime Research Division
South Carolina Institute of Archaeology and Anthropology
University of South Carolina
1321 Pendleton Street
Columbia, South Carolina 29208-0071**

For the

**Naval Historical Center
805 Kidder Breese Street SE
Washington Navy Yard
Washington, DC 20374-5060**

Edited by James D. Spirek and Christopher F. Amer

**Prepared by Christopher F. Amer, Joseph Beatty III, Lynn B. Harris,
Carleton Naylor, James D. Spirek, and Mark K. Ragan**

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EXECUTIVE SUMMARY

This report, *A Management Plan For Known and Potential United States Navy Shipwrecks in South Carolina*, presents the results of a multi-year study that partnered the Maritime Research Division (MRD) of the South Carolina Institute of Archaeology and Anthropology (SCIAA) at the University of South Carolina (USC) with the Naval Historical Center (NHC) in Washington, DC. The project, as outlined in a memorandum of agreement dated 2 September, 1998, was conducted in two phases. The first phase called for compiling historical and cultural data of United States Navy vessels lost in South Carolina waters to document the losses and subsequent wreck history of each vessel. The resultant information was then used to update the NHC's database of shipwrecks in or near state waters claimed by the Navy to more accurately reflect the status of the naval shipwrecks in state waters.

The second phase of the project included conducting remote sensing operations on a limited number of shipwreck sites and areas of naval activities, primarily from the Civil War. The primary area of operation for this phase was the Charleston area, and included surveys of USS *Patapsco*, USS *Weehawken*, and USS *Keokuk*, as well as the site of USS *Housatonic*. A second area of survey was Port Royal Sound, which was another center of naval activity between 1861 and 1865. During those years, the Union forces used areas of the Sound to supply and repair ships of the South Atlantic Blockading Squadron. Several areas of the Sound and its approaches were magnetically and acoustically surveyed and a number of magnetic and acoustic anomalies were ground-truthed to determine their source. Additionally, two shipwrecks were documented, one previously located wreck and one newly-discovered site, thought to be a US Navy-owned whaling ship. A third survey area was in the ACE Basin (Ashepoo-Combahee-Edisto Rivers) to gather information about two Civil War vessels, USS *Dai Ching*, a navy gunboat, and USS *Boston*, an army transport. The fourth area centered on the Civil War wreck of the USS *Harvest Moon*, a navy vessel, sunk by a torpedo in Winyah Bay. This information was documented in a geographic information system (GIS) database format and presented in Chapter Seven of this report.

The report begins with the updated inventory of US Navy wrecks in South Carolina. Using criteria developed by MRD staff, the list of shipwrecks claimed by the Navy was reduced from 96 to 46 vessels. Each of the remaining 50 shipwrecks falls into one of four categories--US Navy vessels outside state waters, Confederate vessels, US Army transports, South Carolina Navy vessels, and foreign flag vessels, vessels from the latter three categories being located within the state's Territorial Sea. Tables of these shipwrecks are provided as appendices. A brief history of the United States naval presence in South Carolina follows, including the establishment of strategic naval installations at Port Royal and Charleston. Historical research resulted in the presentation of historic and cultural information on each vessel, or in the case of the two Stone Fleets, each group of vessels. That information is followed by analyses of the inventory using such factors as historical periods of sinking, causes of loss, geographical distribution of loss, environmental situation, and potential natural and cultural threats to aid in

determining the historical and archaeological significance of a navy shipwreck in state waters.. Management of US Navy shipwrecks is then addressed, as are field investigations and Geographical Information System analysis of the sites.

Recommendations include: continuing to develop partnerships between NHC and SCIAA to manage Navy shipwrecks in South Carolina waters; continuing fieldwork operations based on priorities set by NHC and SCIAA, including archival and field research at the former Charleston Navy Shipyard and former Port Royal Naval Station; preparing National Register of Historic Places nominations for known shipwrecks; and continuing to build and maintain the GIS database and datasets as information emerges.

ACKNOWLEDGMENTS

This report, *A Management Plan For Known and Potential United States Navy Shipwrecks in South Carolina*, was made possible by a grant from the Department of Defense Legacy Resource Management Program, administered through the Naval Historical Center in Washington, District of Columbia. Additional funding was provided by the South Carolina Institute of Archaeology and Anthropology (SCIAA) at the University of South Carolina, Columbia, South Carolina.

Our sincere thanks go out to the Department of the Navy, Naval Historical Center's, Director of Naval History, Dr. William Dudley and his staff, Dr. Robert Neyland, Ms Barbara Voulgaris and Ms Wendy Coble, for their assistance, support and patience throughout the tenure of this project. The authors also wish to express our deep appreciation to South Carolina State Senator Glenn F. McConnell and the South Carolina State Legislature for providing the funding that enabled us to have built the ADAP III marine surveying system that we used throughout this project.

We also wish to acknowledge the cooperation and assistance of the following people and organizations: Dr. Bruce Rippeteau, former director of the South Carolina Institute of Archaeology and Anthropology, Dr. Jonathan Leader, Interim Director of SCIAA, Richard Lawrence, Branch Head, Underwater Archaeology Branch, State Historic Preservation Office, North Carolina, and Dr. Roger Smith, State Underwater Archaeologist, Bureau of Archaeological Resources, Florida Department of State. Last but not least, we thank Steven Hoyt, State Marine Archaeologist of Texas, and Victor Mastone, Director, Massachusetts Board of Underwater Archaeological Resources for their substantial assistance in reviewing both the penultimate and final drafts of the report.

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CHAPTER 1

INTRODUCTION

South Carolina's coastline extends some 200 miles from North Carolina to Georgia. Inlets, bays, and estuaries add approximately another third to that distance making approximately 270 miles of actual shoreline. The sandy, shifting seabed remains shallow, less than 30 feet, out three to five miles from the shore and only deepens to twice that depth from 12 to 25 miles offshore. From the sixteenth century on, the inlets and bays of South Carolina's coast were visited by vessels of exploration, colonization, war and commerce. Many of these early ships failed to successfully negotiate the constantly shifting, often treacherous shallows and became permanent reminders of the dangers of the coastal waters. Some stricken craft were carried ashore in storms and some were abandoned, while others sank due to the guns of war. Of the hundreds of vessels that sank or were otherwise wrecked on South Carolina's coast only a few score have been located and investigated by archaeologists. Many of the submerged archaeological sites in the State are not located on the coast but within the 11,000 linear miles of rivers, streams, and navigable waterways that flow through the State.

South Carolina claims title to all constantly inundated land beneath these watercourses and to the ocean bottom of the State's Territorial Sea (out to the three mile limit) pursuant to the Submerged Lands Act of 1953. All told, the area of submerged lands in the State constitutes some 2,873 square miles or 1,838,720 acres. The State also claims title to, and therefore responsibility for, the cultural resources that lie on, or are embedded in, that land. The demands and pressures made on those finite resources, notably historic shipwrecks, are increasing with every passing year. The demands come from several special interest groups, including sport divers, archaeologists and the historical preservation community, developers, and professional treasure hunters.

Among the countless wrecked watercraft in State waters lies a body of naval vessels spanning the years from the American Revolution to modern times. In early 1998, Dr. Robert Neyland, the United States Naval Historical Center's (NHC) Submerged Resources Inventory Program coordinator, met with Christopher Amer, South Carolina's State Underwater Archaeologist, to discuss plans for the South Carolina Institute of Archaeology and Anthropology (SCIAA) to assist the NHC with inventorying and assessing naval shipwrecks in the State's waters as part of the US Navy's cultural resource management of US Navy warships and US Navy property sunk in the State. Less than two years previous to that conversation, SCIAA, the NHC and the National Park Service's Submerged Cultural Resources Unit, had successfully completed an assessment of the submarine *H.L. Hunley* and were then planning a similar assessment of USS *Housatonic* for 1999. Additionally, SCIAA had recently acquired the ADAP III, a custom-designed and built marine remote sensing ensemble. In response to these discussions, SCIAA's Maritime Research Division (formerly the Underwater Archaeology Division) prepared a proposal to conduct a remote sensing survey of the area between *H.L. Hunley* and USS *Housatonic*; inventory, study, and assess the Navy's

shipwrecks that lie in, or in close proximity to, Charleston Harbor and elsewhere in the State; and to conduct historical research on all submerged shipwrecks of the United States Navy lost in South Carolina.

A Memorandum of Agreement (MOA) between SCIAA and the NHC was drafted and signed on 2 September, 1998. Both parties entered into an agreement to conduct a two-phase project. The first phase called for compiling historical and cultural data to document United States Navy vessels lost in South Carolina waters. The resultant information included the number of vessels, vessel types, and known shipwreck locations, along with previous salvage or archaeological investigations, natural and cultural threats and management recommendations for the sites. The NHC provided SCIAA with a database of shipwrecks in or near State waters laid claim to by the Navy. Using the information amassed during the first phase of the project, SCIAA updated that database to more accurately reflect the status of the naval shipwrecks in State waters.

The second phase of the project included conducting remote sensing operations on a limited number of shipwreck sites and naval usage sites. The primary area of operation for this phase was the Charleston area and included surveys of USS *Patapsco*, USS *Weehawken*, and USS *Keokuk*, as well as the site of USS *Housatonic*. A second area of survey was Port Royal Sound, which was another center of naval activity between 1861 and 1865. During those years, the Union forces used areas of the Sound to supply and repair ships of the South Atlantic Blockading Squadron. From 2002-2003, several areas of the Sound and its approaches were magnetically and acoustically surveyed, amassing much digital data. Additionally, two shipwrecks were documented and several magnetic and acoustic anomalies were ground-truthed to determine their source. Division staff had previously recorded one of the wrecks in the 1980s, while the Division in 2003 newly discovered a second wreck. A third survey area of concentration was the ACE Basin (Ashepoo-Combahee-Edisto Rivers). Division staff surveyed and gathered information about two Civil War vessels, USS *Dai Ching*, a navy gunboat, and USS *Boston*, an army transport. The fourth area centered on the Civil War wreck of the USS *Harvest Moon*, a navy vessel, sunk by a torpedo in Winyah Bay. This information, as per the MOA, was documented in a geographic information system (GIS) database format.

The report is divided into eight chapters and eight appendices. Chapter 2 provides a hard copy of the updated inventory of US Navy shipwrecks in State waters, and includes the criterion used by SCIAA to amend the NHC database. A brief history of the US Navy's presence in South Carolina is presented in Chapter 3 with an emphasis on historical periods of naval development in the State. Following those historical periods, the next chapter develops a specific history for each vessel in the inventory, including pertinent events after loss of the vessel and a history of the wreck site. In Chapter 5, the shipwrecks are analyzed as to historical period, causes of loss, geographical distribution and environmental situation, known site locations and known salvage and/or archaeological investigations. Additionally, the environmental context of the sites is explored along with potential natural and cultural threats and factors affecting preservation of the shipwrecks. Chapter 6 addresses Federal and State management issues associated with the naval shipwrecks in South Carolina and catalogues the

significance and eligibility potential of each shipwreck to the National Register of Historic Places based on a systematic and consistent set of criteria. Chapter 7, Geographical Information System (GIS) of United States Navy Shipwrecks, is devoted to the results of the fieldwork completed during the second phase of the project and analysis of the data derived therein. The chapter describes the survey equipment used on the project, the ADAP III system, and relates how the data are used to construct the GIS database. Descriptions of the remote sensing surveys in the areas investigated make way for an anomaly-specific analysis of the data. The report concludes with Chapter 8, which is a synopsis of the purpose and results of the project and provides a series of recommendations for future research, field investigations, and management options.

Appendix A contains the amended text of South Carolina's Antiquities Act. Appendices B through E provide the reader with databases of the shipwrecks that were removed from the original NHC database during the first phase of this project. These include, US Navy shipwrecks outside State waters, Confederate Navy shipwrecks and blockade-runners in State waters, foreign flag vessels sunk in State waters, South Carolina State Navy shipwrecks, and Union Army shipwrecks in State waters. Appendix F contains information and photographs of artifacts recovered from the Skull Creek Wreck (38BU723) in Port Royal Sound. Appendix G consists of a table of artifacts recovered from the Station Creek Wreck (38BU2080) in Port Royal Sound, while Appendix H contains the identification of wood samples extracted from various scantlings of that wreck and that of USS *Harvest Moon*.

CHAPTER 2

INVENTORY OF UNITED STATES NAVY SHIPWRECKS IN SOUTH CAROLINA

The Naval Historical Center (NHC) is mandated by Section 110 of the National Historic Preservation Act to maintain an inventory of its cultural resources. The inventory compiled by the NHC serves as a cultural management tool for the identification, location, evaluation, nomination, and protection of historic naval properties. The number of shipwrecks in the current database totals 3,043 shipwrecks, with the greatest number of shipwrecks residing in Virginia waters. Shipwrecks in the inventory span the 283 years of the Navy's existence and include naval vessels lost through war and peacetime operations in US, foreign, or international waters. In addition to naval shipwrecks, the database includes vessels that were leased or chartered by the Navy, foreign vessels, Confederate-owned shipwrecks, other US government vessels, and a host of others. Many of the shipwrecks not outright owned by the Federal government are included in the NHC database until title or jurisdiction is clarified. The majority of the shipwrecks date from World War II (1,084), the second largest group date from post-World War II to modern times (740), and the third largest date from the Civil War (564). The NHC relies on the inventory to select vulnerable resources requiring survey based on their historical or archaeological significance, and if the resource is threatened by human intervention or environmental processes (Voulgaris 2001).

The Naval Historical Center inventory submitted to the Maritime Research Division for research and analysis consisted of 96 shipwrecks reportedly lying in South Carolina waters. Of these shipwrecks 31, or 30 percent, were associated with the First and Second Stone Fleets the Federals used to obstruct the ship channels into Charleston Harbor during the Civil War. The remainder of the inventory consisted of a wide variety of shipwrecks including British warships, South Carolina naval vessels, Army vessels, Confederate warships, privateers, blockade runners, shipwrecks outside State waters, and unidentified shipwrecks. Findings from our research were used to discriminate and select only US Navy ships to include in the final inventory, which amounted to 46 shipwrecks. Only one shipwreck was added to the final list of naval shipwrecks, *Robert B. Howlett*, a lightship used by the Federal Navy off Charleston Harbor during the Civil War. Table 2.1 lists the final inventory of US Naval Shipwrecks in South Carolina that are discussed in this management report. Figure 2.1 graphically displays the general or known location of the USN shipwrecks in State waters.

Four criterion were used to determine which wrecks would be included in the South Carolina naval shipwreck database:

1. Vessel the property of the US Navy?
2. Vessel purchased or chartered by the US Navy for naval use?
3. Vessel previously a navy ship?
4. Vessel part of the Continental Navy?

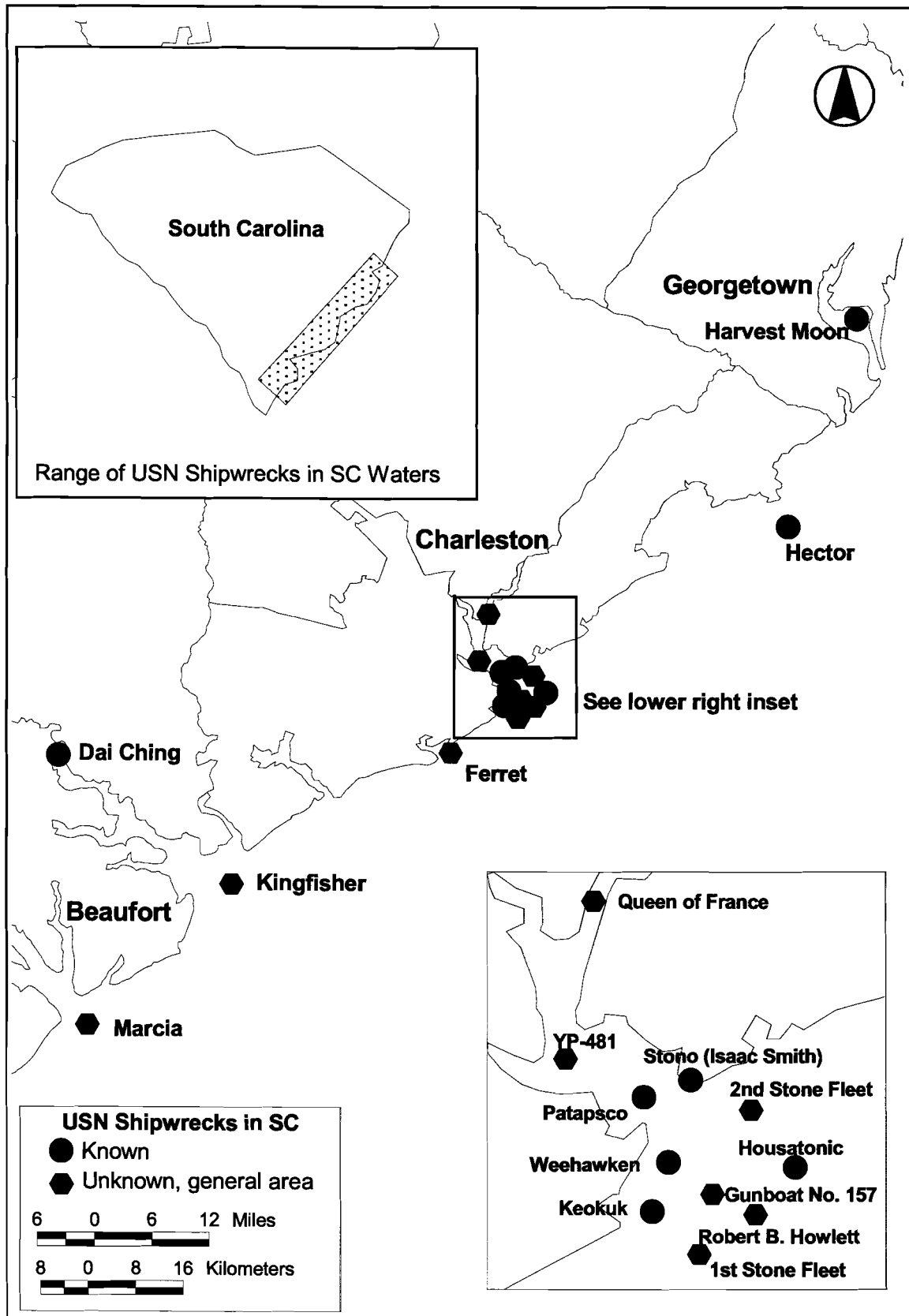


Figure 2.1: USN shipwrecks in South Carolina waters.

Ten of the shipwrecks in the database met the first criterion and included the *Ferret*, *Gunboat No. 157*, *Dai Ching*, *Harvest Moon*, *Housatonic*, *Keokuk*, *Patapsco*, *Kingfisher*, *Weehawken*, and *Hector*. Thirty-four of the shipwrecks in the database met the second criterion including the 31 vessels comprising the first and second Stone Fleets, along with *Marcia*, *Robert B. Howlett* and *YP-481*. One shipwreck met the third criterion, *Stono*, a Confederate blockade runner, formerly the USS *Isaac Smith*, which had been captured by rebel forces in 1863. One shipwreck met the fourth criterion, *Queen of France*.

The remainder of the shipwrecks not meeting the above criterion were placed into tables in the appendices under separate categories: Foreign Flag Shipwrecks, Confederate Navy Shipwrecks, US Army vessels, South Carolina State Navy Shipwrecks, and US Navy Shipwrecks Outside State Waters. Wrecks of uncertain identification, whether potentially naval or merchant, were stricken from the inventory.

Table 2.1: United States Navy Shipwrecks In South Carolina Waters (in date order) (* refers to shipwrecks for which SCIAA has GPS coordinates).

VES_NAME	PREV_NAME	VES_TYPE	WRECK	LOC_ST	LOCATION	COMMENTS
QUEEN OF FRANCE	LA BRUNE	FRIGATE-28GUN	1780	SC	CHARLESTON HARBOR	PURCHASED IN NANTES FRANCE 1777. BURNED AND SCUTTLED TO AVOID CAPTURE IN LATE MARCH 1780 IN THE COOPER RIVER-MOUTH.
FERRET(USS)		SCHOONER-8GUN	1814	SC	STONE INLET-PORT ROYAL	GROUNDEN EN ROUTE FROM PORT ROYAL TO CHARLESTON OFF STONO INLET (CHAPPELLE) OR NORTH BREAKERS 2/2/1814 (CHARLESTON COURIER 2/5/1814). EMMONS:ALTERED TO A BRIG AND CALLED VIPER.
GUNBOAT NO 157(USS)		GUNBOAT	1811	SC	CHARLESTON BAR	LOST ON THE SOUTH BREAKERS OF LAUFORD CHANNEL EN ROUTE BETWEEN CHARLESTON AND ST MARY'S 5/17/1811.
AMAZON		318T-BARK (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET 1861. SCUTTLED IN THE MAIN SHIP CHANNEL 12/19-12/20/1861.
AMERICAN	AMERICA?	329T-BARK (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET 1861. SCUTTLED IN THE MAIN SHIP CHANNEL 12/19/1861.
ARCHER		322T-SHIP (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET 1861. SCUTTLED IN THE MAIN SHIP CHANNEL 12/19/1861.
COURIER		381T-SHIP (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET 10/23/1861. SCUTTLED IN THE MAIN SHIP CHANNEL 12/19-12/20/1861.
DOVE		151T-BARK (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED 11/1861 FOR SECOND STONE FLEET. SCUTTLED AS OBSTRUCTION IN MAFFITT'S CHANNEL 1/25-1/26/1862.
EDWARD		340T-BARK	1862	SC	CHARLESTON HARBOR?	PURCHASED FOR SECOND STONE FLEET 1861. POSSIBLY SCUTTLED 1/25/1862.
FORTUNE		292T-BARK (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET 10/28/1861. SCUTTLED IN THE MAIN SHIP CHANNEL 12/19-12/20/1861.
FRANCIS HENRIETTA		407T-BARK	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET 1861. ASSUMED SCUTTLED AS OBSTRUCTION IN THE MAIN SHIP CHANNEL 12/19/1861.
HERALD		274T-SHIP (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET. SCUTTLED IN THE MAIN SHIP CHANNEL 12/19-12/20/1861.

VES_NAME	PREV_NAME	VES_TYPE	WRECK	LOC_ST	LOCATION	COMMENTS
INDIA		366T-SHIP	1861	SC	CHARLESTON HARBOR	PURCHASED FOR SECOND STONE FLEET 1861. SUNK AS OBSTRUCTION IN MAFFITT'S CHANNEL 1/26/1862.
JUBILIE		233T-BARK	1862	SC	CHARLESTON HARBOR	MERCHANTMAN PURCHASED FOR 2ND STONE FLEET 1861. SCUTTLED IN MAFFITT'S CHANNEL 1/25-1/26/1862.
KENSINGTON		357T (OR 400T)-SHIP (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET 1861. SCUTTLED IN THE MAIN CHANNEL 12/19-12/20/1861.
LEONIDAS		231T-BARK (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET. SCUTTLED IN THE MAIN SHIP CHANNEL 12/19-12-20/1861.
MAJESTIC		297T-SHIP (WHALER)	1862	SC	CHARLESTON HARBOR	PURCHASED FOR SECOND STONE FLEET. SCUTTLED IN MAFFITT'S CHANNEL 1/25-1/26/1862.
MARCIA		343T-BARK	1862	SC	PORT ROYAL BAR	PURCHASED BY NAVY AT PORTLAND ME 1861. INTENDED FOR SECOND STONE FLEET. STRUCK BOTTON AND SANK 1/7/1862.
MARGARET SCOTT		330T-BARK (WHALER)	1862	SC	CHARLESTON HARBOR	PURCHASED AT NEW BEDFORD MA 1861 FOR 2ND STONE FLEET. SCUTTLED IN MAFFITT'S CHANNEL 1/25-1/26/1862.
MARIA THERESA		330T-SHIP (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET. SCUTTLED IN THE MAIN SHIP CHANNEL 12/19-12/20/1861.
MECHANIC		335T-SHIP (WHALER)	1862	SC	CHARLESTON HARBOR	PURCHASED 1861 FOR SECOND STONE FLEET. SCUTTLED IN MAFFITT'S CHANNEL 1/25-1/26/1862.
MESSENGER		216T-BARK (WHALER)	1862	SC	CHARLESTON HARBOR	PURCHASED FOR SECOND STONE FLEET. SCUTTLED IN MAFFITT'S CHANNEL 1/25-1/26/1862.
NEW ENGLAND		368T-SHIP (WHALER)	1862	SC	CHARLESTON HARBOR	PURCHASED FOR SECOND STONE FLEET. SCUTTLED IN MAFFITT'S CHANNEL 1/25-1/26/1862.
NEWBURYPORT		341T-SHIP (WHALER)	1862	SC	CHARLESTON HARBOR	PURCHASED FOR SECOND STONE FLEET. SCUTTLED IN MAFFITT'S CHANNEL 1/25-1/26/1862.
NOBLE		274T-BARK (WHALER)	1862	SC	CHARLESTON HARBOR	PURCHASED FOR SECOND STONE FLEET. SCUTTLED IN MAFFITT'S CHANNEL 1/25-1/26/1862.
PERI		265T-SHIP OR BARK	1862	SC	CHARLESTON HARBOR	MERCHANTMAN PURCHASED FOR SECOND STONE FLEET. SCUTTLED IN MAFFITT'S CHANNEL 1/25-1/26/1862.
POTOMAC		356T-SHIP (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET. SCUTTLED IN MAIN SHIP CHANNEL 12/19-12/20/1861.
REBECCA ANN SIMS		400T-SHIP (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET. SCUTTLED AS OBSTRUCTION IN THE MAIN SHIP CHANNEL 12/19-12/20/1861.
ROBIN HOOD		395T-SHIP (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET. SCUTTLED AS OBSTRUCTION IN THE MAIN SHIP CHANNEL 12/19-12/20/1861.
STEPHEN YOUNG		200T-BRIG	1862	SC	CHARLESTON HARBOR	MERCHANTMAN PURCHASED BY NAVY 11/27/1861 FOR 2ND STONE FLEET. SCUTTLED IN MAFFITT'S CHANNEL 1/25-1/26/1862.
TENEDOS		245T-BARK (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET. SCUTTLED AS OBSTRUCTION IN THE MAIN SHIP CHANNEL 12/19-12/20/1861.
TIMOR		289T-SHIP (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET. SCUTTLED AS OBSTRUCTION IN THE MAIN SHIP CHANNEL 12/19-12/20/1861.
DAI CHING*		520T-SCREW STEAMER GUNBOAT	1865	SC	COMBAHEE RIVER	SHOMETTE: GUNBOAT 4TH RATE TUG RIG. NAVYDB DATA: 1-2MI BEL TAR BLUFF. RAN AGROUND AND BURNED TO PREVENT CAPTURE 1/26/1865. POSSIBLY SALVAGED UNDER CONTRACT POST 1866.

VES_NAME	PREV_NAME	VES_TYPE	WRECK	LOC_ST	LOCATION	COMMENTS
HARVEST MOON*		546T-SIDEWHEEL STEAMER	1865	SC	WINYAH BAY	SUNK BY A CONFEDERATE TORPEDO IN TWO AND ONE HALF FATHOMS OF WATER IN SWASH CHANNEL DURING EXPEDITION TO GEORGETOWN 2/29/1865. MACHINERY SALVAGED CONTEMPORANEOUSLY. HULL REMAINS.
HOUSATONIC*		1540T-OSSIPPEE-CLASS SCREW SLOOP	1864	SC	CHARLESTON HARBOR	SUNK BY TORPEDO (MINE) FROM H L HUNLEY 2/17/1864. INCOMPLETE SALVAGE 1873 AND 1909. GREAT AMOUNT OF HULL REMAINS BELOW SEAFLOOR.
KEOKUK*	MOODNA	677T-DOUBLE-TURRETED IRONCLAD STEAMER	1863	SC	CHARLESTON HARBOR	DAMAGED BY GUNFIRE DURING ATTACK ON CHARLESTON 4/7/1863. SUNK 4/8/1863 OFF MORRIS ISLAND NEAR MAIN SHIP CHANNEL. STATE SITE FILE 38CH271.
KINGFISHER		451T-BARK	1864	SC	ST. HELENA SOUND	RAN AGROUND AND ABANDONED 3/28/1864 ON COMBAHEE BANK.
PATAPSCO*		1875T-PASSAIC-CLASS-SINGLE-TURRETED MONITOR	1865	SC	CHARLESTON HARBOR	HIT TORPEDO AND SANK IN 36 FEET OF WATER NEAR FT. SUMTER ON THE NIGHT OF 1/15/1865. HULL AND SCATTERED MACHINERY REMAINS. STATE SITE FILE 38CH270.
ROBERT B. HOWLETT		120T-SCHOONER	1864	SC	CHARLESTON HARBOR	USED AS A LIGHTSHIP. BROKE ANCHOR DURING STORM ON 12/9/1864 AND DRIFTED ONTO NORTHERN BAR.
STONO*	USS GUNBOAT ISAAC SMITH (9/9/1861)	SCREW STEAMER	1863	SC	CHARLESTON HARBOR	WRECKED ON BOWMAN'S JETTY 6/5/1863. HULL REMAINS EAST OF JETTY. STATE SITE FILE 38CH880.
WEEHAWKEN*		1875T-PASSAIC-CLASS-SINGLE-TURRETED MONITOR	1863	SC	CHARLESTON HARBOR	FOUNDERED WHILE AT ANCHOR NEAR THE MAIN SHIP CHANNEL OFF MORRIS ISLAND DURING A GALE 12/6/1863. SOME SALVAGE BY BENJAMIN MAILLERFERT IN 1873. STATE SITE FILE 38CH272.
BOGOTA		300T-SHIP	1862	SC	CHARLESTON HARBOR	MERCHANTMAN PURCHASED FOR THE SECOND STONE FLEET. SCUTTLED IN MAFFITT'S CHANNEL 1/25-1/26/1862.
L C RICHMOND		341T-SHIP (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET. SCUTTLED AS OBSTRUCTION IN THE MAIN SHIP CHANNEL 12/19-12/20/1861.
WILLIAM LEE		331T SHIP (WHALER)	1861	SC	CHARLESTON HARBOR	PURCHASED FOR FIRST STONE FLEET. POSSIBLY SCUTTLED AS OBSTRUCTION IN THE MAIN SHIP CHANNEL 12/19-12/20/1861.
HECTOR **		230T-COLLIER	1916	SC	ATLANTIC OCEAN-EAST COAST	DAMAGED IN STORM AND DRIVEN ASHORE OFF CAPE ROMAINE ON 7/14/1916. BROKE IN HALF AND SANK 3 DAYS LATER. SALVAGE UNSUCCESSFUL.
YP-481	PRINCESSMARY	PATROL VESSEL	1943	SC	CHARLESTON HARBOR-MOUTH	DESTROYED BY GROUNDING 4/1943. REMOVED 4/25/1943 TO "SECTION BASE". REMOVED FROM COMMISSIONED LIST 7/28/1943. LOCATION UNKNOWN.

** USS *Hector* is located approximately 10 miles off Cape Romaine, South Carolina. The wreck is included in this inventory because of it has been positively identified and is in close proximity to South Carolina Territorial waters.

CHAPTER 3

HISTORY OF UNITED STATES NAVAL PRESENCE IN SOUTH CAROLINA

Introduction

This section explores several themes that are regionally and historically specific to the naval presence in South Carolina. Themes include the role of South Carolina harbors as naval entrepôts, types of vessels the navy used or navy vessels that visited the South Carolina coastline, Navy personnel (seamen, crew, and other militia), shipyards and shipbuilding for naval purposes, and the naval strategies and engagements practiced in the wars that took place around the ports of Charleston, Port Royal, and Georgetown, as well as the inland waterways of Carolina. Problems and the politics surrounding naval issues are interwoven into the discussion to highlight South Carolina's role within the larger context of American naval policy. References to local newspaper articles and memoirs, correspondence and logbooks in the South Carolina Historical Society furnish additional details that range from engineer's dredging reports about shipwrecks in Charleston Harbor, personal recollections about wartime events, or public opinions about a naval presence in South Carolina.

Colonial (1740-1785)

As soon as the early Carolina colonists cleared their land and built their homes they began constructing watercraft of all kinds. Not only was ocean commerce the lifeline of the colony, but also local rivers and bays were the inland economic arteries of the day. The vessels they built ranged from dugout canoes to full-rigged ships of up to 300 tons. Dispersed amongst the colony's earliest records of deeds, inventories, bills of sale, and wills for the year 1698 are registrations for four vessels built in South Carolina specifically for the ocean-going or coastal merchant trade (Charleston County Probate Court Records 54:111,114,125,135).

The crews of South Carolina's militia and merchant vessels were frequently comprised of a combination of slaves and European seamen. It is estimated that during the period from 1732 to 1782 forty-six percent of slave mariners in South Carolina were listed as sailors as opposed to boatmen and fishermen. By the 1760s, with the increase in the volume of coastal and ocean trade, and greater participation by local planters and merchants, more slaves discovered their sea legs (Powers 1994:27).

As the colony grew and began to thrive, so did the boat and ship building industries. While not comparable with the shipbuilding activities of the Northern colonies, shipbuilding did become South Carolina's largest manufacturing industry during the colonial period (Weir 1983:161). South Carolina shipwrights built more than 300 vessels for ocean-going or coastal trade between 1735 and 1775 (Olsberg 1973:189-279).

So by the time the American Revolution began, it seemed natural for the South Carolina patriots to start their own navy.

In January 1775, the Provincial Congress created the Council of Safety with unlimited authority to execute a range of administrative and security issues. Henry Laurens, who became President of the Council, recommended that the Council's role should be to sign certificates that served as commissions for military officers, to direct and arrange military operations, confirm or reverse sentences in court martial cases and capital cases, and to supervise and direct the treasury (Chestnutt 1985:182). In October of 1775, the South Carolina Council of Safety purchased the schooner *Defence* and named Captain Simon Tufts, a native of Massachusetts, as its commanding officer (Simons 1949:172). The *Defence*, a merchant vessel, was hastily converted to a warship with the addition of two 9-pound guns, six 6-pounders, and four 4-pounders (Drayton 1969:71 [1821]). *Defence's* first assignment was harbor patrol duty. As William Moultrie, who at this time commanded Charleston's militia, noted in his memoirs, "It was now thought necessary to have some armed schooners for the defense of our harbor and rivers." More specifically, the Council of Safety had information that boats from the British men-of-war anchored far out in Charleston harbor were sneaking close to town at night to gather intelligence. In response, the Council stationed *Defence* between the Charleston peninsula and Fort Johnson to intercept these boats (Moultrie 1968 I:93 [1802]).

The fledgling South Carolina Navy saw its first action on November 1775 when *Defence* exchanged fire with the British warship *Tamar*, a 16-gun, ship-rigged, man-of-war. In October the Council of Safety had authorized the purchase of six schooners to be sunk to obstruct Marsh Channel and Hog Island Creek. Two schooners were sunk in Marsh Creek (Drayton 1969:70-71 [1821]). Captain Tufts in the *Defence* was then ordered to cover the sinking of the remaining four schooners in Hog Island Creek, thus preventing the British ships from entering Cooper River. According to Moultrie, "Capt. Thornborough, in the Tamer sloop of war, warped up to prevent them, but could not get near enough. Capt. Tufts and he, exchanged a few long shot, but no damage was done" (Moultrie 1968:I:107). Three of the schooners were sunk in place, but the fourth was taken by the British and towed to shallow water where she sank (Drayton 1969:72-73 [1821]). This brief skirmish became known as the Battle of Hog Island.

By early 1776 two additional vessels were added to the list of South Carolina Navy warships. These were the brigantine *Comet*, and the ship *Prosper*. *Comet*, reported to carry eighteen 6-pounders (Clark 1968:1310), had been ordered fitted out for naval service in September 1775 but it was not until February 1776 that Joseph Turbin, part owner of the schooner *Molly*, was named to command her. In March of 1776 *Comet* was sent to patrol the Carolina coast. Captain Turbin's orders included the caveat not to "expose your Vessel & Men to the danger of encountering an unequal Match." In August 1776, while sailing off St. Augustine, *Comet* captured a large ship carrying a cargo of lumber, indigo, and some forty slaves belonging to Georgia loyalists (Chesnutt 1988:30,149-150, 266). The *Prosper* was the first full-rigged ship in the State's navy. She had been a merchant ship plying the Atlantic between Bristol and the American colonies for some years before being acquired by the State in November 1775 (Mouzon

1958:1-2). She was quickly armed with eight 12-pounders, eight 6-pounders, and some 4-pounders and swivels (Drayton 1969:81 [1821]). Another account has her armed with twenty-six 12-pounders (Clark 1968:1310) while Moultrie (1968:110 [1802]) claims she was mounted with twenty 9-pounders.

The South Carolina Navy continued to add vessels to its inventory. Between June 1775 and February 1780 South Carolina had managed to build, buy, borrow or capture forty-five or more ships (Simons 1947:172). While taking part in only a few major naval engagements, the South Carolina Navy stayed busy nonetheless. Between 1776 and 1779 the South Carolina Navy captured some thirty-five small prizes, however only about half of these reached homeports without being recaptured (Simons 1947:172).

On June 1, 1776, the British fleet under Commodore Sir Peter Parker arrived off Charleston. The British spent the next three weeks getting their larger warships over the Charleston bar, sending out small boats to take soundings, and landing the 2,500 British troops under General Sir Henry Clinton on Long Island which today is the Isle of Palms. (Tilley 1987:75-77). The British fleet included Parker's flagship the 50-gun *Bristol*, the 50-gun *Experiment*, the 28-gun frigates *Solebay*, *Active*, *Syren*, and *Acteon*, the 26-gun *Friendship*, the 20-gun *Sphinx*, the bomb ship *Thunder*, several other armed vessels, and dozens of transport vessels (Chesnutt 1988:243-244). On June 28 the British fleet weighed anchor and began its bombardment of the patriot fort on Sullivan's Island. The plan was for *Bristol*, *Solebay*, *Active*, and *Experiment* to fire directly on the fort while *Sphinx*, *Acteon*, and *Syren* entered the harbor to attack from the rear. This plan failed when *Sphinx*, *Acteon*, and *Syren* ran aground on a shallow sandbar that bordered the main channel known as Lower Middle Ground (Morrill 1993:23). This was fortunate for the South Carolinians for "had these three ships effected their purpose, they would have enfiladed us in such a manner, as to have driven us from our guns" (Moultrie 1968:I:178).

According to the newspaper account of the action, *Sphinx*, after losing her bowsprit in a collision with *Acteon*, and *Syren* subsequently got off the bar and sailed off. *Acteon* however, was stuck fast. In the meantime, the bombardment of Fort Sullivan was going badly. Not only were the British shells having little effect on the palmetto log fort, but also the American shells were finding their marks with devastating results. No less than seventy cannonballs hit the 50-gun *Bristol*, Commodore Parker's flagship, tearing off her mizzenmast and severely damaging her mainmast. The other 50-gun ship, *Experiment*, had her mizzen gaff shot away. Deserters from the British ships reported that about 180 sailors and officers were killed or wounded. On the American side, 12 were killed and 23 wounded. As to what happened next the newspaper account (*South Carolina American and General Gazette*, August 2, 1776 in *Gibbes 1857:16-17*) tells it best:

Next Morning, all the Men of War, except the *Acteon*, were retired about two Miles from the Island, which they had quietly effected under Cloud of Night. The Garrison fired several Shot at the *Acteon*, which she returned. But soon after, her Crew set her on Fire, and abandoned

her leaving her Colours flying, Guns loaded, with all her Ammunition, Provisions and Stores on board. They had not been long gone before several Boats from the island went to her; Lieut Jacob Milligan with some others, went on board, and brought off her Jack, Bell, some Sails and Stores: while the Flames were bursting out on all Sides, he fired three of her Guns at the Commodore. In less than Half an Hour after they quitted her, she blew up.

William Moultrie, commander of the American forces at Fort Sullivan, noted that *Aceton* exploded with such force that "from the explosion issued a grand pillar of smoke, which soon expanded itself at the top, and to appearance, formed the figure of a palmetto tree" (Moultrie 1968:I:180). For a military man, he was not above a patriotic similitude.

Henry Laurens, President of the Council of Safety and later president of the Continental Congress, summed up the battle of Fort Sullivan the best when he noted that the British failure was "An Insult which Gen. James Grant did not think the Americans capable of offering to British Ships" (Chesnutt 1988:238). British General James Grant had earlier addressed the British House of Commons and had ridiculed the American's ability to fight against the British (Chesnutt 1985:133n).

In the fall of 1776, the South Carolina General Assembly established a Navy Board to oversee the construction, purchase, and outfitting of vessels for the State's navy (Salley 1909:80). To these ends in April 1777 the board leased Captain Cochran's shipyard on Shipyard Creek just above Charleston. The lease included not only the use of all the buildings at the shipyard but also five "Negroe Workmen" (Salley 1912:54). However, the Shipyard Creek site proved a somewhat unsuitable location. In October 1778, the State bought the Hobcaw Creek shipyard of Paul Pritchard. Not only was the Hobcaw shipyard larger and better suited to the Navy Board's purposes, but its distance from town proved more advantageous since at the Shipyard Creek site, "the people belonging to the Vessels do Frequently come to Town, get Drunk, and [quit] the Service." In addition, the Hobcaw shipyard had, "good Wharves and Other conveniences Sufficient to Heave down Three Vessels at the same time," whereas the Shipyard Creek site had room for only one vessel at a time (Salley 1912:177-178).

In February 1779 the Hobcaw yard constructed a ship's boat for *Hornet* while at the same time was refitting the brig *Notre Dame*, both South Carolina Navy vessels. Less than a week later the shipyard was busy altering a large barge into an armed galley (Salley 1912:234, 235). The refitting and overhauling of vessels and construction of ship's boats comprised the majority of the work performed at the Hobcaw shipyard while it was owned by the State.

Today most of the original Hobcaw Shipyard 340-acre tract has been subdivided into residential areas. One of the tracts lining Hobcaw Creek belongs to the Hernandez family who purchased the land in 1991. The Hernandez's invited the Division to test and excavate areas of their property, which reflected temporal ranges of historic occupation and utilization of the site as recorded in the historic record. A survey of the adjacent

creek bottom confirmed the presence of eighteenth and nineteenth-century materials including ballast rock, brick, and ship frames eroding out of the bank. Remnants of boat slipways or launching areas were evident from discrete areas along the foreshore that featured evidence of wood cribbing and pilings (Amer and Naylor 1996:40-41).

South Carolina saw little naval action again until 1778. Late in 1777 the 32-gun Continental frigate *Randolph* came to Charleston. Following repair work to the frigate at the Hobcaw shipyard, a joint Continental Navy-South Carolina Navy expedition was organized. The plan was for the combined force to clear the coast of British warships, continuing down to the West Indies to capture British merchantmen there and along the way. The South Carolina vessels taking part in the excursion were *Notre Dame*, 16 guns; *General Moultrie*, 18 guns; *Polly*, 16-guns; and *Fair American*, 14 guns. These last three were privateers temporarily taken into the State's service. On February 1, 1778, the American fleet left Charleston and, with such a show of force, quickly cleared the coast of British ships. The fleet then proceeded to the Caribbean. On March 7, while off Barbados, *Randolph* and *Notre Dame* encountered the 64-gun Royal Navy ship of the line *Yarmouth* and proceeded to attack her. While *Randolph* and *Yarmouth* slugged it out at close quarters, *Notre Dame* came aft of the British ship and raked her stern. The two American ships were inflicting heavy damage on *Yarmouth* when suddenly *Randolph* exploded and sunk. Only four of her crew survived (Simons 1949:175).

The beginning of the end for the South Carolina Navy occurred on December 26, 1779, when a British fleet of some ninety vessels under the command of Admiral Marriott Arbuthnot left New York City with an invasion force of 8,500 British soldiers under command of Sir Henry Clinton. South Carolinians were unaware of it, but the fleet's ultimate destination was Charleston (Morrill 1993:67). On February 11, the British warships *Roebuck* and *Perseus* entered North Edisto Inlet with a flotilla of transports and began off loading troops for an invasion of Charleston (Tilley 1987:175). In the meantime, Governor Rutledge gave Commodore Abraham Whipple of the Continental Navy, having recently arrived in Charleston in command of the Continental frigates *Providence*, *Boston*, and *Queen of France*, plus the sloop-of-war *Ranger*, command of the South Carolina Navy's fleet. This consisted of the ships *Bricole* and *Truite*, the brigantine *Notre Dame*, the galleys *Carolina*, *South Edisto*, *Marquis de Bretagne*, and *Lee* as well as an assortment of pilot boats, privateers and merchant vessels (Sayen 1986:232,234; Salley 1913:71-72).

By the end of February, the British army had arrived on James Island, which forms the south side of Charleston Harbor. The plan was for Clinton's troops, now some 10,000 strong, to cross the Ashley River, landing above Charleston, and lay siege to the city from landward. At the same time, Arbuthnot would bottle up the harbor and rivers around Charleston (Fraser 1993:120-121). On March 28, 1780, the British troops boarded a flotilla of twenty-two boats on Wappoo Creek which separates James Island from the mainland, and set out up the Ashley River, landing Clinton's troops opposite Drayton Hall, about fifteen miles above Charleston. They then proceeded down to Charleston. On April 8, Arbuthnot, having gotten his smaller ships and frigates across the bar, weighed anchor and set sail for Charleston's inner harbor with the 44-gun

Roebuck leading the way and the 50-gun *Renown* bringing up the rear. In addition to *Roebuck*, and *Renown*, the naval contingent included *Romulus*, the frigates *Richmond*, *Raleigh*, *Blonde*, and *Virginia*, the armed vessel *Sandwich*, and the store ship *Aeolus*. According to a Hessian officer who witnessed the activity:

As soon as the enemy saw themselves confronted by our ships they withdrew all their frigates and armed ships into the Cooper River and sank seven schooners, the frigate *Queen of France*, and an old two-decker between Cooper Island (Shute's Folly) and the city, so that our ships, even though they should pass Fort Moultrie, would not be able to cut off their retreat by way of the Cooper River (Uhlendorf 1935:213, 215).

Passing Fort Moultrie the British ships were raked by the American guns to little effect. The only serious casualty was *Aeolus* which ran onto a sandbar just inside the fort and was destroyed by the American fire. Having gotten past the city's outer harbor defenses, they anchored off the peninsula city. The Americans surrendered on May 12, 1780 (Tilley 1987:179-181, 184-185).

An interesting footnote in the history of the South Carolina Navy was the story of the frigate *South Carolina*. In 1780, Commodore Alexander Gillon of the South Carolina Navy negotiated the charter of the frigate *L'Indien* from the duke of Luxembourg. *L'Indien* had been built in Amsterdam from French designs in 1776-1777. She was a large warship rated at 1,186 tons and carried twenty-eight 36-pounders and twelve 12-pounders. (For comparison, the British frigate *Acteon* was rated at 594 tons with twenty-four 9-pounders and four 3-pounders). Gillon renamed her *South Carolina* and manned her with 250 American sailors recently released from British prisons. Departing Amsterdam in 1781, she cruised the North Sea and then proceeded to Spain taking several prizes on the way. She then headed for America, arriving off the coast of British-occupied Charleston in December. This was the only time she would ever sail in South Carolina waters. Unable to enter Charleston harbor, she bore away for Havana. On May 8, 1782, she took part in the American invasion and capture of Nassau in the Bahamas. In December 1782, the British ships *Diomedes*, 44 guns; *Astea*, 32 guns; and the 32-gun *Quebec* captured her. She was taken to New York and sold (Millar 1978:18, 263-265).

Despite the lack of what would be considered major naval activity on the part of the South Carolinians, the Revolution was a time when these colonists discovered that their seafaring way of life, their mastery of ocean-going commerce, and the skills they had learned as boatmen, sailors, pilots, and shipbuilders fostered a sense of independence needed to form a new nation.

Antebellum (1785-1865)

Thomas Jefferson's Naval Policy and South Carolina

In 1800, the Jefferson administration instigated a policy of mothballing larger craft and building shallow draft gunboats for naval defense. Congress passed two acts, one in 1801 and another in 1803, authorizing fifteen gunboats to be built. The construction of an additional 188 gunboats was approved in 1807. The gunboats were used in a variety of roles, ranging from fighting Barbary pirates to patrolling the shallow Southeast shorelines, which was reflected in different design features. The vessels were built to several different design specifications based on intended cruising locations. Numbers 5-10 were sent to the Mediterranean. No. 3 had leeboards. The rest, with the exception of No. 9 had false keels added. All these craft had either a dandy or yawl rig suitable to an ocean crossing.

Gunboats 9 and 156 through 165 were built in South Carolina. No. 9 was built at Fair Bank plantation by Paul Pritchard and was launched in 1805. The vessel was rigged as a fore-and-aft ketch, had a square stern and a single rowing hatch along the centerline. Dimensions were listed as 71-feet in length, 21-feet in beam, and with a 6-foot 2 and a half inches depth of hold. The dead rise was 12-inches. James Marsh, who had been Pritchard's foreman at Hobcaw Creek Shipyard, built five gunboats at his yard in Charleston, and Francis Saltus, at Beaufort, built the remaining five boats. No.157 capsized on Charleston Bar and numbers 159, 161 and 164 sank off St. Mary's in Florida. None of the gunboats that went to the Mediterranean were ever involved in active service because of a peace settlement that negated the need for these specially designed vessels (Chapelle 1949:197,198, 225; Fleetwood 1995:86).

War of 1812

The British embargo of 1807, which prohibited all American exports and forbade the importation of British goods, and the War of 1812 brought South Carolina's economy to a decline (Edgar 1998:324). The main issue of the war was British dominance and sea power. When the war started, the British were slow to pay attention to the Southeast coast of the United States. Major-General Thomas Pinckney was placed in command of the Southeast and requested that South Carolina raise a quota of 5,000 men. The Federal government did send a few troops, but the State accepted the bulk of the responsibility for furnishing arms, equipment, and militia for naval service. After the war, the Federal government haggled about the details of their debt and did not repay the State for nearly one hundred years (*Carolina Gazette*, June 12, 1813; McClendon 1977:13).

During this relatively short war, which lasted from June 1812 to the early months of 1815, the Navy purchased and procured vessels for both coastal and harbor defense. Many of these ships were hastily manned and armed with few receiving more than a brief description in the official naval records of the period (Chapelle 1949:246). *Ferret*, for

example, was a small schooner purchased in Charleston, South Carolina, at a cost of \$3,500 dollars (“Z” Files at the Naval Historical Center).

Ferret, under the command of Acting Master Smith, was assigned the task of cruising sporadically in the sounds and inlets along the South Carolina coast for the protection of inland navigation (Z files, Navy 1853:10). According to naval communication of the period, *Ferret* was doing just that well into the spring of 1813 (Dudley 1985 v. 2:58). Further evidence that *Ferret* was used exclusively for coastal defense comes from an order dated April 9, 1813:

The schooners *Carolina* and *Ferret*, and the Gun Boat at Beaufort, are to be employed for the protection of the coast and harbors of South Carolina, and are not to go off soundings, or leave that coast without orders from this department (Dudley 1985 v. 2:96, Tucker 1993:141).

No British cruisers were found off the port of Charleston until October 1812 when the British came into Charleston and took vessels and even secured supplies. By October 14, three 12-to 18-gun vessels blockaded Charleston and were taking prizes. This caused obvious problems in the local community receiving staple exports, and the City Council of Charleston reacted by imposing rationing on certain goods (*City Gazette*, August 10, 13; October 15, 16, 19, 1812; *Carolina Gazette*, September 25, 1813). There were so many British cruisers off Charleston that the commandant of the US Navy base in that port could no longer risk sending his small craft to sea to protect the coasting trade (Gardiner 1998:171).

Additionally, privateers, although not part of the naval establishment, sent a large percentage of captures and valuable cargoes into their neutral ports. The Admiralty Records show about twenty captures by Americans, almost all by privateers (Admiralty Records, February 1814). These privately owned and armed vessels roamed the Atlantic shipping routes preying on British merchantmen. Privateers, operating out of Charleston, were built in that port city and in local area shipyards. These included *Mary Anne*, a 50-ton schooner, which mounted one four-pound gun, and vessels like *Saucy Jack* of 170 tons and 16 guns. *Saucy Jack* was built at the Pritchard and Shrewsbury shipyard on the Cooper River. A contemporary newspaper advertisement describes the vessel at the time of the launching as “90 feet on deck, 24 feet beam, and 70 feet keel” (*Charleston Courier*, March 27, 1813; August 6, 1812).

Overall, the Charleston naval outpost, under the command of Captain John H. Dent, appeared to be fraught with logistical problems and personnel conflicts. In 1813, Captain Dent commanded a force comprised of barges, also referred to as “heavy row galleys,” and four schooners: *Alligator*, *Carolina*, *Ferret*, and *Nonsuch*. Barge or galley was a term applied loosely to a double-ended boat, sometimes rigged for sailing. However, smaller craft were sometimes fitted for rowing only and designed somewhat like whaleboats. Most barges or galleys had a long gun aft and a carronade mounted

forward. There were three different designs. One was 40-feet long, 10-feet beam, and fitted to row only. The second design was 50-feet long, 12-feet in beam, and had a three-foot 6-inches depth of hold. The third design was 75-feet long, 15-feet in beam, and 4-foot depth of hold. In the inland waterways, these vessels could out row and out maneuver the gunboats. The larger galleys had one or two masts (Chapelle 1949:275-277). A letter from Secretary of the Navy William Jones to Senator Samuel Smith of the Navy Department on June 7, 1813, provides a detailed discussion of the barge (also referred to as galleys) in which he describes the details of size, draft, cost, and maneuverability, as well as advantages and disadvantages of these war craft used so prevalently in the War of 1812 (Dudley 1985 v. 2:148-151).

Dent experienced difficulties in finding enough crew for his fleet of vessels. He complained bitterly in a letter to the Secretary of the Navy William Jones that it was "impossible to man, the Schooner or Barges, what few men are here are either taken by privateers or engaged by France..." (Dudley 1985 v. 2:36). It is evident from correspondence extracts that Charleston's naval fleet's contribution to the 1812 war effort was unsatisfactory. In a highly critical letter, Secretary Jones reprimanded Captain Dent for deploying fleet boats outside of Charleston coastal waters in a time of need; for creating a navy yard in Charleston; and an agency in Beaufort without permission of the Navy Department. He was ordered to abolish the Navy Yard and discharge any persons he had employed (Dudley 1992 v. 2:96). Local citizens in the community were aware of the tensions and wartime exploits of vessels offshore. On November 28, 1812, John Green wrote to his mother in Philadelphia that "all the privateers here have gone out (six or eight) in pursuit of the British fleet bound to the West Indies." (South Carolina Historical Society Collection # 43/0815).

By 1813, British vessels swarmed the coastline and inlets of South Carolina from Savannah to Winyah Bay. The sailors looted plantations, captured ships, and created paranoia amongst the Charlestonians (McClendon 1977:14). In response, more barges were placed under Dent's command, but again with no sailors to fill the crew complement. These vessels were described as being of:

large dimension & carry a twelve pound carronade, with accommodations for one months provisions for thirty men, they are better calculated to act in the inlets against the small privateers, that infest them, than Gunboats and move with greater facility from one point to another (Dudley 1992 v. 2:142).

They were located at Bulls Bay, Stono and North Edisto Rivers (Dudley 1992 v. 2:142).

In June of 1813, *Ferret* was under the command of Lieutenant Lawrence Kearney, a seasoned naval officer who had been recommended for the command by the Secretary of the Navy (Dudley 1985 v. 2:144). With Lt. Kearney at the helm, *Ferret*

continued to patrol the shallow inlets and narrow waterways along the South Carolina coast through the summer and fall of 1813. On the second of February 1814, she grounded in Stono Inlet during a gale while making passage from Port Royal to Charleston for supplies. The breakers completely wrecked their vessel, but her officers and men succeeded in getting ashore safely (*Charleston Courier* February 5, 1814)

By August 1813, officers and crew from the sailing vessels *Carolina* and *Nonsuch* were taken off the schooners and placed on board the barges “to traverse the river and inland passages” (Dudley 1985 v. 2: 212-213). Later that month, several of the barges sustained severe damage in a hurricane that destroyed bridges, wharves, and docks in the city of Charleston, adding to the existing problems the navy was experiencing at this Southern station (Dudley 1985 v. 2:212-213). Desertion by crew employed by the Navy was another prevailing problem in Charleston, which was attributed to careless treatment and neglect by Navy officers. The exposed situation of the barge crews stationed at inlets, further depleted numbers due to epidemics of “Bilious Fevers, Pleurisy, and other violent Diseases” (Dudley 1985 v. 1:212-213, 306-307; Joshua Barker Whitridge (1789-1865), South Carolina Historical Society Collection # 1114.00).

The War of 1812 was an event that was characterized primarily by a strained relationship between the local commanding officer in Charleston and his superiors in the Navy, frustrations of the locals with the inability of a ill-equipped navy consisting mainly of a fleet of gunboats and galleys to protect their coastline, and an assortment of related problems such as hurricane damages to vessels and wharves, crew desertion, illness, and the lure of crewing aboard a privateer beyond coastal waters instead of aboard a galley stationed at an inlet.

Civil War

The dominant mission of Union vessels present in Charleston during the Civil War was to create an effective blockade and deny the Confederates their trade, particularly from Europe. Civil War historian William N. Still postulated that the Confederacy’s primary naval strategy in the Civil War was one of defense. They were well aware of the economic and military superiority of the North and made no serious effort to challenge their navy at sea. Instead, the Confederacy’s primary objective was to prevent the capture of key points within the Confederacy, to protect the inland waterways, and to keep their ports open to foreign commerce. The Confederacy was not trying to conquer the North, but to preserve her independence and make the war as costly as possible in order to convince their enemy that coercion into the Union was too difficult to achieve (Still 1997:xi). Within this context, Charleston was an extremely strategic Confederate port city and dramatic setting for the interplay of wartime events that ensued between the Confederate and Union navies. This section will highlight the strategic naval status of the city of Charleston, plus other strategic areas like Port Royal, during the Civil War, and provide a thumbnail sketch of some of the major engagements that occurred between Confederate and Union navies. Memoirs, logbooks and correspondence of several Charlestonians provide insights into the naval presence during the Civil war period (Clelia P. Missroon, South Carolina Historical Society, Collection # 43/0199;

Langdon Cheves, South Carolina Historical Society, Collection # 1167.01.04; Charles Petigru Allston, South Carolina Historical Society, Collection # 1167.02.05.)

Charleston ranked second to New Orleans as a strategic Confederate port. Although it did not have the same volume of trade as New Orleans, it was the Confederacy's dominate shipping point on the Atlantic coast. The harbor was formed by the convergence of the Ashley and Cooper Rivers, offering a deepwater anchorage to vessels of all sizes. Four channels led into Charleston. Only two, Sullivan's Island channel and the main shipping channel, allowed deeper draft ships to enter the harbor. Both were difficult to navigate, but once vessels crossed the sand bars it was easy to gain access to the city. Here, steamboats, river barges, and railroads connected Charleston to the inland plantations. In voyages radiating outward from Charleston, vessels traveled up and down the Georgia, South Carolina, and Florida coastline, to the West Indies and across the Atlantic to trade in a plethora of European markets (Wise 1998:17; Bradlee 1925:209-210).

When South Carolina seceded from the Union in December 1860, it viewed the four Federal military outposts in Charleston (Fort Moultrie, Fort Sumter, Castle Pickney, and the Arsenal) as manifestations of an enemy presence in Charleston. Confederate forces regarded efforts to reinforce Federal troops at Fort Sumter as an aggressive action. The Confederates responded in several ways. They fired from their strongholds situated on the deserted Union outposts at Forts Moultrie and Morris Island on ships like *Star of the West* carrying troops and supplies to Fort Sumter, established a floating battery used between the harbor and Fort Sumter, and took vessels into the service of the State to guard the entrance into the harbor. Additionally, they sank four hulks loaded with granite in the shipping channels to prevent the passage of any vessels drawing more than twelve feet (*Official Records of the Union and Confederate Navies* [ORN], ser. 1, vol. 10:249; Burton 1970:10-13; Doubleday 1876:123-125).

In what can be likened to the first move in a chess game leading to war, Major Robert Anderson, moved his seventy-five Union troops from Fort Moultrie to Fort Sumter on the evening of December 26, 1860, after assessing his position as being untenable. The following day South Carolina troops took control of not only Fort Moultrie but of Castle Pinckney in Charleston harbor as well. On January 9, 1861, Citadel cadets on Morris Island fired upon the Union supply ship *Star of The West* as she sailed into Charleston harbor attempting to bring reinforcements to the beleaguered Union forces on Fort Sumter. All this maneuvering and "saber-rattling" culminated in the bombardment of Fort Sumter on April 12, 1861, and the start of civil war.

The firing continued throughout the day and on into April 13 when a Confederate round landed in the officer's quarters on Fort Sumter. The blaze quickly spread to the barracks, forcing the magazines to be closed. A short time later, negotiations began for the surrender of the Union troops. Six days later, President Abraham Lincoln issued a proclamation declaring a blockade of all Confederate ports from South Carolina to Texas. The United States Navy took some time to put the blockade into effect. South Carolinians viewed it as a "paper blockade" as the Federal government did not have

enough vessels to carry out such a blockade effectively (*Charleston Courier*, May 1861). On May 10, 1861, USS *Niagara* took up a blockading position off Charleston. The vessel did not establish effective control. It was only later in the year with the seizure of Port Royal further south that the Union forces gained a foothold and a port where blockading vessels could be supplied, repaired, and fueled (Hayes 1969:365).

In mid-1861, Union strategists began planning a military strike into South Carolina using combined naval and army forces. The purpose of the venture was to disrupt interior communication and trade networks, and to establish a base to launch offensive operations. Port Royal Sound was ultimately chosen as the focus of the combined operation as this region proved the most convenient to effect these goals (Jones 1960:209-210). On 7 November, the Union force, under the joint command of Flag Officer Samuel Francis DuPont and General Thomas W. Sherman, comprised of an assortment of steam and sail warships, auxiliary craft, and a large contingent of troops, stormed through the Confederate defenses guarding the Sound's entrance. Confederate forces retreated to the mainland to regroup. Union mopping-up operations around the Sound and at Beaufort occurred throughout the following weeks. Union forces quickly began to establish the infrastructure necessary to support the occupying army and the South Atlantic Blockading Squadron. The Confederates, meanwhile, constructed a defensive cordon, extending from the mainland opposite Hilton Head Island to along the Coosaw River, which consisted of a series of batteries and pickets. This line was never breached by Union forces until abandoned by the Confederates in advance of General William T. Sherman in January 1865 (Jones 1960:215; Ammen 1887:674-7; ORN, ser. 1, vol. 12:263-5; Emilio 1969:256-267).

For the next four years, Union forces solidified their hold on the region and engaged in several combined operations to achieve military objectives. The naval presence at Port Royal consisted of a fleet of naval gunboats complemented by army gunboats to patrol and secure the Sound, a steady stream of supply and logistical support vessels, transitory naval vessels from the South Atlantic Blockading Squadron and other squadrons, and vessels under repair. Infrastructure to support the Army and Navy units in Port Royal included docks, warehouses, repair facilities, and fortifications, primarily located on Hilton Head Island at the channel entrance (Jones 1960:233). Along this side of the island, Union forces constructed a "T" dock approximately 1,277 ft. long which was equipped with a rail line to move supplies from ship to shore. Over time, two other piers were constructed adjacent to the main dock (DR 146-14; I 33-1, RG 77, NARA). Across the Sound a repair shop was established on two small islets along the northern bank of Stations Creek. A floating machine shop, consisting of two whaling hulks lashed together, was moored in the creek (Canney 1998:53). Historic charts also reveal that two small docks were built at the interface of land and marsh (165-S, Box 2, RG 165-S, NARA). On Bay Point, another "T" dock was constructed with a rail line and served as a naval coal depot (I-54, RG 77, NARA).

Confederate strategy in the Port Royal Sound region was defensive in nature to protect the mainland and the Charleston and Savannah Railroad (C&SRR) from Union encroachment. Union strategy consisted of protecting their gains, attempting to cut the

Charleston and Savannah Railroad, and retaliating against Confederate attacks. Several Union combined operations were launched against the Confederate defensive line from 1861 to 1865, and while bending, the line was not broken until January 1865. In late December 1861, Union forces launched an assault against Confederate forces in retaliation for Confederate batteries firing at Union Army and Navy gunboats navigating in Whale Branch River. This operation, known as the Battle of Port Royal Ferry, was the first operation since capturing Port Royal Sound. Union forces successfully destroyed several Confederate batteries, which were soon repaired following the departure of Union forces several days later (*Official Records of the Union and Confederate Armies* [ORA], ser. 1, vol. 6; ORN, ser. 1, vol. 12). The Battle of Mackay Point in October 1862, situated at the headwaters of the Broad River, was a complete Union failure in their attempt to demolish the C&S RR bridge over the Pocotaligo River (Thompson and Wainwright 1918, vol. 1:162). Another attempt to destroy the C&S RR, known as the Battle of Honey Hill, occurred in late November 1864 and was another Union failure (Emilio 1969:240). The last military engagement in the Sound commenced in early December 1864 with another assault at Mackays Point and the same objective to destroy the C&S RR. The trestle was finally captured in mid-December, after Confederate forces retreated in advance of Gen. W. T. Sherman's Western Army which had moved into the area from Savannah (Emilio 1969:256-267). This action effectively signaled the end of the war in Port Royal Sound. During these engagements, the Navy and Army gunboats provided transportation, logistical support, and covering fire for the land forces.

Ship losses in the Sound during the war included the *Martins Industry Lightship* which was burnt by the Confederates in advance of the Union expedition, most likely in Skull Creek (Jones 1960:228). The Confederates also apparently sank several schooners in Skull Creek as obstructions (ORN, ser. 1, vol. 15:171). In addition to these wrecks in Skull Creek, several Union vessels under Army contract were abandoned around the Quartermaster's facilities at Seabrook Landing, Hilton Head. The bark *Marcia*, destined for the Second Stone Fleet off Charleston, wrecked on the shoals entering Port Royal Sound (Spence 1984). Only one Union vessel was lost due to enemy action, USS *George Washington*, which was sunk by a Confederate battery in Whale Branch River in April 1863 (ORN, ser. 1, vol. 14:115-117). In the 1930s, a 24-pdr. bronze howitzer was recovered in the marsh, reputedly one of the guns from the gunboat, by the local sheriff and donated to the Beaufort Museum, where it is currently on display. Unfortunately, the exact location of the wreck has slipped from the collective memory of local residents (Roger Pinckney 1998: pers. comm.).

The military situation in Charleston Harbor was one of a stalemate for the duration of the war until Confederate forces abandoned the city environments in February 1865. In December 1861, sixteen old whaling ships, with their holds full of large granite rocks, arrived off Charleston under command of Federal troops. Designated the "Stone Fleet," the vessels were sunk in a checkerboard fashion across the main channel that ran off Morris Island. Shortly thereafter a second "Stone Fleet", of fourteen vessels, was loaded with granite and sunk in Maffitt's Channel, the other main channel into Charleston harbor. Despite these efforts, the entrance into Charleston remained open (ORN, ser. 1,

vol. 12:422-424, 514-515). Most of the Stone Fleet vessels were classified as either ships or barks, formerly used as whalers, and ranged between 200 and 400 tons.

On September 5, 1862, Admiral Samuel Du Pont reported to Secretary of the Navy Gideon Welles expressing his concern about the Confederate ironclads under construction at Charleston and urged Welles to send him ironclads. His concern was well founded for on January 31, 1863, the Confederate ironclads CSS *Chicora* and CSS *Palmetto State* attacked the blockading fleet. During the attack CSS *Palmetto State* rammed USS *Mercedita*, and CSS *Chicora* engaged USS *Keystone State* severely damaging the vessel (ORN Series I vol. 13:311-312, 577-578). During this engagement USS *Keokuk* was riddled with 90 hits. The following day, the stricken vessel sank off Morris Island with no loss of life (ORN ser.1, vol. 14:23-24).

A bombardment of Charleston's defenses was renewed in August 1863 with the Federal ironclads *Weehawken*, *Catskill*, *Nahant*, *Montauk*, *Passaic*, *Patapsco*, and *New Ironsides*, and several gunboats. On September 6, the Confederate batteries on Morris Island were abandoned. With these batteries abandoned, Admiral John Dahlgren mounted an assault on Fort Sumter with more than thirty vessels and 400 sailors and marines. The assault failed miserably and more than 100 of the assault force were captured (ORN, ser. 1, vol. 14:458, 531-533, 572, 610-611).

Meanwhile, the first sinking of the Confederate submersible *HL Hunley* occurred on August 29 at Fort Johnson on James Island. Five crewmembers were killed (US Department of the Navy 1971 III:134). Following a second sinking of the submersible *H. L. Hunley* on October 15, 1863, with the loss of the entire crew, including Horace L. Hunley, the chief backer of the venture, the vessel was raised and another crew was picked. After several months of training for the new crew, the *Hunley* set sail from Sullivan's Island on the night of February 17, 1864. Reaching the blockading fleet *Hunley* managed to plant her torpedo into the side of USS *Housatonic*, thus becoming the first submersible to sink an enemy warship (ORN ser. 1 vol. 15:327-339).

For the remainder of the war, small naval skirmishes made up the bulk of naval activity. These small engagements did lead to the loss of several vessels on both sides. These include USS *Weehawken* off Morris Island. For reasons unknown at the time, USS *Weehawken* started taking on water in her forward compartment. Attempts to beach the ironclad failed, and she suddenly sank in 30 feet of water some five minutes after raising the alarm to the ships of the fleet, and carrying down with her 31 crewmen (Mooney 1991:191). USS *Boston* sank in the Ashepoo River, CSS *Etiwan* off Fort Johnson, CSS *Resolute* in the Back River near Savannah, CSS *Firefly* and CSS *Isondiga* were scuttled at Scrivens Ferry, and CSS *Savannah* and CSS *Midgeville* scuttled in the Savannah River. USS *Dai Ching* was abandoned and burned in the Combahee River on January 26, 1865 following an engagement with a Confederate shore battery.

By May 1864, 21 Federal vessels lay anchored at the mouth of Charleston Harbor. Others anchored at various inlets. In early July, Union forces landed around 2,500 men at the southern end of James Island and attempted an amphibious assault with gunboats and

monitors shelling Confederate lines from the water. The Stono River was full of ships and multiple skirmishes took place on land, supported by heavy bombardment from Union batteries on Morris Island. The Union assault, however, proved ineffectual and the stalemate between the foes continued.

Union naval losses occurred for a variety of reasons, including weather, groundings, and Confederate torpedos. In January 1865, the ironclad USS *Patapsco*, which was navigating near Fort Sumter, hit a torpedo that had been submerged by the Confederates some 24 hours earlier (Wilcox 1966:74). The stricken vessel sank in less than a minute, taking 62 of her crew and officers down with her (Mooney 1991:224). The following month, USS *Harvest Moon*, which was dispatched to duty with the South Atlantic Blockading Squadron off Charleston struck a submerged Confederate mine in Winyah Bay and sank (US Department of the Navy 1971 IV:62-63; ORN ser. I, vol. 15:160-171, vol.16:171-181,187-203, 282-285, and 484,486).

USS *Kingfisher* was stationed in St. Helena Sound, South Carolina, where the vessel conducted reconnaissance work and operations against small parties of Confederates ashore. *Kingfisher* occasionally shelled Confederate troops ashore and sent small landing parties inland to capture food for her crew and gather information. On March 28, 1864, USS *Kingfisher* grounded on Combahee Bank, filled with water and sank.

Other Union vessels sank as a result of weather conditions or simply running aground on the shallow coastline sandbanks. These included the *Robert B. Howlett*, a schooner used as a light ship that broke anchor and drifted onto a sandbar in Charleston Harbor, the *Ston*, a Confederate blockade runner (previously the gunboat USS *Isaac Smith*) that wrecked at Bowman jetty, and the *Marcia*, a vessel that was intended for the second stone fleet, sank on the Port Royal Bar.

The South Carolina Confederate Navy was comprised of a potpourri of local vessels. At the start of the war Charleston, like much of the Confederacy, was reliant on existing small craft to defend her coastline and estuaries. Navies of both the North and the Confederacy built an assortment of boats for patrolling the local waterways. The Hilton Head boat shop base of the Union Navy built cutters, yawls, surfboats and gigs of standard Navy design. The Confederate Navy used hundreds of rice flats, dugout canoes, large plantation boats and other lighters that were pressed into service for ferrying troops and supplies. Elizabeth Pringle complained about the loss of their dugout *Rainbow*, the “pride of the plantation” which was donated to the war effort (Pringle 1992:342).

Lighters, flats, tugs, river and coastal steamers were purchased and converted into military vessels. In a salvage report about a Confederate wreck thought to be the Confederate receiving vessel *Indian Chief*, an engineer describes the remnants of a “three-masted schooner of heavy timber sheathed with Muntz metal. She appeared to be 150' long. Ribs were 10"x10" mahogany, 7" copper spikes and 16" copper drift bolts” (South Carolina Historical Society Collections, Rivers, Henry Fowles, 1890-1973. Log books, 1921-1938. (197.00). Collection #0197.00, log book entry August 1, 1929).

The wooden vessel *Planter* was built in 1860 in Charleston with live oak frames and red cedar planking. She was a side-wheel steam vessel with a shallow draft of three feet, nine inches and ideally suited to river and coastal work. The Confederate Navy chartered the vessel in 1860 and a timber barricade was erected around the state-of-the-art high-pressure steam machinery located on the main deck. Vessels like *Planter* were shallow draft (3 feet, 9 inches) and maneuverable in contrast to many of the Union vessels that were less suitable to the local environment. Of great service to the Confederate forces in Charleston, the *Planter's* slave crew, however, stole the initiative of securing their freedom and commandeered the vessel and defected to the Union side. City intelligence reported in the local newspaper that this was an “extraordinary occurrence(sic)” and that *Planter* was regarded as one of the fastest boats in the harbor, and “very valuable for river services, but unfit for seaway.” *Planter* had four large guns on board, “one rifled forty-two pounder . . . two, eight inch Columbians, and one, 32-pounder.” In addition to these, she had on board her own armament which consisted of one 32-pounder and one 24-pounder, making six guns in all taken out to the Union fleet (*Charleston Daily Courier*, May 14, 1862:1).

Their action created ripple waves of shock in the city. To pacify the community in Charleston, a misleading report in the newspaper claimed the Union fleet was astonished at the arrival of *Planter*, and anxious to restore the crew to their owners as they were “very difficult to manage and regarded with extreme aversion by both officers and men of the navy” (*Charleston Daily Courier*, May 19, 1862:2). Instead, the pilot of *Planter*, Robert Smalls, became a valuable addition to the Union Navy and later the Army. With Smalls serving as a Union captain, *Planter* proceeded to play an invaluable role to the North in operating around the shallow South Carolina creeks and inlets.

Until 1862, southern riverboats were still being converted into ships of war. In the summer, Stephen Mallory, Secretary of the Confederate Navy, and other progressive officers started to emphasize ironclads as the major objective of naval policy. Three hundred thousand dollars were appropriated for the South Carolina ironclad construction program (Still 1971:84-85). The concept of building Confederate ironclads was also very popular amongst the public. Letters to the editor of the local newspaper expressed great enthusiasm about this new weapon. The public visited the yards where these boats were built and the idea of fund-raising to support the Confederacy became a popular trend. Various public sector groups, including men’s clubs, military organizations, town councils, private businesses and women’s organizations either donated money or offered their services in fund-raising for the program.

Advertisements for gunboat support meetings and events were scattered throughout the local newspapers such as the *Charleston Daily Courier*. On May 10, 1862 Governor Pickens visited the Ladies Gunboat Fair “expressing his admiration of the rich collection of oblations, laid by the daughters of South Carolina on the altar of their wronged and bleeding country.” Some events were devoted to fund-raising for a specific vessel, for instance the gunboat *Palmetto State* at the Ladies Fair held at Hibernian Hall (*Charleston Courier*, May 10, 1862:1). Ironclad mania was rampant!

Local newspapers kept the public apprised of developments in the construction of gunboats and ironclads and advertised for necessary ship parts. With all this outpouring of public support Charleston, like other strategic Confederate ports, such as Savannah and Mobile, boasted an official Confederate naval squadron by 1863. The squadron was comprised of several wooden vessels and four ironclads—flagship *Charleston*, *Chicora*, *Palmetto State*, and *Columbia*. CSS *Palmetto State* and CSS *Chicora* attacked two Union blockaders in January 1863. After a confusing nighttime engagement, the Union vessels surrendered. CSS *Charleston*, CSS *Chicora*, and CSS *Palmetto State*, as well as the receiving ship *Indian Chief*, were ultimately scuttled in the harbor to prevent their capture (Watts 1995:38). The remnants of these vessels are possibly intermingled with those of Union casualties.

Armed with torpedoes and cannon, the ironclads were used to reinforce harbor defense and anchored in the channels between Fort Moultrie and Fort Sumter. A logbook dating to the early 1900s describes CSS *Chicora* as:

150 feet long, 35 feet in beam and a 12 foot depth of hold. Armor: two layers of iron plating laid upon a twenty-two inch backing of oak and pine. Plating was continued below the waterline and also covered the ram which was a strong elongation of the bow. 500 tons of iron used in her armor and she was propelled by an engine with a thirty inch diameter cylinder and twenty-six stroke driving a three bladed screw 8 feet in diameter. Battery: 2-9 in. smooth bore guns and 4 rifles, 32 pounders each. (South Carolina Historical Society Collections, Rivers, Henry Fowles, 1890-1973. Log books, 1921-1938 (197.00; Collection #0197.00, logbook 3, entries for December 1929 and January-March 1930).

Confederate war vessels, like the Charleston ironclads, were seen as “makeshift.” Although well-armed and armored, they were at a disadvantage due to their slow speeds, difficulty in handling, and because they were unreliable mechanically and therefore frequently inoperable (Still 1988:230).

In addition to the vessels built in Charleston, the Confederate government issued letters of marque and reprisal, and a number of privateers were fitted out. The most unusual watercraft of this class was *HL Hunley* that served in Charleston, but was built in Mobile. Similar to the *Hunley*, but not completely submersible, were the *Davids*, which were cylindrical, with conical ends. The namesake on these steam-driven semi-submersibles, *David*, measured 48 feet in length and had a five-foot beam. Only a midship coaming, which protected the helmsman, two ventilation funnels, and a smokestack protruded above the water. Attached to the bow was a long spar fitted with a black-powder torpedo. On October 5, 1863 (four months before the *Hunley*'s fateful voyage), the *David* ventured out of Charleston harbor and managed to explode its torpedo against the hull of USS *New Ironsides*, which was part of the blockading fleet. The explosion failed to sink the Union warship, but caused enough damage to force it to leave to effect repairs (Fleetwood 1995:134).

By the end of the Civil War, Charleston was in an economic decline. No immediate Federal aid was expected to rebuild the city. Although strategically situated for ocean commerce at the convergence of the Cooper and Ashley rivers, the city needed to clear obstructions, like the wreckage of ships and other war debris, so that commercial vessels could use the port again. By 1871, an engineering office was established in the city and a partnership with the Federal government played a vital role in clearing the devastation of the Civil War years.

Post Bellum (1865-1940s)

Spanish-American War

United States naval activities decreased after the Civil War. By 1879, only 48 of the Navy's 142 vessels were available for immediate service. These were obsolete wooden-hulled steamers or ironclad ships. An era of modernization began in the 1880s during the administration of President Chester A. Arthur. The Navy Act of 1883 authorized building the ABCD fleet, the steel cruisers USS *Atlanta*, USS *Boston*, USS *Chicago*, and the dispatch vessel USS *Dolphin*. The new Navy also added the ships USS *Texas* and USS *Maine*. During the administration of Benjamin Harrison, the Navy's role began to shift from defense and commerce towards more offensive capabilities. A Navy bill, dated June 30, 1890, initiated the construction of three battleships-USS *Indiana*, USS *Massachusetts*, and USS *Oregon*, and two years later the battleship USS *Iowa* (Crawford 1998:4-5).

A certain ambivalence about overseas expansion checked America's foreign expansion and sea power until the late 1890s. Americans lost their inhibitions primarily due to a public sense of outrage regarding Spanish imperialism and ultimately a declaration by President William McKinley that Spanish tensions in Cuba were threatening American property and trade. The sinking of the battleship USS *Maine* on February 15, 1898, represented a landmark event that ultimately led to the Spanish-American War. A month later the United States fleet boasted five battleships, two armored cruisers, thirteen protected cruisers, six steel monitors, eight old ironclad monitors, 33 unprotected cruisers and gunboats, six torpedo boats, and 12 tugs. Congress approved another 50 million dollars to acquire auxiliary watercraft-colliers, refrigerator ships, and water distilling ships, many of which later became part of the permanent fleet after the war (Crawford 1998:7-8).

Generally considered the best harbor between Washington, DC and New Orleans, Charleston and South Carolina, however, did not play a large role in the Spanish-American War. Troop and supply ships used Charleston as an entrepôt of various war materials, and embarked troops and laborers bound for Cuba. USS *Resolute*, put in at Charleston then departed to Newport News. Troops departed from Chickamauga Station, Georgia, via train to Charleston and then embarked on steamers to Cuba (AGO 1993:117-119.132-133, 144).

American strategists, fearing an attack along the southeastern United States coastline by Spanish warships, constructed fortifications for coastal defense. In South Carolina, such installations included Quarantine Fort, Fort Haines, Mackay Fort, and Station Fort on Parris Island, and a landing wharf at Hilton Head that was subsequently occupied by an Army artillery unit. Many of these installations were armed with Civil War period ordnance amongst other weapons (Alvarez 1998:35).

As early as 1816 the *Times of Charleston*, an official publication of the city council, accused Washington representatives of favoritism towards Northern seaports in its naval expenditures policy. The editors noted that local shipbuilders had petitioned Congress for an equal distribution of Federal favors during the War of 1812 with little effect. The government then had six naval bases in operation, but none of them south of the Chesapeake (*The Times*, May 21, 1816).

After numerous failed attempts to bring this issue to the attention of the lawmakers in the 1820s, Charleston renewed its application for a navy installation before Congress once again in the 1830s. Between 1834 and 1839, the city council, chamber of commerce, and an ad hoc association of more than 400 merchants and mechanics submitted no less than four memorials for a navy yard and dry dock in South Carolina (Greb 1978:196).

The Charleston Navy Yard was as much the favorite stepchild of political pork barrel politics as it was of naval strategy. However, during the early post-bellum years, the Navy retained a presence in the Port Royal area. They had captured the harbor in the early part of the Civil War, which conveniently became the operating base for the South Atlantic Blockading Squadron. A continuous presence was maintained in Port Royal following the Civil War until the present day. In 1883, the Federal government began purchasing lands on Parris Island, centrally located in Port Royal Sound, to build a naval coaling depot (Espenshade 1995:57). By 1894, the depot became a naval station owing to the construction of a dry-dock and additional personnel and infrastructure. The dry dock cost \$449,427.09, and built from 1894-95, with \$25,000 expended on an attendant dock (Citizen's Committee of Beaufort and Port Royal 1900:5). William Elliot, a member of the House of Representatives, enthusiastically proclaimed that it was "...the only dock on the Atlantic coast at present capable of taking in the battleships" (Elliott:1898:2).

Despite Elliot's ardent support, there were known problems associated with this location as a Navy yard. It often silted up making it inaccessible at high tide. In 1896, the commandant at the USN Station Port Royal commented on the dry docking of *Indiana* and reported that there was no problem on a high tide aligning and blocking the vessel in the dry dock. Nevertheless, the last time *Indiana* had to go to dry dock, the vessel was sent to Halifax, Nova Scotia, instead. This decision was accompanied by a concern that the vessel would not fit in the dry dock due to the addition of bilge keels since it's initial visit. The dry dock at Port Royal would need costly adjustments to fit such a vessel. It became starkly evident that dredging operations were critical to make Port Royal dry docks usable to service the battleships (Elliott 1898:2, 4).

In May 1900, the Naval Appropriation Bill passed in House of Representatives with \$100,000 allocated to rebuilding Port Royal Naval Station in concrete or stone and not to cost over \$500,000, along with other needs of the station. The Bill was sent to the Senate and then referred to the Committee on Naval Affairs. While still under consideration, the Secretary of the Navy received a note and a letter from Admiral Endicott, Chief of Bureau and Yards, requesting a total appropriation for expenditure at Port Royal for a dry dock, and other public works of \$712,000 (Citizen's Committee of Beaufort and Port Royal 1900:5).

The drydock at Port Royal was completed, but was never satisfactory. It was too small for larger warships and the wooden timbers of the dock became infested with shipworms in the saltwater environment. Simultaneously, the Navy decided to replace all wooden docks with ones made of stone or concrete (McNeil 1985:39). Charlestonians watched these dry dock developments at Port Royal critically. Local leaders, including the colorful and vocal senator Benjamin Tillman and the genteel mayor Adgar Smith, decided to take up the city's cause. They wanted the navy yard badly. Relocating the yard in Charleston would help rejuvenate a poor economy that had never recovered after the Civil War, the earthquake of 1886, and the ambitious extravaganza to attract business investments, the South Carolina Interstate and West Indian Exposition of 1901, which was a dismal economic failure.

Armed with facts about improvements to the harbor and other advantages that Charleston offered, the mayor and the senator presented Charleston's case. After hearing lengthy arguments on both sides, a specially appointed board of naval officers recommended moving the Navy Yard to Charleston. The arguments for Charleston being a better location among other things, was that the facilities for transportation to the interior, the proximity of a large commercial city, the convenience of obtaining at all times skilled labor of all classes, and an availability of fresh water, were lacking at Port Royal (Citizen's Committee of Beaufort and Port Royal 1900:6). There was continuous deep water in Charleston, whereas at Port Royal required extensive and costly dredging for larger ships, plus a deep-water basin. This work would have to be undertaken solely for naval reasons, and not for any commercial benefit at Port Royal. Whereas, dredging at Charleston harbor served both commercial and naval purposes. Port Royal also suffered from storms. Also, during the Hurrican of 1893, the naval station was under two feet of water with waves three to four feet high. Charleston had already received approval of expenditures to get controlling depth of channel to thirty-one feet (Citizen's Committee of Beaufort and Port Royal 1900:6-7).

In response to the Charleston mayor's proposal to remove the naval station to Charleston, a citizen's committee from Beaufort and Port Royal prepared a rebuttal to his statements. Amongst several other supporting arguments in their favor, they claimed that all seafaring men said that Port Royal was a superior harbor on the South Atlantic coast (Citizen's Committee of Beaufort and Port Royal 1900:15). They also noted that: the Charleston & Western Carolina Railroad had a terminal at Port Royal, only two miles from the station, and that it connected with other lines; the Steamer *Pilot Boy* made regular weekly trips between Beaufort and Charleston, delivering all freight to the

Navy wharf; the Beaufort and Savannah Steamboat Company had two steamers plying between Beaufort and Savannah, making three trips a week, and stopping at the Naval Station going and returning; and the steamer *Lillian* made two trips a day between Beaufort and the naval station for the convenience of workmen. Also, there was an ample supply of skilled labor in the area and plenty of water available via a water barge or they could bore an artesian well. The depth of water at the bar was twenty-one feet at low water. The channel would be dredged to twenty-five feet and kept clean by the vast amount of water on the ebb tide. The committee reasoned that "the channel on the Port Royal Bar is a natural one; what it was three hundred years ago it is to-day." (Citizen's Committee of Beaufort and Port Royal 1900:16,19).

Despite the counter-arguments by the citizens of Port Royal, the shipyard was moved in 1901 from its location in Port Royal and re-established on the west branch of the Cooper River, occupying nearly 2,000 acres on both sides of the waterway. The illustrious South Carolina Senator and one-eyed farmer, Benjamin Ryan Tillman, affectionately known as "Pitchfork Ben," helped bring the Navy Yard to Charleston and arguably did more than anyone else to keep it there (McNeil 1985:38). The US Army Corps of Engineers began dredging operations to make the channel deeper to the new navy yard, and in 1902 work started in earnest to construct the base. The dry dock was completed five years later and by 1909 five shop buildings and a powerhouse had been built. By this time there were around 300 civilian workmen in the yard and a score of naval officers. In 1912 a Navy machinist shop was started. The first vessels were built by the yard the following year. They were two paddle-wheel steamboats for the Corps of Engineers. Later, they built a ferryboat and a tug that towed it to Rhode Island (McNeil 1985:33).

Two earlier projects begun in 1869 proved valuable to making Charleston accessible to shipping, and thus a suitable location as a Navy Yard in the twentieth century. The first project was to clear the Civil War shipwrecks that littered the channel. These included the Confederate ironclads *Palmetto State*, *Charleston*, and *Chicora*, in addition to the Union ironclad monitors *Weehawken*, *Patapsco* and *Housatonic*. The other project was aimed at improving access to Charleston. Two converging jetties were built to channel the power of the ebb tide in an effort to maintain a twenty-one foot channel, in contrast to the previous twelve-feet of water at the harbor entrance. The jetties were built from platforms of logs covered with brush. Thirty to sixty tons of stone were placed on each platform to form the jetty foundation. The jetties were completed a decade later by Frederick V. Abbott of West Point. He added layers of stone and continued dredging operations to produce a 23-foot channel. With the harbor now accessible to deep draft vessels and the new dry dock in operation, the Charleston Navy Yard became known as a first-class facility for the Navy (McNeil 1985:34-36; 43).

World War I

During World War I the yard was a hive of activity. Circuit Court Judge James E. Peurifoy described the Navy Yard's role during these years as "the largest thing that your city can boast. It is the biggest item and the largest trade drawer that you have" (*News and Courier*, September 27, 1917:10). Many South Carolinians worked in the Naval

Clothing Factory or attended the Naval Training Camp, known as Camp Bagley, located adjacent to the yard. It provided preparation for wartime tasks ranging from naval aviation to machinist training. Accommodations were very basic and the military lifestyle in the yard was frugal. Wooden barracks and tents pitched under the pine trees housed about 1,000 men (McNeil 1985:57,64; Photographs in South Carolina Historical Society, Collection 51-154, microfiche).

Sailors enjoyed being stationed at the Charleston facility. They reveled in the hospitality of the locals and beauty of the city. Sergeant Hermann, who was stationed in Charleston, pronounced that “here the enlisted man reigned supreme. One sees him everywhere! He is petted and spoiled and shown every possible consideration” (*Charleston News and Courier: The Sunday News*, September 23, 1917:7). Local merchants went out of their way to assist in providing food supplies for the Navy Yard (*News and Courier*, May 31 1917) and social activities such as musical concerts and trolley rides were offered on the premises allowing navy personnel to have contact with the civilian lifestyle (*News and Courier*, June 1, 1917; June 3, 1917).

The Navy Yard employees formed highly competitive baseball and football teams and competed against other teams, such as workers from the asbestos factory and visiting ship crews. The Navy Yard band provided musical entertainment and the events were attended by “gentlemen and members of the fair sex,” the latter who were allowed to view the event free of charge (*News and Courier*, June 16, 1917:8; *Sunday News* June 24, 1917:22). Navy Yard workers participated in local charity drives such as raising money for the Red Cross war fund and thereby gained popularity and respect in the local community (*News and Courier*, June 24, 1917:12).

As chairman of the Naval Affairs Committee of the United States Senate, Senator Tillman retained his former close links to the Navy Yard and visited on occasion, asking questions that “bore on the worth of the yard to the government” (*News and Courier*, September 26, 1917:8). All around Charleston there was evidence of military activity throughout the war years. This included exercises like artillery training around Fort Moultrie by the National Guard (*News and Courier*, June 3, 1917). In the Yard, warships were built, repaired, and converted. When war was declared, five German freighters interned at Charleston harbor were immediately seized and converted into naval use as transport vessels and a submarine tender. Small craft and big ships alike were overhauled and rebuilt to serve an active military role (*News and Courier*, 7 April, 1917:1; Photographs in the South Carolina Historical Society Collection #38/001 collection depict US ships—USS *Mercury* and USS *Pocahontas* as well as individual military personnel in Charleston).

The keel for the warship *Asheville* was laid on June 9, 1917. The vessel was 241 feet long with a 41-foot beam and displaced 1,207 tons. Her armament consisted of three, four-inch guns (*News and Courier*, June 10, 1917:7). Other naval vessels were built at the Cooper River, mostly auxiliary vessels, including a number of submarine chasers called Sea Wasps.

“Tonnage means Victory” was the subtitle of a press statement in the *News and Courier* authorized by the British Controller of Shipping on September 29, 1917. The statement indicated that there was an urgent need for the United States to increase shipbuilding programs. There were ongoing needs for increased numbers of workers in the Charleston Navy Yard as the war years progressed and newspapers advertised for “machinists, ship fitters, shipwrights, boat builders, pattern makers, sheet metal workers, and for the clothing factory female operators.” Residents of South Carolina were favored as applicants for these positions (*News and Courier*, June 22, 1917:8).

The naval workforce had tripled in size by the end of the war and employment peaked at 5,600. In the years between the wars, the shipyard almost died. During the Depression, substantial funding was poured into the shipyard once again, and it created jobs for many out-of-work Charlestonians.

Modern Period (1940s-Present)

World War II

World War II was a double-edged sword for Carolinians: it created certain social problems and paved the way for solving others. South Carolina’s naval involvement in World War II is associated primarily with social and industrial developments at the Navy shipyard in North Charleston, which occupied a central position in this interplay of events. In turn, these developments impacted the overall dynamics of labor market of this southern state and highlighted its status quo as one of the poorer communities in the nation. This section examines the growth and role of the Charleston Naval Shipyard during the war years, the ensuing local problems created by increased military recruiting plus the unprecedented explosion of growth in metropolitan Charleston, and landmark events like the increased employment of women and blacks in the shipyard.

Facilities at the shipyard included workshops, two dry docks, shipbuilding ways, storage facilities, a naval hospital, and marine barracks (Navy Yard Development Association 1941:21,39,93; Hamer 1998:48). To facilitate increased numbers of laborers and greater workloads during World War II, the Navy shipyard expanded and improved. The biggest project was Dry Dock 2. It was completed in 1942 and cost \$3,000,000. The Navy built four new shop buildings, two new piers, more roads and crane tracks. A crash program to build destroyer escorts a month after Pearl Harbor resulted in the Navy awarding a contract to the Charleston yard. Existing facilities were occupied by destroyer construction and ship repair, so the new South Yard was built extending the space considerably (McNeil 1985:126). The yard was so productive that in October 1942 it was awarded the Army E pennant; a prize to the nation’s industries that produced more than the required quotas (Hamer 1998:110).

At the onset of the war, the shipyard worked on destroyers, destroyer escorts, and harbor tugs and repaired and refitted their existing vessels. Hospital ships, gunboats, patrol craft, and Coast Guard cutters were also regular customers in the yard. From 1938

to 1945, twenty new destroyers were launched. These vessels handled multiple tasks including hauling supplies, convoy duty, bombarding the enemy from shore stations, and protecting carriers. The first destroyer built by the Charleston Navy Shipyard was *Sterret* (DD-407). *Bryant* (DD-665) was the last one to be commissioned in December 1943 (McNeil 1985:112).

By 1942, the production function of the Navy Shipyard focused on the need for more landing craft and supply vessels as the Allies planned invasions of Europe and the Pacific Islands. Large cavernous vessels like Landing Ship Tanks (LST) and Landing Ship Mediums (LSM) to troops, tanks, and trucks in amphibious exercises were necessary for the war effort and Charleston adjusted to these new needs. Much of the work was subcontracted and the vessels prefabricated elsewhere (McNeil 1985:102-103). Security was also an issue with the threat of prowling U-Boats off the coastal waters, and commercial boats were commissioned into the navy to patrol harbor waters.

The Navy Shipyard, with a workforce of 26,000, was not the only shipbuilding facility in Charleston. Smaller, privately owned companies like the Charleston Shipbuilding and Dry Dock Company built tugs, minesweepers, and smaller naval vessels. Although this company only employed 3,000 workers, it also played an important role in the city's economy (U.S. Maritime Commission, Record Group 178, National Archives II; Hamer 1998:46, 47).

The knowledge and skills to build and equip naval vessels demanded experienced workers including electricians, sheet metal workers, machinists, pipe fitters, and riggers. Newspapers announced job openings in the shipyard and listed the skills needed. The *Charleston News and Courier* advertised on November 15, 1943, for "mechanics and helpers to include: sheet metal chippers, caulkers, riveters, bottle makers, machinists (shop and outside) and marine and structural draftsmen." Workers had to fit vessels with the latest electronic range finders, gunnery radar and machinery, and fulfill basic needs such as lighting and fire control (McNeil 1985:39,47,57).

Skilled workers were hard to find in Charleston. In 1941, a revised apprentice program started at the dockyard and included both class instruction and practical work. By March 1941, employment in the Navy Shipyard grew at a rate of 300 to 400 workers per month (Memo: Personnel Matters, Charleston Navy Yard, March 1941, Division of Shore Establishments and Civilian Personnel (DSECP), File #6, Box 80, National Archives I; Hamer 1998:50,51,55). Additionally, the Navy advised that new graduates from engineering schools such as The Citadel, the local military college, and other schools in the region, including Clemson and Georgia Technical College, be recruited when necessary (Secretary of the Navy to Commandant, Charleston Navy Yard, December 2 1940, File#6, Record Group 80, National Archives I).

Charleston and South Carolina economically benefited from World War II as the Navy Shipyard expanded into a highly productive shipbuilding and repair facility. Although the war disrupted the city with problems of housing shortages, childcare, and food rationing this was also the first time women and African Americans were employed

in the Navy Shipyard, some in skilled positions. Ultimately, the war was a landmark event that led to social change and civil rights events in Charleston. The labor history of the Naval Shipyard reflects these social developments (Hamer 1998:iii, iv).

As the war continued and the need for even more workers grew, more blacks were hired. In March 1944, African-Americans comprised twenty-eight percent of the workers. Most of them were in unskilled positions, and there were fewer job-training opportunities for them. Although whites denied that racism was a factor, others conceded that white workers would not work alongside black workers (*Charleston News and Courier*, November 7, 1943 and letter to the Editor March 26, 194[?]). Surprisingly, Charleston's Navy Shipyard recruited women more readily and speedily than the nation as a whole. More than half worked in office jobs as secretaries and in clerical positions, rather than in the shipyard itself (Hartman 1982:54). Others were employed in non-traditional roles as automobile mechanics, machinists, welders, gas cutters, burners, policewomen and riggers. They came from all over South Carolina as well as from states like Georgia, North Carolina, and Tennessee (McNeil 1985:136).

The war, the shipyard, and the role of an expanded military impacted the population as a whole. The Navy Shipyard was one the biggest wartime military employers. In the 1930s, three quarters of the South Carolina population was rural or lived in small towns. Although war ultimately brought military employment to 184,000 persons in the State, it was an attractive, but unavailable proposition to many other men and women. Workers in the villages of the upstate tried to escape the tedium of mill labor. One half of black applicants and one third of white males were rejected by the military due to illiteracy and bad health. Rejection rates were some of the highest in the nation and reflect the level of poverty that existed in South Carolina at the time. An increased military, in turn, created other problems like a shortage of workers on farms and at factories as workers flooded into the city of Charleston to work in the Navy Shipyard and other defense related firms in the area (Edgar 1998:513). The unexpected growth of the urban population put stresses on the local resources and exacerbated the already existing pressures caused by food rationing, coastal blackouts, and air-raid drills (Edgar 1998:514, 515; Ewing 1943:579-581).

The port of Charleston continued to prosper during post World War II years as all port operations were devoted to military purposes. During both world wars, the North Charleston terminal facilities were used as a port of embarkation for the military. At the end of World War II, the majority of the port facilities, excluding the Navy Shipyard, were returned to the City of Charleston, which in 1947 transferred title of those properties to the State Port Authority (Pender and Wilder 1974:6).

During the twentieth century, few US Navy vessels were lost in South Carolina waters. Those losses were attributed to either running aground or being deliberately sunk in the vicinity of Charleston (although not necessarily in State waters) as practice targets. Vessels lost included, USS *Balao*, a World War II submarine; USS *Soley*, and USS *Hobby*, both World War II era Destroyers (See Appendix B). Evidently, the World War II Patrol vessel, *YP-481* (ex-*Princess Mary*) was the only World War II US Navy vessel

that met its demise in State waters. After running aground in the Charleston Harbor mouth in April 1943, *YP-481* was decommissioned, and presumably scrapped.

In 1993, the closure of the base was mandated pursuant to the recommendations of the 1993 Base Closure and Realignment Commission (BRAC) for the purpose of reducing the military infrastructure and saving operation and maintenance costs over the long term (US Department of Navy 1995:3-4). The former twentieth-century Charleston Naval Base property, which closed in 1996, is situated approximately five miles north of the city of Charleston. It consists of 2,911 acres with 1,574 acres on the west side of the Cooper River and 1,397-acres on the east side on Clouter Island. The shipyard was in the central portion of the base. It was comprised of the Naval Base, Naval Weapons Station/Polaris Missile Facility Atlantic (POMFLANT), the Naval In-Service Engineering Directorate, the Naval Hospital, the Southern Division, Naval Facilities Engineering Command, and the Mobile Mine Assembly Group. Today the former navy base is once again becoming economically viable through privatization of the property for private commercial ventures, along with Federal, State, and local government activities.

Conclusion

The Revolutionary War in South Carolina was a landmark event when shipbuilding activity escalated in South Carolina and local patriots started their own navy. An ill-equipped fleet of local vessels and unrealistic expectations of the Navy Department created a strained relationship between local commanding officers and the Charleston community during the War of 1812. During the Civil War both the Union and Confederate Navies experienced multiple maritime casualties. The majority of shipwrecks around Charleston harbor were caused by engagements and skirmishes between the two navies or as deliberate and strategic scuttling as obstructions to shipping-like the Confederate granite hulks and ironclads, plus the two Union Stone fleets. The central political and social events associated with the Navy's history in South Carolina during the years after Civil War, was the relocation of the Navy Yard from Port Royal to the then economically depressed city of Charleston in 1901. During World War I the yard was a hive of activity and played an integral role in South Carolina's economy. World War II created certain social problems and paved the way for solving others such as providing employment and training for the Carolina community. The Navy Shipyard again occupied a central position in this interplay of wartime events during both World Wars. The 200 plus years of the US naval presence in South Carolina has resulted in a number of shipwrecks caused by war, nature, and accident. The following chapter details in more depth the individual history of these shipwrecks and their archaeological integrity.

CHAPTER 4

UNITED STATES NAVY SHIPWRECKS IN SOUTH CAROLINA

The following chapter provides a historical sketch for each US naval shipwreck in South Carolina waters. The shipwrecks are divided by historical period, and in addition to the ship's history, any salvage activities following the ship's loss, for instance, by the US Army Corps of Engineers, and any archaeological work is discussed. For those wreck sites that have been entered into the State Archaeological Site Files, an alphanumeric designation is also provided. For example, USS *Patapsco*'s file number is 38CH270, with 38 denoting the state of South Carolina, CH an abbreviation of Charleston County, and 270 as that number site recorded in the county.

Colonial (1775-1785)

Queen of France

Queen of France was built in the port of Nantes, France as the privateer *La Brune* prior to the American Revolution (Figure 4.1). Following her career as a French privateering vessel, she was purchased by Marie Antoinette, then Queen of France, and in turn sold to American Commissioners Benjamin Franklin and Silas Deane in 1777. In honor of Marie Antoinette, the name of the vessel was changed from *La Brune* to *Queen of France* (Mooney 1991:412).

In May of 1778, the newly acquired 28 gun French frigate sailed into Boston harbor with a valuable cargo of clothing and military supplies. Upon her arrival, the French officers and men were paid off, but the vessel remained moored at the Boston docks for nearly a year before she received her American officers and crew (Mooney 1991:412). On March 13, 1779, *Queen of France* under the command of Captain Joseph Olney, departed Boston harbor in the company of American naval vessels *Ranger* and

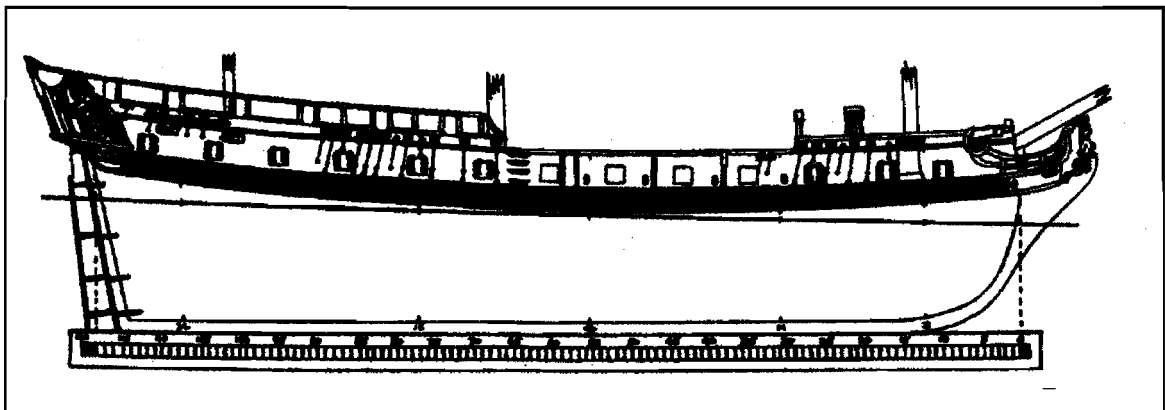


Figure 4.1: Drawing of Queen of France hull (from Coker, Charleston's Maritime Heritage, p. 105).

Warren, with a mission to “Chastise the Insolence of those small cruisers [English privateers] upon the coast of Virginia and the Carolinas.” For nearly a month, strong gales battered the three ships as they moved southward toward Virginia, where on the morning of April 6, some 16 miles east of Cape Henry, Virginia, the first enemy sail was sighted (Mooney 1991:412).

After a brief chase, the British 10 gun privateer schooner *Hibernia* was captured without a fight. The following morning the three Americans spied nine enemy sails and gave chase into the early afternoon. Seven of the nine enemy vessels, heavily laden with cavalry equipment for the British Army, were captured that day with the 20 gun *Jason*, and 10 gun *Meriah* topping the list. On April 20, 1779, the three American warships, *Ranger*, *Warren*, and *Queen of France* once again sailed into Boston harbor with their newly captured prizes.

While *Queen of France* was in Boston, Captain John Peck Rathburne relieved Captain Olney in command of the frigate. She put to sea again on June 18, 1779 with the *Providence* and *Ranger*. In mid July while cruising off of Newfoundland, the three Americans accidentally fell in with the British Jamaica Fleet of some 150 vessels ranging from merchantmen to warships. In the dense fog, the American warships pretended to be British frigates attached to the convoys escort, and quietly took possession of eleven prizes before slipping away under cover of darkness. Three were later re-captured by the British before reaching Boston harbor.

By December of 1779, Charleston, South Carolina, was busily preparing for an expected siege by British Naval forces. During the previous October and November, the British-occupied port city of Savannah, Georgia, was attacked unsuccessfully by a combined French and American naval force. With the French Fleet having departed for the West Indies, Charleston was wide open for invasion. With a British force then in route to South Carolina from New York, Colonial naval officers decided that several Continental naval vessels should be sent south to aid in the city’s defense. Under the command of Commodore Abraham Whipple, *Providence*, *Ranger*, *Boston*, and *Queen of France* departed Boston on November 23, 1779 and arrived in Charleston exactly one month later (Coker 1987:103).

Upon arriving in South Carolina it was found that all the vessels attached to Whipple’s command had sustained heavy damage, so much so to *Queen of France* that she was declared unfit for future sea duty. Through January and March of 1780, *Queen of France*, along with several other American vessels, was anchored in the Ashley River on the southern approach to the city. With the British then in possession of the shoreline, heavy guns were soon brought up from the rear and placed along the British front, near the site of the present Ashley River bridge. The new English guns forced *Queen of France* and other ships stationed at the mouth of the Ashley to weigh anchor and pass around the city into the Cooper River where they remained until Commodore Whipple decided their fate.

With a plan of opposing the English at the entrance to the harbor deemed unfeasible, it was decided that the majority of the South Carolina State ships, which had been put under Whipple's command in February, would be of more value as water obstructions to the British, than as fighting warships on the harbors surface. Therefore in late March 1780 *Queen of France* and eight South Carolina State Navy vessels were stripped of their armaments and stores, fitted with spiked obstructions on their decks, bound together, and intentionally sunk as an obstruction at the mouth of the Cooper River between Shutes Folly and the foot of Gillon Street.

Wreck Site History

There is no known location of this site, consequently there has not been any archaeological investigation or known sport diver activity on this site.

ANTEBELLUM (1785-1865)

USS *Ferret*

During the opening months of the War of 1812, American naval agents feverishly purchased numerous vessels for both harbor and coastal defense. Many of these ships were hastily manned and armed with few receiving more than a brief description in the official naval records of the period (Chapelle 1949:246). From a short description of *Ferret* found in the "Z" Files at the Naval Historical Center (Washington Navy Yard), comes the fact that the vessel was purchased in Charleston, South Carolina at a cost of \$3,500 dollars.

From a Charleston naval communication sent by Captain J.H. Dent to the Secretary of the Navy on November 12, 1812, come the following lines describing the recently purchased schooner *Ferret*, "The other a small schooner sails fast will carry, eight 6 pound and one long 12 pound on a circle, fitted she will proceed to her station, Beaufort, in ten days, called *Ferret*" (Dudley 1985:1:586). Nine days latter Captain Dent sent another letter to Washington stating the following:

The schooner *Ferret* mounts nine guns, and will sail for Beaufort in five days, having no commissioned officers and but one Midshipman. I have made Mr. John Smith an Acting Master in the Service, and given him command of *Ferret*. He is an active and intelligent Gentleman and will be of infinite benefit to the service, as he is well acquainted with this coast and its inlets (Dudley 1985:1:586).

With a crew of 53, Acting Master Smith was assigned the task of cruising sporadically in the sounds and inlets along the South Carolina coast for the protection of inland navigation (Z files, Navy 1853:10), and according to naval communication of the

period, was doing just that well into the spring of 1813 (Dudley 1985:2:58). As further evidence that *Ferret* was used exclusively for coastal defense comes the following lines taken from an order dated April 9, 1813, "The schooners Carolina and Ferret, and the Gun Boat at Beaufort, are to be employed for the protection of the coast and harbors of South Carolina, and are not to go off soundings, or leave that coast without orders from this department." (Dudley 1985:2:96; Tucker 1993:141).

By June of 1813, *Ferret* was under the command of Lieutenant Lawrence Kearney, a seasoned naval officer who had been recommended for the command by the Secretary of the Navy (Dudley 1985:2:144). With Lt. Kearney at the helm, *Ferret* continued to patrol the shallow inlets and narrow waterways along the South Carolina coast through the summer and fall of 1813. On the second of February 1814, while making passage from Port Royal to Charleston for supplies she grounded in Stono Inlet during a gale. Although breakers completely wrecked their ship, her officers and men succeeded in getting ashore safely (Z Files). From the February 5, 1814 edition of the *Charleston Courier* comes the following report filed by Lieutenant Kearney:

Loss of the U.S. Schooner Ferret. (Official) Folly Island, 3rd Feb. 1814.
Sir: I am sorry to acquaint you of the entire loss of the U.S. schooner Ferret. This unfortunate circumstance occurred last evening on the North Breakers of Stono Inlet. I am happy to say none of her officers or men were lost or injured. They have lost everything belonging to them, and would suffer much, was it not for the kindness of Mr. Darley and Mr. Henland, who have rendered them many services. I am making preparations to proceed to the wreck with a vessel, to save what articles of rigging and sails I can get at. I am in hopes to get some of her guns, which I threw into the hold. Finding the vessel half full of water, I ---- headed her drifting out in deep water, should she be lightened, would render our situation more hazardous [last paragraph is unreadable]. Lawrence Kearney, Lieut. Commanding U.S. schooner Ferret.

From the "Z" files at the Washington Navy Yard, the following sentence is found. "A court of inquiry into the loss of the vessel imputed no blame to Lt. Kearney." Unfortunately, a search of the fragmented Naval Area Files (Record Group 45, National Archives) for the southern coast during the War of 1812 yielded nothing in relation to the Court of Inquiry mentioned in the "Z" files (two paragraph) summary of *Ferret*. No records were found regarding the proposed salvage of *Ferret*'s rigging and guns.

Wreck Site History

There is no known location of this site, consequently there has not been any archaeological investigation or known sport diver activity on this site.

March 2, 1807, Congress prohibited the importation of African slaves into the United States after January 1, 1808. Despite the new law, traffic in slaves continued and it was in the waters of the patrolling South Carolina gunboats that it was most ignored (Tucker 1993:97).

Gunboat 157 searched for illegal slavers in the shallow waterways along the coast between St. Mary's, Georgia, and Charleston, South Carolina. In early May of 1811, *Gunboat 157*, under the command of Lieutenant John Kerr, departed from her base at St. Mary's, Georgia, to sail to Charleston for supplies. Upon leaving the port of Charleston on the morning of May 17, heavily laden with food stores for her sister gunboats on station in far away St. Mary's, *Gunboat 157* was driven onto the South Breakers of Lauford's Channel and lost. On May 18, 1811 the following news story describing the event appeared in the *Charleston Courier*:

The U.S. Gun-Boat No. 157, Lt. John Kerr, commander, bound to St. Mary's, in attempting to beat out at the south channel yesterday morning missed stays and drifted upon the south breakers; the wind being strong at east, and a heavy sea upon the bar, rendered it impossible for any boat to approach her, and the small boat which they had on board having been dashed to pieces by the sea. Immediately after she struck, the crew had no alternative but to cling to the rigging in the hope that something might come to their relief. It was about eight o'clock in the morning when the Gun-Boat struck on the breakers, and at ten her mast having worked out of the step, she instantly rolled over and the whole crew (22 in number) were precipitated into the waves. Those among them who could swim, got upon the bottom of the vessel, where they remained for some hours, and about 2 or 3 o'clock, when the wind lulled, those who had sufficient strength remaining, swam about 70 to 80 yards to some fishing boats which were on the lookout to save them, but who could not approach the place where the vessel struck without a certainty of sharing in their fate --- but of the whole number of which the crew was composed, nine only were rescued from a watery grave.

Among those who were saved were Messrs. Atwood of Maryland, Heriot of Georgetown, and Gyles of this city, all young men who had just entered the navy as midshipmen, and who were entirely unacquainted with the sea. Mr. Forneau, the pilot, and five of the crew, were also saved; several of these persons were nearly exhausted when taken up by the Fisherman. The following are the names of the persons drowned: Lieut. John Kerr, M. Tupper, boatswain, James, Dogarthy, Oliver, Corry, John Card, Campbell, Barthamew, Fuller, Jos, Daily, John Adams, Troller, Joseph Lucas, Duboise, and Wm. Mucker a boy. At the same time the above fatal accident took place, two fishing boats having on board nine Negroes were overturned near the bay by the violence of the sea, and one man only was saved out of the number.

On the same day that the above news article appeared in the *Charleston Courier*, Captain Hugh Campbell, of the Charleston squadron, reported the sinking of *Gunboat 157* to Washington. No records have come to light regarding salvage of the vessels cargo or guns.

Wreck Site History

There is no known location of this site, consequently there has not been any archaeological investigation or known sport diver activity on this site.

USS *Dai Ching* (38BU123)

Construction on *Dai Ching* commenced in 1862 at the New York harbor shipyard of the Jewett (McLeod) Company for service in F. T. Ward's Chinese Navy. The vessel was designated a screw steamer gunboat with dimensions of 170 feet (length) by 29 feet, four inches (beam), and weighing 520 tons. Two steam engines, geared to a single propeller that could propel the gunboat at a top speed of six knots (*The Official Records of the Union and Confederate Navies in the War of the Rebellion* [ORN], vol. 2, ser. 1:70; Silverstone 1989). On April 21, 1863, *Dai Ching* was purchased for the United States Navy by Rear-Admiral H. Paulding at a cost of \$117,575, outfitted at the New York Navy Yard, and commissioned *Dai Ching* on June 11, 1863. The original Chinese name was retained. Under the command of Lieutenant Commander J.C. Chaplin the vessel was quickly fitted with four 24-pounders, two twenty-pounders and a hundred pound cannon (Mooney 1991:232).

Within days after her commissioning Lt. Commander Chaplin and his crew of 83, were ordered to seek out and destroy the Confederate Privateer *Tacony*, which was then attacking United States shipping along the northeastern coast (Mooney 1991:232; Silverstone 1989). By early July, Lt. Commander Chaplin had put in at the retaken port of Norfolk, Virginia, as one of *Dai Ching's* steam engines had broken down and was in need of repair. While *Dai Ching* was at anchor at Norfolk, Chaplin received orders to proceed south with *Dai Ching* and join Admiral John A. Dahlgren's South Atlantic Blockading Squadron on duty outside Charleston Harbor, South Carolina (Mooney 1991:232).

On the 24th of July 1863, *Dai Ching* arrived off Charleston harbor and immediately received orders that she and her crew were to take part in a joint bombardment of Battery Wagner located on the northern tip of Morris Island. On the 25th of July and again on August 13th and 14th, *Dai Ching* participated in assaults on both Battery Wagner and Fort Sumter which were soon followed by a series of attacks on other fortifications around the harbor (Mooney 1991:232). On the 14th of November, 1863, while on patrol in the Santee River, South Carolina, *Dai Ching* captured the Confederate schooner *George Chisholm* with a cargo of salt. In January of 1864, *Dai Ching* was ordered south and joined an expedition up Florida's St. John's River and remained on duty in that area from the 6th of February through the 7th of March (Mooney 1991: 232).

With *Dai Ching* ordered back to the Charleston blockade Lieutenant Commander Chaplin and his crew returned to patrolling along the South Carolina coast and by January of 1865 had been ordered to patrol the Combahee River. On the 26th of January *Dai Ching* captured the rebel schooner *Coquette* with a load of cotton. Following the capture, *Dai Ching* continued up the Combahee and in the vicinity of Tar Bluff, came under attack from a Confederate battery consisting of three cannons. From the following report filed by Lieutenant Commander Chaplin, some 48 hours after the attack on his ship, comes a vividly detailed description of the events that led up to the loss of his gunboat:

U.S. Ship New Hampshire, Port Royal Harbor, S.C., January 28, 1865.
Sir: In obedience to your order of the 24th instant, I proceeded to St. Helena, where I procured a pilot from the USS Stettin and proceeded up the Combahee River. At 5 o'clock p.m. we anchored, as the pilot was afraid to go up after dark. At 6 a.m. the morning of the 26th, I came on deck to get the ship underway and proceeded on up the river, but seeing a boat of white men coming down, delayed getting underway until I could ascertain her character. The boat went along side the tug Clover, which was in company with us, and soon after Acting Ensign Leach, commanding the tug, came on board and reported the boat to be from the schooner Coquette, loaded with 74 bails of cotton, and lying about two miles below the batteries at Tar Bluff, about five miles above where we lay.

We immediately got under way and proceeded up the river, the tug following. At 7:30 a.m. we got to quarters, the earthworks on Tar Bluff being in sight, though no guns or men could be seen with a glass from the masthead. We were now about two miles above the works, and nearly up to the schooner. Acting Master George Howorth was sent with an armed crew in the first cutter to take possession of the prize, and the tug was ordered to take her in tow, and follow us on up the river. When within a mile of the earthworks, and while training the 20-pounder rifle upon it, the rebels opened upon us with three guns, one shot falling short, the other two going over our deck. The engines were immediately reversed, the ship turned and headed down the river, with the intention of engaging them in the reach below, where we would be less exposed to rebel fire.

While turning a very sharp bend, the wind blowing fresh down the river, with a strong ebb tide, I perceived that the ship would run into the bank on our starboard bow, and discovered that the pilot had deserted the bridge. I immediately rang three bells, but before the ship could be backed, she forged ahead into the bank, where she remained fast. Our howitzers and after 20-pounder were now at work, being the only guns we could bring to bear. Signals were made for the tug to come to our assistance, and the main rail was being cut away, so that the 100-pounder could be trained,

which soon commenced playing on the enemy doing good execution. The tug came up, and while attempting to take our line, got in between the ship and the bank, and with great difficulty we succeeded in springing her out. She then took our line, which parted, and instead of returning and taking a hawser, which was ready, she stood on down the river.

Mr. Howorth was ordered to proceed down the river, and communicate with the U.S. steamers Pawnee and Stettin. Signals were again made calling the tug, and though only a half mile below us, she took no notice of them. Acting Ensign Duncan was now sent with four men in a second cutter, with orders to bring her back, but just before the boat reached the tug she started down the river.

The tide having fallen considerably, the ship settled down by the stern, where she had six fathoms of water. Our battery was worked vigorously all the while. The Dai Ching had now been struck more than 30 times, her decks were shot through in six or seven places, one shot going through the reinforced deck, lodging in the berth deck. The launch was shot away and the masts and smokestack were hit in several places. One shot penetrated the hull below the water line. Our 100-pounder was the only gun we could now use, as the ammunition of the 20-pounders was expended. The crew, except enough to work the 100-pounder and pass ammunition, were now ordered to jump on the marsh and keep close under the bow, clear of the enemy's fire, which was now very accurate, the projectiles being mostly shell, apparently from a Brooke rifle.

At 2:30 p.m. our 100-pounder was struck by a solid shot, cutting away the forward hurter, smashing eccentric, thus disabling our only hope, and wounding four men. The ship was now a perfect wreck, and we could make no reply to the enemy, who were playing on us with terrible effect. A consultation was now held, and it was deemed advisable to fire and leave the ship, as there was no hope of saving her. The small arms were passed to the men in the marsh. The chronometer and paymaster's books were placed in the gig, the only remaining boat. Acting Ensign Walton was sent in charge of her, taking two of the wounded men who were unable to walk. At 3 p.m. the ship was fired aft, and all the officers now took to the marsh, and all hands proceeded in the direction of the mouth of the river. At 3:30 p.m. the ship was in flames, and main and mizzen mast fell over the side with colors flying.

After walking four miles in the marsh, and wading several creeks, we saw the tug and made signals to her, when she came to our assistance and took us off. Acting Ensign had in the mean time arrived on board the tug, and reported having been fired into by a picket of 12 men, and having seen the second cutter ashore with several bullet holes in her, crew and officers gone, being probably captured while conveying orders to the tug. We now

proceeded down the river, and at 11 p.m. arrived on board the Pawnee, where we were all kindly cared for. Acting Masters Mate Bryant, of the Clover, was sent on board of the prize when she was captured, and had in the meantime taken her to the mouth of the Combahee and anchored.

It is my opinion that had they come to our assistance when ordered, and taken our hawser, the ship would have been saved, as sluing her stern a very little would have brought the tide on our inside quarter, which would have swept the ship off. I would particularly call your attention to the coolness and gallantry of Acting Master William McKendry and Acting Ensign Walter Walton, the former firing the hundred pounder for seven hours and the later the 20-pounder till the ammunition was expended, when he went below and filled shells for the hundred pounder, and afterwards took charge of the gig with the wounded men and brought them off safely, though fired upon by rebel pickets all along the bank of the river. Every officer and man did his duty. I herewith enclose the surgeon's report of the wounded.

I have neglected to mention, had it not been for Acting Ensign Walton arriving at the Clover the time he did, we would have been compelled to remain in the marsh all night, as Acting Ensign Leach had given orders to get underway and proceed down the river, disregarding the orders of Acting Master Howorth to return to Dai Ching, and it was only by positive command that Mr. Walton could make him proceed up the river for a short distance in search of the officers and men in the marsh. I would respectfully request that the loss of the USS Dai Ching be further examined into by a court of enquiry. Very Respectfully, your obedient servant. J.C. Chaplin, Lieutenant -Commander (ORN ser. 1, vol. 16:192).

After Admiral Dahlgren had read Lieutenant Commander Chaplin's report he issued the following order:

Flagship Harvest Moon, Port Royal, S.C., January 30m 1865. Sirs: You are hereby appointed a naval court of enquiry to ascertain the facts attending the loss of the USS Dai Ching, and report them with your opinion thereon. Your attention will be particularly directed to the conduct of the commanding officer of the U.S. tug Clover, and how far that influenced the final loss of Dai Ching. Acting Assistant Paymaster J.T Lee, of the Cimarron, will act as Judge-advocate. Respectfully, your obedient servant, J.A. Dahlgren (ORN ser. 1, vol. 16:195).

Even though the Court of Enquiry that followed found Chaplin innocent of any wrong doing in the loss of Dai Ching, Admiral Dahlgren apparently saw some flaws in

Chaplin's judgment, for in his personal diary the following lines appear in regard to the burning of *Dai Ching*:

January 27, 1865. At 6 p.m. Captain Chaplin was announced. In half a dozen words he told me that his ship, the Dai Ching, had been cut up by a rebel battery on the Combahee and destroyed. It took place yesterday. He came in range, and was opened on about 8 o'clock. Soon after she was grounded and that settled her fate. The battery was heavy, and he could not retire. After a defense of seven hours, he set fire to her and left her about 3 p.m., bringing off all his crew, except an officer and three or four men, who were captured in a boat by the pickets on the bank. Two mistakes. He did not drive in the pickets, and grounded at high water. Had he avoided these mistakes the Dai Ching would have been safe, having had seven hours for exertion (ORN ser. 1, vol. 16:366).

Within weeks following the burning of *Dai Ching*, Confederate salvage teams were at work on her trying to salvage anything that could be of use to the Southern war effort. From the following report it would appear that their efforts were not very successful.

U.S.S. Ottawa, Combahee River, South Carolina, February 9, 1865. Sir: At 2 p.m. got underway, firing occasionally into the banks; 3:30 p.m. anchored within 200 yards of the Dai Ching; sent boats and found that she had been sunk to the waters edge, the rebels having been at work on her, but with little success, judging from what they worked with... Very Respectfully, your obedient servant, James Stillwell (ORN ser. 1, vol. 16:223).

On March 16, 1866, nearly a year after Lee's surrender, the United States government entered into a contract with a Cecil C. Neal and Company to raise *Dai Ching*. Unfortunately, nothing is known regarding the proposed salvage of the vessel or the outcome of the contract.

Wreck Site History

Until the Spring of 2003, when the MRD conducted a remote sensing survey of the site, the location of the gunboat recorded in the state site files was based solely on historical information and conjecture. Remains of the gunboat still have not been positively identified. However, the presence of large magnetic anomalies and submerged, buried wood and iron contacts upstream of Gunboat Island on the Combahee River suggest the gunboat's final resting place.

During 1969 and 1974, two salvage groups indicated an interest in finding and recovering materials from the wreck. On January 9, 1969, the Palmetto Historical Research Society completed a SC Department of Archives and History application for a permit to salvage the remains of *Dai Ching* (SC Department of Archives and History Survey License Application, January 9, 1969, on file at MRD/SCIAA). The Palmetto Historical Research Society, a group composed mostly of students from the Citadel, Virginia Military Institute, and Clemson (Jesse Rice to Charles Lee, October 23, 1968, letter on file at MRD/SCIAA). The group wanted to recover the cannons and other ship stores and supplies and then loan the artifacts to an in-state historical institution before outside interests salvaged the vessel and sold the artifacts to out-of-state individuals or organizations (Jesse Rice to Charles Lee, October 23, 1968, letter on file at MRD/SCIAA). The group believed that the wreck lay buried under eight feet of mud (SC Department of Archives and History Survey License Application, January 9, 1969, on file at MRD/SCIAA). Apparently, the process went no further than the application process as no additional paperwork or correspondence exists in the SCIAA files concerning the wreck.

In 1974, Charleston salvager E. Lee Spence of Sea Research Society expressed an interest in salvaging *Dai Ching* in a series of letters to SCIAA, the GSA, and Navy (Letters on file at MRD/SCIAA). However, like the previously proposed project, Spence's effort went no further than his initial inquiries. In 1974 *Dai Ching* was transferred to the General Services Administration for the purpose of disposal through a salvage contract (E. A. Grimstead to R. L. Stephenson, September 8, 1975, letter on file at MRD/SCIAA). No such work was ever accomplished, and today, *Dai Ching* still lies undisturbed beneath the sandy bottom of the Combahee River.

USS *Harvest Moon* (38GE440)

The USS *Harvest Moon* was a 193-foot long, 546-ton, side wheel steamer built in Portland, Maine, in 1863. Purchased at Boston on November 16, 1863, by Commodore Montgomery from Charles Spear for \$99,300, *Harvest Moon* was soon fitted out for blockade duty at the Boston Navy Yard and commissioned on February 12, 1864. Under the command of Acting Lieutenant J. D. Warren, the vessel was dispatched to duty with the South Atlantic Blockading Squadron on February 18, 1864, and arrived at her base of operations off Charleston Harbor on the 25th of February (ORN, vol. 2, ser. 1:99; Mooney 1991:266).

Within 24 hours after her arrival off the South Carolina coast, Admiral John A. Dahlgren, commander of the squadron, made the large side-wheel steamer his flagship. After several months of blockading duty, *Harvest Moon* reported to the Washington Navy Yard for additional modifications and repairs. The vessel was reported to have carried four 24-pounder howitzers, one 20-pound Parrott rifle and one 12-pounder rifle. Following the repairs, *Harvest Moon* returned to her regular blockading duties on June 7, 1864, off the South Carolina and Georgia coast (Mooney 1991:266). For the next nine months the steamer served off Tybee Island, North Edisto River as well as off Charleston

Harbor. Her duties during the closing months of the war included both acting as a picket steamer, and dispatch vessel, as well as Admiral Dahlgren's flagship (Mooney 1991:266).

While proceeding in company with the tug *Clover* on the morning of February 29, 1865, *Harvest Moon* accidentally struck a submerged Confederate torpedo, or mine, in Winyah Bay. From the log book of *Harvest Moon* comes the following lines describing the loss of the vessel:

At 7:45 a.m., when about 3 miles from Battery White, we ran on a torpedo. It blew a hole through the starboard quarter, tearing away the main deck over it, which caused this ship to sink in five minutes in 2 ½ fathoms of water. Tug Clover immediately came to our assistance. The admiral and staff went on board Clover, the ship's officers remaining on board to save everything possible. Sent gig in charge of Acting Ensign D.B. Arey to the Pawnee for assistance. Sent three boats up the river to drag for torpedoes. John Hazard, wardroom steward, missing, supposed drowned, he being in the hold at the time of the explosion. From 8 a.m. to midnight: Ship sank in Swash Channel, Winyah Bay, 3 miles S. E. by E. from Battery White, in 2 ½ fathoms water (ORN, ser. 1, vol. 16:285).

It was reported that the vessel sank in five minutes leaving Admiral Dahlgren with only the uniform he was then wearing (Jones 1962:369). From Admiral Dahlgren's official report, the exact location of the vessel is revealed:

Flag-steamer Nipsic, Georgetown Roads, March 1, 1865. Sir: My latest dispatches Nos. 82 and 83 had been closed, and not hearing anything of General Sherman at this place, I was on my way to Charleston, but was interrupted for the time by the loss of my flagship, which was sunk by the explosion of a torpedo. This took place at 7:45 a.m. to-day, and the best information I now have is from my own personal observation. What orders may have been noticed will be elicited by the court of enquiry which I shall order.

Harvest Moon had been lying near Georgetown until yesterday afternoon, when I dropped down to Battery White, 2 or 3 miles below, intending to look at the work and leave by the next day. Accordingly, this morning early Harvest Moon weighed anchor and steamed down the bay. She had not proceeded far when the explosion took place. It was nearly 8 o'clock, and I was waiting breakfast in the cabin, when instantly a loud noise and shock occurred, and the bulkhead separating the cabin from the wardroom was shattered and driven in toward me. A variety of articles lying about me were dispersed in different directions.

My first impression was that the boiler had burst, as a report had been made by my engineer the evening before that it needed repair badly. The smell of gun powder quickly followed and gave the idea that the magazine had exploded. There was naturally some little confusion, for it was evident that the vessel was sinking, and she was not long in reaching the bottom. As the whole incident was the work of a moment, very little more can be said than just related. But one life was lost, owing to the singular fortunate fact that the action of the torpedo occurred in the open space between the gangways and between the ladder to the upper deck and the wardroom, which is an open passageway, occupied by no one, and where few linger safe for a moment.

Had it occurred farther aft or forward the consequences would have been fatal to many. A large breach is said to have been made in the deck just between the main hatch and the wardroom bulkhead. It had been reported to me that the channel had been swept, but so much has been said in ridicule of torpedoes that very little precautions are deemed necessary, and if resorted to are probably taken with less care than if due weight was attached to the existence of these mischievous things. As I close this communication Colonel Brown has arrived here with a portion of the New York One hundred and fifty-seventh, and I have directed all the posts ashore at Georgetown held by the Navy to be turned over to the Army. I have the honor to be, very respectfully, your obedient servant, J. A. Dahlgren, Commanding South Atlantic Blockading Squadron (Record Group 45, M89, # 152, National Archives).

Extensive salvaging took place after the sinking by the Union navy. After removing the machinery, supplies, and other materials, *Harvest Moon* was abandoned on April 21, 1865.

Wreck Site History

Over the years, *Harvest Moon* has been the subject of several private surveys and projects intended to raise and recover the vessel for display. In the late 1950s or beginning of the 1960s, a survey of the wreck was undertaken by the New England Maritime Museum. They claimed the vessel was in a remarkable state of preservation (Mark Newell, Harvest Moon Project Report on file at MRD/SCIAA). In 1963, Southern Explorations Association, Inc. announced their intention to raise and to restore the ship. The group found 20 to 30 ft. of mud covering the vessel, consequently making little headway in their endeavor (Mooney 1991; Mark Newell, Harvest Moon Project Report on file at MRD/SCIAA).

A decade later, SCIAA issued salvage license No. 20 to The Confederate States Historical Foundation, Inc. to investigate the remains of *Harvest Moon*. The group conducted an initial survey of the site on April 21, 1974. They located five feet of the

smokestack, with the deck cowl around the tube, protruding above the surface at low tide. Investigators probed along a 30-foot centerline with five-foot rods but did not touch down onto the cabins. They surmised that the upper cabins were missing due to previous Federal salvage work. Mud overburden covering the hull was approximately four to five feet thick. The smokestack listed 15 degrees, which may also correspond to the list of the ship. Probing also revealed a large cylindrical object due south of the stack. The group proposed a two-stage excavation strategy. The first phase would include dredging down to remnants of the superstructure and establishing hull characteristics. Work during the second phase would include dredging a channel to the wreck in order to clear a section of the hull from the extant top to the bottom of the keel (Mark Newell, *Harvest Moon* project report on file at MRD/SCIAA). According to an undated and unnamed newspaper article, the group began excavations over a weekend to remove mud from the hull to uncover wood and iron objects on the deck. The artifacts were reportedly in good condition. Up to 15 divers and 30 technicians and engineers were noted as participating in the project. The group planned to raise the vessel and house it in Georgetown as a museum. These plans to raise the shipwreck were never realized (Wallace C. Hitchcock, undated and unnamed newspaper article on file at MRD/SCIAA). No documents or the disposition of any recovered artifacts concerning this weekend project are on file at SCIAA. The remains of *Harvest Moon* remain firmly embedded in the sediments of Winyah Bay.

USS *Housatonic*

The Ossipee-class sloop of war *Housatonic* took her name from the Housatonic River, which flows through the Commonwealth of Massachusetts. The other Ossipee-class vessels built during the war were *Adirondack*, *Juniata* and *Ossipee*. Built under government contract at the Boston Navy Yard during the fall of 1861, the steam-powered sloop was sponsored by Miss Jane Croffin Colby and Miss Susan Peters Hudson (Mrs. William H. Chase), daughter of Commodore William L. Hudson, the commandant of the yard (Benham 1926:81). The vessel carried two main boilers and one auxiliary, all three of the Martin tubular patent-type, with two horizontal, 42 inch cylinder, direct action engines which generated approximately 1150 horsepower (Figure 4.3). The sloop of war *Housatonic* was finished, minus her engines, in mid November and launched in front of a cheering crowd on November 20, 1861. The following news article copied from the pages of the November 21, 1861, edition of the *Boston Daily Advertiser* gives an excellent description of her christening ceremony, dimensions and future armaments:

The second-class steam (auxiliary propeller) Housatonic was launched at Charlestown at 1:20 P.M. 20th inst. Housatonic has been constructed under the direction of William L. Hanscom, Naval Constructor, aided by the master builder of the yard, Mr. William B. Sprague. The keel was laid June 15. The frame is of live oak, filled in solid and caulked as far as the first futtock head, and cross strapped with iron 4 1/2 inches in width and five-eighths of an inch in thickness, placed about three feet apart. This bracing extends fore and aft the ship, and is



Figure 4.3: Drawing of USS Housatonic (from Naval Historical Center, Washington Navy Yard).

bolted to each timber and crossing, and 'chucked'. The hull is copper-fastened below the load line.

The extreme length of the vessel is 215 feet; length of the hull at load line 205 feet; breadth of beam 38 feet; depth of hold 16 feet 10 inches. Her measurement is 1540 tons. The accommodations for officers and men is spacious and well ventilated, and the mess rooms, store rooms and lockers fitted up with a close regard to the requirements of the ship, her officers and crew. The vessel will have a galley of sufficient capacity to cook for 300 men. She is provided with four large composition pumps and force pumps calculated to be used in case of fire and for supplying water to wash decks. The engines and machinery for Housatonic are in process of construction at the Globe Works, South Boston. Her engines are computed at 1150 horsepower as the maximum, and she is expected to steam at the rate of 14 knots per hour.

The armament of Housatonic will consist of two 11-inch pivot guns of immense weight; four nine inch broadside guns, weighing fifty-seven cwt., and two rifled guns mounted fore and aft. The gun carriages are of a peculiar style, and the guns of the latest pattern. She will carry five boats, each of which will mount a howitzer, in case of emergency.

The crowd of spectators at the launch was very large. The stars and stripes were hoisted at the main, the pennant at the mizzen and the Union Jack at the fore. A bevy of young ladies stood upon the bow deck and as Housatonic dipped upon old Neptune's bosom, Miss Jennie Colby and Miss. Hudson (daughter of the commander of the yard) christened the ship by breaking two bottles filled with the pure juice of the grape upon the

bow, and in a clear and loud voice pronounced her name - "Housatonic" at the same time the Navy Yard Band, which was on board, struck up "Hail Columbia", "Yankee Doodle", and other National airs. The party on board cheered and altogether it was a lively scene.

It would seem that delays were encountered during the construction and installation of *Housatonic*'s engines for some nine months elapsed between the time of her launching and commissioning. On August 29, 1862, USS *Housatonic* received a formal commission from the United States Navy and was placed under the command of Commander William Rogers Taylor. For several weeks prior to the commissioning of the new sloop of war, plans for her deployment south were already in motion for on July 15, 1862, some 45 days before her official commissioning, the following letter was sent to the Commandant of the Boston Navy Yard.

Navy Department, July 15, 1862. Sir: I transmit herewith an order for Housatonic and Canandaigua to proceed to Port Royal, S.C., the moment they are ready for sea. Your last weekly report states that they will be ready by the 25th of this month. The Department desires you press forward the work on them. It is important that they should sail before the 25th, if possible, as Flag-Officer Du Pont's force has been much diminished by the necessary return of vessels for repairs. I am, respectfully, etc., Gideon Welles (ORN ser. 1, vol. 13:191).

On the same day as the above order was sent to Commandant William L. Hudson, the following communication was sent to Commander William Rogers Taylor, the appointed commander of the nearly completed *Housatonic*. "Sir: The moment the U.S. steam sloop Housatonic, to the command of which you have been appointed, is ready for sea, proceed with her to Port Royal and report to Flag-Officer S. F. Du-Pont for duty. Respectfully, Gideon Welles" (ORN ser. 1, vol. 13:192). Evidence suggests that some confusion arose concerning the theater of operations to which *Housatonic* would be deployed, for just 16 days before she would receive her commission the following order was sent to Captain Taylor:

Navy Department, August 13, 1862. Sir: The Department's order of July 15 is hereby revoked, and as soon as the U.S. steam sloop Housatonic is ready for sea you will proceed with her to the Gulf of Mexico and report to Rear-Admiral D.G. Farragut for duty in the Western Gulf Blockading Squadron. You will touch at Mobile, where you may obtain information of the movements of Rear-Admiral Farragut. I am, respectfully, your obedient servant, Gideon Welles (ORN ser. 1, vol. 19:154).

It would appear that *Housatonic* was destined not for the South Atlantic Blockading Squadron, but instead for the squadron of the West Gulf, for the following brief communication was sent to Rear-Admiral David Farragut within the week:

The department will endeavor to send you more vessels and to place at your command a sufficient force to continue the prosecution of the good work already accomplished. The new steam sloop Housatonic, Captain William R. Taylor, will sail from Boston shortly to join your squadron (ORN ser. 1, vol. 19:162).

For reasons unknown the decision to send *Housatonic* to the blockading force off Mobile, Alabama was again reversed for documentation found in the ORN states clearly that the newly fitted USS *Housatonic* sailed for Port Royal, South Carolina on September 11, 1862 and arrived on the 19th (Mooney 1991:371). For some two months *Housatonic* lay off Port Royal and made ready to join the blockade off Charleston. On December 12, 1862, Captain Taylor received the following order directing him to join the blockade:

Flagship Wabash, Port Royal Harbor, S. C., December 12, 1862. Sir: You will proceed with the USS Housatonic under your command off Charleston and report for blockading duty to Captain S. W. Gordon, senior officer present. On your way you will also tow a coal schooner, which will be sent along side of you, to the anchorage off Stono, sending in by her the accompanying dispatch (not listed), for Lieutenant-Commander Whiting. Respectfully, etc., S. F. Du Pont, Rear-Admiral (ORN, ser. 1, vol. 13:478).

For the next month, *Housatonic* remained on duty off Charleston, and settled into a daily and nightly routine that varied little from one day to the next. It was perhaps due to this daily inactivity that prompted *Housatonic*'s crew to become a bit too anxious in getting into a scrap with a phantom blockade-runner, for on the night of January 21, 1863, the sloop of war's crew accidentally fired in the dark on one of her blockading sister ships. A brief statement, taken from a longer in depth report of the incident, regarding the accidental firing appears in the ORN records as follows:

U.S. Gunboat *Ottawa*, Off Charleston Bar, January 22, 1863. I would respectfully report that while in chase of the *Etiwan* and nearing her Housatonic fired across our bows, I suppose intended for the schooner. I sent up a rocket and showed the red light on the side toward her. A second shot was fired from her about the time our shot was fired at the schooner, which passed over our mastheads. I immediately hoisted the running night signal lights"(ORN ser. 1, vol. 13:525).

In a little over a week following this rather embarrassing mistake in identity, *Housatonic*'s crew thoroughly redeemed themselves in action against the Confederate ironclads CSS *Palmetto State* and *Chicora*. From the log books of *Housatonic*, these are the only known entries for all *Housatonic* logs went down with the vessel when she was sunk on February 17, 1864, comes the following entries regarding their encounter with the ironclads [these entries were copied from the *Housatonic* log and sent to Washington with an official report on the incident]:

January 31, 1863. From 4 to 8 a.m.: Set starboard watch, stationed and armed as in the first and mid watches. At 5:05 a.m. saw the flash and heard the report of a gun bearing S.W.; the firing continued about half an hour at intervals, when there was a cessation of about twenty minutes; it was then resumed, the direction varying from S.W. to S. Could not see the vessels from whence it came on account of the dense mist about the horizon. At 6:15 a.m. saw three vessels together, bearing S. By E.; made one of them out to be the Quaker City. USS Augusta burned Coston's signals, which were not understood, but which were supposed to mean danger; she got underway and stood toward the firing. We immediately slipped and steamed after her, all hands at quarters. Hailed the prize steamer and ordered her to get underway.

About 6:40 a.m. saw black smoke to the westward and as soon as it became light enough to see, discovered a ram with a Confederate flag, steaming rapidly toward Fort Sumter. The *Augusta* was then engaged with another vessel. Ran down between them, when a second ram was discovered, on which we opened fire at 7:08 a.m. She was then moving slowly toward the direction of the harbor. At 7:37 a.m. she went out of range. We fired thirty-four guns at her in this interval; she returned our fire, but none of her shots struck us. We knocked away her pilot house and forward flagstaff. At 7:50 a.m., discovering her roof covered with men, fired two shots from the 100-pounder rifle at extreme elevation, both of which fell short...Released the prisoners from confinement before going into action. Depth of water alongside, 30 and 29 feet. Pressure of steam, 23 and 25 pounds. Edwin T. Brower, Lieutenant (ORN, ser. 1, vol. 13:589).

Some two months later, in early April of 1863, *Housatonic* played a supporting role in Admiral Du Pont's attempt to take Fort Sumter with his ironclads. Although the vessel did not take an active role in the attack, she is mentioned in both Du Pont's battle plan and charts regarding placement of vessels during the attack (ORN, ser. 1, vol. 14:9). Following the failed attempt to take Fort Sumter, all the ironclads had been injured in the miscalculated attack that later cost Du Pont his command, *Housatonic* remained off the South Carolina coast and continued in her duties to thwart blockade-runner traffic in and out of Charleston. In the early morning hours of April 13, 1863, just a few days after the

attack on Sumter, the constant alertness of her sentries apparently paid off, for an enemy vessel was spotted and fired upon in the darkness. The following report regarding the incident was sent to the senior officer of the squadron latter that morning:

USS Housatonic, Off Charleston, April 13, 1863. Sir: I have to report that a boat was seen soon after 4 o'clock this morning pulling rapidly and noiselessly past us, on the offshore side. I immediately fired upon her with small arms, when she pulled across our stern, passing between this ship and the Augusta, and soon, almost instantly, disappeared in the direction of the land. As she was passing across the stern we got one shot at her from a 12-pounder howitzer. The rapidity with which she was pulling, and her almost instant disappearance, rendered useless any pursuit by boats. At daylight nothing could be seen of her. Very Respectfully,
William Rogers Taylor, Captain (ORN ser. 1, vol. 14:128).

Evidently, the vigilance of *Housatonic's* crew was soon again rewarded for within a week following the above reported encounter with an enemy boat, another Confederate vessel was spotted attempting to run the blockade. Captain Taylor's report regarding the capture of the Confederate blockade-runner *Neptune* is reproduced in its entirety:

USS Housatonic, Port Royal, April 21, 1863. Sir: The sloop Neptune was captured on the night of the 19th instant, while attempting to run out of Charleston, by this ship. Her cargo consists of 115 barrels of sprits of turpentine and 13 bails of cotton. The vessel is merely a large launch, with no accommodations for officers or crew. In my opinion she is not worth sending to a northern port, and a prize crew would be exposed to much discomfort and perhaps danger in an attempt to go there.

Her papers, consisting of the register, shipping articles, manifest, clearance, and bill of health, were all made out in the Charleston custom-house, and show that the vessel was owned in Charleston and was bound to Nassau. I enclose them all for your information. The sloop is now lying at anchor near this ship in charge of an officer and two men. I am, sir, very respectfully, your obedient servant William Rogers Taylor,
Captain (ORN vol. 1, ser. 14:148).

On May 15, 1863, *Housatonic* assisted in the capture of the Confederate blockade-runner *Secesh* and remained on duty off the Charleston bar until the morning of July tenth when *Housatonic*, and howitzers mounted in several of *Housatonic's* boats, joined in the bombardment of Battery Wagner, which began the continuing shelling of the Confederate works around Charleston (Mooney 1991:371). In the months that followed her crew repeatedly manned boats, which patrolled close to shore taking part in

both intelligence gathering and the occasional shelling of shoreline batteries. It was during this period that the command of *Housatonic* was transferred from Captain Taylor to Charles W. Pickering. He would continue in command until her loss (ORN, ser 1, vol. 14:494).

On the night of September 8, 1863, several boats belonging to *Housatonic* were manned by her crew and took part in a combined land assault against Fort Sumter. The surprise federal attack failed miserably and several of *Housatonic*'s crew were taken prisoner (ORN, ser 1, vol. 14:630). In the month following the thwarted attack on Sumter little or nothing out of the ordinary happened to *Housatonic* or her crew, and the men settled back into their daily routine. Nothing regarding *Housatonic* appears in any official records of this period until mid October when Captain Pickering sent the following dispatch to Captain Joseph Green, the Senior Officer off Charleston:

U.S. Steam Sloop Housatonic Off Charleston, October 17, 1863. Sir: The officer of the picket boat from this ship, returning this morning, report having passed on his way in last evening a raft of six barrels lashed upon a spar; six feet apart, drifting seaward from the inner harbor. Apprehensive of torpedoes etc, he did not examine it very closely but stated that it appeared to have been in the water some time. This may have been a raft of torpedoes intended for the squadron inside, but my own opinion is that it was a buoy which had been attached to the chain of obstructions inside, and that each barrel contained a torpedo. I am, Very Respectfully Your Obedient Servant C.W. Pickering, Captain (Record Group 45, M625, reel 208, National Archives).

Following the supposed discovery of a string of floating contact mines, *Housatonic* once again continued on her daily monotonous duty off Charleston, apparently in the general vicinity of Rattlesnake Shoal off Sullivan's Island as mentioned in a federal dispatch, with occasional short voyages to Port Royal for supplies (ORN, ser 1, vol. 14:676). A short note regarding one of these trips follows:

USS Housatonic, Off Charleston, January 13, 1864. Sir: In obedience to your order of yesterday I proceeded to Port Royal, anchored near the Light Ship there at 9 P.M. – ran in at early day light this morning; & finding the Lehigh had left for Charleston Bar I did not consider myself warranted under my instructions to detain the ship for any more coal but left immediately for this anchorage. I am, very respectfully Your Obedient Servant C. W. Pickering, Captain (Record Group 45, M625, Area 8, Reel 208, National Archives).

For the month that followed the crew of *Housatonic* settled back into the calm routine of blockade duty. This routine would be shattered quickly for, on the night of February 17, 1864, *Housatonic* would become the first vessel in history to fall victim to an enemy submarine. The following orders regarding the nocturnal duties of her crew and lookout posts during the night of the attack is printed below:

The orders to the Executive Officer and the Officer of the Deck were to keep a vigilant lookout, glasses in constant use; there were three glasses in use by the Officer of the Deck, Officer of the Forecastle and Quarter Master, and six lookouts besides; and the moment he saw anything suspicious to slip the chain, sound the gong, without waiting for orders, and send for me. To keep the engines reversed and ready for going astern, as I had on a previous occasion got my slip rope foul of the propeller by going ahead.

I had the Pivot guns pivoted in broadside, the 100-pounder on the starboard side, and the eleven inch gun on the Port side; the battery all cast loose and loaded, and a round of cartridges kept in the arm chest so that two broadsides could be fired before the reception of powder from the magazine. Two shells, two canister and two grape were kept by each gun. The Quarter Gunner was stationed by the match, with the gong. Watch and lookouts armed as at Quarters. Three rockets were kept in the stands ready for the necessary signal.

Two men were stationed at the slip rope, and others at the chain stopper and shackle on the spar deck. The chain was prepared for slipping by reversing the shackle aft instead of forward. The pin which confined the bolt removed and a wooden pin substituted, and the shackle placed upon chain shoes for knocking the bolt out; so that all that was necessary to slip the chain was to strike the bolt with the sledge once, which broke the wooden pin, and drove the bolt across the deck, leaving the forward end of the chain clear of the shackle. I had all the necessary signals at hand, ready for an emergency. The order was to keep up 25 pounds of steam at night always, and have every thing ready for going astern instantly (Proceedings of the Naval Court of Inquiry Case #4345, Record Group 45, M625, National Archives).

The following testimony regarding the first sighting of the Confederate submarine *H.L. Hunley* was given at the Court of Inquiry by Officer of the Deck John Crosby:

It was about 75 to 100 yards from us on our starboard beam. The ship heading northwest by west 1/2 west at the time, the wind two or three points on the starboard bow. At that moment I called the Quartermaster's attention to it asking him if he saw any thing; he looked at it through his

glass, and said he saw nothing but a tide ripple on the water. Looking again within an instant I saw it was coming towards the ship very fast. I gave orders to beat to quarters slip the chain and back the engine, the orders being executed immediately (Proceedings of the Naval Court of Inquiry Case #4345, Record Group 45, M625, National Archives).

With quarters sounded, Captain Pickering immediately came on deck to see what was happening. His sworn testimony follows:

I sprang from the table under the impression that a blockade-runner was about. On reaching the deck I gave the order to slip, and heard for the first time it was a torpedo, I think from the Officer of the Deck. I repeated the order to slip, and gave the order to go astern, and to open fire. I turned instantly, took my double barreled gun loaded with buck shot, from Mr. Muzzey, my aide and clerk, and jumped up on the horse block on the starboard quarter which the first Lieutenant had just left having fired a musket at the torpedo.

I hastily examined the torpedo; it was shaped like a large whale boat, about two feet, more or less, under water; its position was at right angles to the ship, bow on, and the bow within two or three feet of the ships side, about abreast of the mizzen mast, and I supposed it was then fixing the torpedo on. I saw two projections or knobs about one third of the way from the bows. I fired at these, jumped down from the horse block, and ran to the port side of the Quarter Deck as far as the mizzen mast, singing out 'Go astern Faster (Proceedings of the Naval Court of Inquiry Case #4345, Record Group 45, M625, National Archives).

While frantic sailors leaned over the rail firing muskets and pistols at the partially submerged *Hunley*, Executive Officer Higginson stood on the bridge watching the action. From his sworn testimony comes the following:

I went on deck immediately, found the Officer of the Deck on the bridge, and asked him the cause of the alarm; he pointed about the starboard beam on the water and said 'there it is.' I then saw something resembling a plank moving towards the ship at a rate of 3 or 4 knots; it came close along side, a little forward of the mizzen mast on the starboard side. It then stopped, and appeared to move off slowly. I then went down from the bridge and took the rifle from the lookout on the horse block on the starboard quarter, and fired it at this object (Proceedings of the Naval Court of Inquiry Case #4345, Record Group 45, M625, National Archives).

While chaos reigned on the decks above, Assistant Engineer Mayer was in the engine room, desperately trying to engage the huge propeller and move *Housatonic* astern. His testimony follows:

Three bells were struck a few seconds after I got there, the engine was immediately backed, and had made three or four revolutions when I heard the explosion, accompanied by a sound of rushing water and crashing timbers and metal. Immediately the engine went with great velocity as if the propeller had broken off. I then throttled her down, but with little effect. I then jumped up the hatch, saw the ship was sinking and gave orders for all hands to go on the deck (Proceedings of the Naval Court of Inquiry Case #4345, Record Group 45, M625, National Archives).

At about the same time that the three bells were being struck to inform the engine room to go astern, Ensign Charles Craven was rushing on deck. In his own words comes his testimony regarding his final minutes aboard *Housatonic*:

I heard the Officer of the Deck give the order 'Call all hands to Quarters.' I went on deck and saw something in the water on the starboard side of the ship, about 30 feet off, and the Captain and the Executive Officer were firing at it. I fired two shots at her with my revolver as she was standing towards the ship as soon as I saw her, and a third shot when she was almost under the counter, having to lean over the port to fire it.

I then went to my division, which is the second, and consists of four broadside 32 pounder guns in the waist, and tried with the Captain of number six gun to train it on this object, as she was backing from the ship, and about 40 of 50 feet off then. I had nearly succeeded, and was almost about to pull the lock string when the explosion took place. I was jarred and thrown back on the topsail sheet bolts, which caused me to pull the lock string, and the hammer fell on the primmer but without sufficient force to explode it. I replaced the primmer and was trying to catch sight of the object in order to train the gun again upon it, when I found the water was ankle deep on deck by the main mast. I then went and assisted in clearing away the second launch. Feeling the water around my feet, I started forward and found the ship was sinking very rapidly aft. Almost immediately she gave a lurch to port and settled on the bottom.

Afterwards in looking about aft - for the body of Mr. Hazeltine; I saw that the starboard side of the Quarter Deck, aft the mizzen mast - furniture of the Ward Room and cabin floating within, so that I supposed the whole starboard side of the ship aft the mizzen mast was blown off. I heard a report like the distant firing of a howitzer. The ship went down by the stern, and about three of four minutes after the stern was submerged, the

whole ship was submerged (Proceedings of the Naval Court of Inquiry Case #4345, Record Group 45, M625, National Archives).

Adding to this testimony, Acting Master Joseph Congdon informed the court of the following:

I drew my revolver, but before I could fire, the explosion took place. I immediately went forward and ordered the launches to be cleared away, supposing the captain and Executive Officer had both been killed by the explosion. The ship was sinking so rapidly, it seemed impossible to get the launches cleared away, so I drove the men up the rigging to save themselves. After I got into the rigging I saw two of the boats had been cleared away, and were picking up men who were overboard. As soon as I saw all were picked up, I sent one of the boats to the 'Canandaigua' for assistance (Proceedings of the Naval Court of Inquiry Case #4345, Record Group 45, M625, National Archives).

The following entry in the log book of USS *Canandaigua* concerns its actions to rescue the men of *Housatonic*:

February 17th, 1864. At 9:20 P.M. discovered a boat pulling towards us. Hailed her and found her to be from the 'Housatonic.' She reported the 'Housatonic' sunk by a torpedo. Immediately slipped our chain and started for the scene of danger, with Housatonic's boat in tow. At same time sent up three rockets and burned Coston signals number 82. At 9:30 P.M. picked up another boat from the 'Housatonic,' with Captain Pickering on board. At 9:35 arrived at the 'Housatonic' and found her sunk. Lowered all boats, sent them alongside, and rescued the officers and crew, clinging to the rigging. At 10:30 all were brought from the wreck. Brought on board of this ship, belonging to Housatonic, 21 officers and 137 men (ORN, ser 1, vol. 15:332).

On the morning following the tragic sinking Captain Joseph Green of *Canandaigua* hastily wrote the following report to Commodore Rowan:

USS 'Canandaigua,' off Charleston, S.C., February 18, 1864. Sir: I have respectfully to report that a boat belonging to the 'Housatonic' reached this ship last night at about 9:20, giving me information that vessel had been sunk at 8:45 p.m. by a rebel torpedo craft.

I immediately slipped our cable and started for her anchorage, and on arriving near it, at 9:35, discovered her sunk with her hammock netting under water; dispatched all boats and rescued from the wreck 21 officers and 129 men.

Captain Pickering was very much, but not dangerously, bruised and one man is slightly bruised. I have transferred to the 'Wabash,' 8 of her officers and 49 men, on the account of the limited accommodations on board of this vessel. Very respectfully, your obedient servant, J.F. Green, Captain (ORN, ser 1, vol. 15:328).

The badly injured Pickering delegated to his Executive Officer the responsibility of reporting the disaster to Dahlgren. Executive Officer Higginson submitted the following report:

USS Canandaigua, off Charleston, S.C., February 18, 1864. Sir: I have the honor to make the following report of the sinking of the 'USS Housatonic,' by a rebel torpedo off Charleston, S.C. on the evening of the 17th instant:

About 8:45 p.m. the officer of the deck, Acting Master J.K. Crosby, discovered something in the water about 100 yards from and moving toward the ship. It had the appearance of a plank moving on the water. It came directly toward the ship, the time from when it was first seen till it was close alongside being about two minutes. During this time the chain was slipped, engine backed, and all hands called to quarters. The torpedo struck the ship forward of the mizzenmast, on the starboard side, in a line with the magazine. Having the after pivot gun pivoted to port we were unable to bring a gun to bear upon her.

About one minute after she was close alongside the explosion took place, the ship sinking to stern first and heeling to port as she sank. Most of the crew saved themselves by going into the rigging, while a boat was dispatched to the Canandaigua. This vessel came gallantly to our assistance and succeeded in rescuing all but the following named officers and men, viz, Ensign E.C. Hazeltine, Captain's Clerk C.O. Muzzey, Quartermaster John Williams, Landsman Theodore Parker, Second-Class Fireman John Walsh. The above officers and men are missing and are supposed to have been drowned. Captain Pickering was seriously bruised by the explosion and is at present unable to make a report of the disaster (ORN, ser 1, vol. 15:328).

From the *Hunley* file located in the South Carolina Historical Society in Charleston, South Carolina comes a remarkable letter written by Acting Master John K. Crosby, the first man to see *Hunley* approaching *Housatonic*. In this letter to his wife Irene, penned just 48 hours after the attack, comes a remarkably detailed accounting of the sinking of *Housatonic*, and is included here in its entirety:

USS Canandaigua off Charleston, S.C. February 19, 1864. My Dear Irene: I presume before this reaches you, you will have heard of the sinking of Housatonic. I wrote you a short note yesterday, but I presume it will not reach you before this does. Was in a great hurry for we expected to go to Port Royal, as the admiral was there, but it was thought best to dispatch a steamer to Port Royal, first, and report the disaster, and wait for further orders. We are expecting to hear from him every hour. I do not know what will be done: but I hope he will send us north. I suppose there will be a court of Inquiry held before anything is done. I am in good health and enjoying myself as well as can be expected. I have no clothes, except what I have on, being officer of the deck at the time of the disaster, I came off better than the rest did. Some of the officers barely escaped with nothing on but their shirts. I will write you an account of the disaster.

At 8 P.M. I took the deck, it was a very pleasant night, wind was quite light, and not much sea, the moon was shining bright. I could see nearly all the squadron. The nearest one, (the Canandaigua) was about one mile from us. About 8:45 p.m. while looking in the direction of Breach Inlet, I saw something on the water directly abeam of us, which, at first looked like a porpoise, come to the surface of the water and [???] about 100 yards off. At first I thought it was a porpoise, but in looking a second time, I saw that it was coming directly towards us, and looking more like a plank or large log, merely making a ripple on the water.

I immediately gave orders, to slip the chain, beat to quarters and back the engine, same time informing Captain Pickering of what I had seen. About that time I could see it distinctly and it looked like a log, sharp at both ends. By the time all hands got to quarters, (which did not take only two minutes) the thing struck us just aft the mizzenmast and exploded, blowing the after part of the ship to pieces. Ship filled with water very quick. I do not think that it was over three minutes, from the time I first saw the ripple on the water, until the ship was sunk.

As she was going down orders was given to clear away all boats. I jumped into one of the boats on the port side and as I was clearing her away, the ship rolled over to port and the boat swamped under me, four men in her besides. I got out of her and cleared away another boat and picked up all the men and officers that I could find in the water. At the time I was doing this most of the men and officers were in the rigging.

One other boat was cleared away. That was all the boats that we could get clear, before she went down. I did not know when I got into this boat, that there was but one officer alive [?]. That was Ensign Craven.

I pulled around and picked up two or three officers and all the men I could find in the water, then I pulled back and found Captain Pickering was on the wreck, badly injured and nearly exhausted. I took him off the wreck and started for the Canandaigua, about 1 ½ mile distant. Most of the men I got out of the water were nearly dead, but they are all better and doing well. As soon as the Canandaigua found out what was the matter she slipped chains and started towards the scene of action. She lowered all her boats and took off all the officers and crew, that was alive. Only two officers and three men lost, and nothing but the all-mighty, that could save any of us, it seems to me.

I cannot describe to you the scene, it was awful to behold. Such pitiful sounds, that came from those men in the water as I was picking them up, it was awful. Captain Pickering was the only one that was injured any to speak of. He is doing very well and I think he will be able to get around some in a week or so. We have not heard from the Admiral so I do not know what they will do with us. I am in hopes they will send us north, to get an outfit. I want you to keep all the money you can get, and if you can have one or two shifts of under cloths ready to send if I should want them, or ready for me when I get home.

Go over to Tolmans as soon as you get this and tell him to make me a suit of flannel just as quick as he can. You can judge what else I will want. Get whatever you think I will want, and have it ready to send if I should want it. We are all getting along finely on board of this ship, but it is not like a ship of your own. Please write as soon as you possibly can. Direct your letters the same as ever. We all belong to Housatonic still. I shall come north if it is a possible thing. Be a good girl and don't worry about me. I have lost all your pictures. Send me one. Love to all and yourself. John K. Crosby....P.S. Telegraph to father and mother that I am safe.

It would seem from the following communication that little time was lost in attempting to recover the armaments of *Housatonic*:

USS New Ironsides, off Morris Island, S. C., February 26, 1864. Sir: The divers will see you this morning in relation to making preparations to remove such public property from Housatonic as can be recovered. To this end you will please afford them all the facilities of your command. I would suggest that the Mary Sanford or Nipsic could attend them during the day and put them on board the Geranium in the evening to return to

their schooner inside. When the guns, etc., are all slung ready for hoisting please inform me. Respectfully S. C. Rowan, Captain, and Senior Officer off Charleston (Record Group 45, M625, Area 8, Reel 208, National Archives).

Although no mention of the work performed by the divers on *Housatonic* has yet surfaced in Union naval records, the Charleston newspapers may fill in the gaps as to the extent of the salvage operations. The following entries appear in the *Charleston Mercury*:

Thursday, March 3, 1864, The enemy are engaged on the wreck of Housatonic, endeavoring to raise the armament of the sunken vessel...Friday, March 4, 1864, A schooner with a derrick was alongside of the sunken steamer Housatonic all day yesterday endeavoring to raise her guns...Saturday, November 26, 1864, Several of the enemy's small boats were engaged in raising articles from the wreck of the U.S. steamer Housatonic.

While Union divers attempted to raise the guns from *Housatonic*, the Court of Inquiry that had convened to find answers as to the loss of the vessel came to the following conclusions:

First, That the USS 'Housatonic' was blown up and sunk by a rebel torpedo craft on the night of February 17 last, about 9 o'clock p.m., while lying at an anchor in 27 feet of water off Charleston S.C., bearing E.S.E, and distant from Fort Sumter about 5 1/2 miles. The weather at the time of the occurrence was clear, the night bright and moonlight, wind moderate from the northward and westward, sea smooth and tide half ebb, the ship's head about W. N. W.

Second. That between 8:45 and 9 o'clock p.m. on said night an object in the water was discovered almost simultaneously by the officer of the deck and the lookout stationed at the starboard cathead, on the starboard bow of the ship, about 75 or 100 yards distant, having the appearance of a log. That on further and closer observation it presented a suspicious appearance, moving apparently with a speed of 3 or 4 knots in the direction of the starboard quarter of the ship, exhibiting two protuberances above and making a slight ripple in the water.

Third. That the strange object approached the ship with a rapidity precluding a gun of the battery being brought to bear upon it, and finally came in contact with the ship on her starboard quarter.

Fourth. That about one and a half minutes after the first discovery of the strange object the crew were called to quarters, the cable slipped, and the engine backed.

Fifth. That an explosion occurred about three minutes after the first discovery of the object, which blew up the after part of the ship, causing her to sink immediately after to the bottom, with her spar deck submerged.

Sixth. That several shots from small arms were fired at the object while it was alongside or near the ship before the explosion occurred.

Seventh. That the watch on deck, ship, and ship's battery were in all respects prepared for a sudden offensive or defensive movement; that lookouts were properly stationed and vigilance observed, and that officers and crew promptly assembled at their quarters.

Eighth. That order was preserved on board, and orders promptly obeyed by officers and crew up to the time of the sinking of the ship. In view of the above facts the court have to express the opinion that no further military proceedings are necessary. J.F. Green, Captain and President (Proceedings of the Naval Court of Inquiry Case #4345, Record Group 45, M625, National Archives).

In the weeks following the sinking of *Housatonic*, a letter describing the incident was copied into the March 14, 1864, edition of the *Charleston Daily Courier* from the *Boston Herald*. The copied letter appears in its entirety:

The destruction of the 'Housatonic' off Charleston - A letter in the Boston Herald, from off Charleston, gives an account of the blowing up of the corvette Housatonic by a Confederate torpedo steamer. The event took place about 9 o'clock on one of the coldest nights of the Winter. The letter says:

A long object just on the edge of the water, was discovered astern of the ship. In an instant the cable was slipped, the alarm sounded, and all hands beat to quarters, but before the ship had made any headway the torpedo exploded under her starboard quarter, making a most frightful report. The propeller was broken off, the stern was torn to pieces, and the ship sunk rapidly in less than eight minutes from the time that the torpedo machine was first seen. The vessel sunk in six fathoms of water. As she began to sink the most frightful scenes were witnessed. Men with nothing but their shirts on were seen struggling in the water, officers were trying to get the boats loose, while others were mounting the rigging. Three boats were finally unlashd, and these were sent to rescue those in the water. The gig

at once started for the Canandaigua, carrying Captain Pickering who was badly injured, but is now doing well.

As soon as Capt. Greene, of the Canandaigua, got the news, he at once hoisted signals of distress and came to our assistance, and in three hours after the attack on Housatonic all hands that were saved were safely transferred to that ship, where they received every attention. Subsequently a portion of the survivors were transferred to the 'Wabash.'

Housatonic is a total loss, all hands lost all they possessed - money, clothes, etc. In fact many of them, including some of the officers, went on board of the Canandaigua in a naked state. A sad accident of the disaster is the loss of Ensign Hazeltine, of Concord, New Hampshire; Mr. Muzzey, Captains Clerk; John Williams, Quartermaster, and John Welsh, coal heaver of Boston, were drowned. The latter had got safely on the deck, but ventured back to save \$300, which he had in his bag on the berth deck. Poor fellow, he never returned. Theo. Parker, who was on the lookout directly over where the ship was struck, was blown into the air, and instantly killed. Captain Pickering was slightly injured by the explosion. John Goff, the Captain's steward, was somewhat injured. These were all the casualties. The officers and men of the ship displayed the greatest coolness during the trying scene, and thereby saved many lives. Housatonic the especial spite of the rebels. Three times they have tried to destroy her, and now they have succeeded.

It is feared that many other of the vessels on the blockade will follow the fate of Housatonic. It is well known that the rebels have six or eight more of these infernal machines ready to pounce upon the fleet. The masts of Housatonic are all that can be seen of her, and the gale which is now prevailing will do much to make a complete wreck of that once noble ship.

Ensign Hazeltine got into the second boat, and had he remained in it would have been saved; but as the ship careened over he jumped on board. The last ever seen of him he was floating among the fragments of the wreck, a corpse.

At low tide the water is about six feet above the rail of Housatonic. If the weather moderates her guns, and many valuable articles and the pay masters safe will be recovered. She can not be raised, as her stern is completely blown off, clean to the ward room hatch. She was loaded down with coal and provisions, which will be a total loss. Many of the survivors had quite large sums of money laid away to send home by the next mail. The loss to them is severe

For several months, nothing appears to have been done with the wreckage of *Housatonic*. She apparently lay abandoned until late November when divers once more visited the interior of her hull. The following report describes in great detail what the divers found. This document seems to state that some of *Housatonic*'s cannons may still have been on board at that time:

U.S. Schooner G.W. Blunt, November 27, 1864. Sir: After a careful examination of the wrecks of the sunken blockade-runners and Housatonic, I have the honor to make the following report:

I find that the wrecks of the blockade-runners are so badly broken up as to be worthless. Housatonic is very much worm-eaten, as I find from pieces which have been brought up. She is in an upright position; has settled in the sand about 5 feet, forming a bank of mud and sand around her bed; the mud has collected in her in small quantities. The cabin is completely demolished, as are also all the bulkheads abaft the mainmast; the coal is scattered about her lower decks in heaps, as well as muskets, small arms, and quantities of rubbish.

I tried to find the magazine, but the weather has been so unfavorable and the swell so great that it was not safe to keep a diver in the wreck. I took advantage of all the good weather that I had, and examined as much as was possible. The propeller is in an upright position; the shaft appears to be broken. The rudder post and rudder have been partly blown off; the upper parts of both are in their proper places, while the lower parts have been forced aft. The stern frame rests upon the rudder post and propeller; any part of it can be easily slung with chain slings, and a powerful steamer can detach each part.

I have also caused the bottom to be dragged to an area of 500 yards around the wreck, finding nothing of the torpedo boat. On the 24th the drag ropes caught something heavy. On sending a diver down to examine it, proved to be a quantity of rubbish. The examination being completed, I could accomplish nothing further, unless it is the intention to raise the wreck or propeller, in which case it will be necessary to have more machinery. Very respectfully, your obedient servant, W. L. Churchill, Lieutenant Commanding (Record Group 45, M625, National Archives).

Wreck Site History

On April 20, 1870, Captain William Ludlow submitted a report concerning the condition of the wrecks obstructing Charleston Harbor and its approaches to the United States Corps of Engineers. This informative report included the following description and recommendation as what should be done with the wreckage of *Housatonic*.

Housatonic was a wooden vessel blown up at anchor by a torpedo boat which sunk with her. The wrecks of the two lie nearly four miles due east of the Weehawken Light Ship in 4 1/2 fathoms of water. The wreck has been blasted, the stern blown off and portions of the machinery taken out. Two boilers are still in her weighing 40 and 50 tons each. The wooden sheathing inside and the flanking outside are eaten by worms down to the copper. It is a dangerous wreck lying in deep water in the track of northerly bound vessels, and should be removed. The estimated cost to obtain 20 feet of water is \$10,000. All these amounts are as nearly as possible estimated for the actual cost of removal, and if contracts are made, the contractor is supposed to look for his profit, to the value of the material raised (Miscellaneous Wrecks, 1871-1888, RG 77, File #1125, National Archives, Southeast Region).

On the afternoon of September 20, 1872, the Corps of Engineers accepted a bid from Professor Benjamin Maillefert for the removal of the wrecks *Weehawken* and *Housatonic* to a low-tide depth of twenty feet, as well as the missing submarine boat *Hunley*, if the wreckage of the vessel could be located. Throughout the winter and spring of 1873, the wreck site of *Housatonic* was carefully surveyed by Maillefert's divers. An excellent description of the vessel used to salvage, and break up, *Housatonic* follows:

The wrecking vessel called the *Dreadnaught*, used in raising the heavy sections, consists of a flat-bottom scow built in Charleston, of live oak timber, pine planks, and hacmatack knees, strongly framed to stand heavy seas, is surmounted with a triangular derrick 30 feet high....The dimension of the scow is 60 feet long, 20 foot beam, and 9 foot hold. Its equipment is as follows, vis: Two horizontal low-pressure boilers, 20 horse-power each., worked at 70 pounds pressure. One 25 horse-power, double cylinder, Andrews' engine and two donkey-engines (USACE 1873a:729).

From Professor Maillefert's log books now in the collection of the South Carolina Historical Society, come the following entries regarding work performed on the wreckage of *Housatonic*:

June 17, 1873. 'Dreadnaught' flat over the wreck of Housatonic. Captain Fairchild in charge...June 19, 1873. 'Dreadnaught' over the wreck of Housatonic...June 20, 1873. 'Dreadnaught' on Housatonic...June 23, 1873. 'Dreadnaught' nearly finished over the wreck of the 'Housatonic.' Will return to the city in a day or two. Capt. Fairchild returned to the flat yesterday (Sunday) morning...June 24, 1873. 'Dreadnaught' waiting to get the result of survey over the wreck of the 'Housatonic', when 20 feet is

required by contract...June 28, 1873. 'Dreadnaught' brought up this a.m. Had on considerable copper, brass, lead, two tanks and some little angle iron. Unloaded her wrecking material; all placed in storehouse (Maillefert's Salvage logs, South Carolina Historical Society).

By the late summer of 1873, it would appear that the removal of *Housatonic* was considered complete, for a report filed by Major Gillmore dated August 28, 1873, states the following, "The wooden gun-boat 'Housatonic' sunk outside the bar in 4 1/2 fathoms of water, was removed to a low water depth of 20 1/2 feet. The torpedo-boat, sunk at the same time and place, could not be found "(USACE 1873a:728). It would seem that Maillefert's divers continued to remove articles from *Housatonic* (even though the contract had been closed), well into the year of 1874, for two entries in his salvage log state the following, "April 17th 1874. 'Josephine' after working a little on the "Housatonic" wreck, returned at noon today to Johnson's wharf, bringing with her about 500 lbs. copper bolts, more or less...August 28, 1874. Dreadnaught over Housatonic (Maillefert's Salvage logs, South Carolina Historical Society).

For over thirty years, the wreck of *Housatonic* lay undisturbed beneath a marker buoy that warned visiting vessels of the hazard. As commerce of every description continued to increase during the early years of the twentieth century, surviving documentation suggests that the wreckage of *Housatonic* was becoming too much of a nautical hazard for its continued existence to be tolerated. In the July 12, 1908, edition of the *Charleston News and Courier*, the following article concerning the proposed fate of the warship appeared:

Diving for Housatonic, An historic derelict at entrance of harbor. Thorough investigation has been made by the force of divers who were sent here this week by the Merrit & Chapman Wrecking and Dredging Company, of Norfolk, of the wreck of the frigate Housatonic, which was sunk in the harbor by a Confederate torpedo boat in 1864.

The wreck is situated about four hundred yards southeast of the harbors entrance, and has caused much trouble to the vessels trying to enter and leave the port. It is thought that the government will use the diving companies information and they will probably be given the contract to remove the obstruction.

The story of the sinking of Housatonic by a Confederate torpedo boat is well known here and has often been written of in these columns. After the war no efforts were made to have the wreck removed and soon the derelict became the foundation of a sand bar, which built itself up in the path of commerce of this port, and to mariners it has always been a cause of much anguish. Recently strong efforts were brought forward to have this obstruction cleared away if possible, and the local engineer officer, Capt.

N. R. Stuart who is always ready to assist Charleston arranged to have an investigation made by a diving concern.

The submarine trip of the divers revealed the old Housatonic much the worse for the stay under water, and she was, of course, far beyond recognition. She was of wooden construction and most of her timbers have disappeared, having been washed away by storms. Among things seen below were two boilers and much of the armament of the old time battle ship, and it is thought that a good amount of salvage can be obtained from the old iron that can be easily gotten out of the old fighting machine. Should Housatonic be removed, dynamite will be used in great quantities, and the last death of the old reminder of the War Between the States will be a grand sight.

A little over a year after the above article appeared in the Charleston papers, a contract to remove what was left of *Housatonic* was awarded to a diver named William Virden. On February 19, 1909, a survey of the wreckage was begun prior to final demolition and within a couple of weeks following the completion of this task, the two boilers of *Housatonic* were blasted and buried in the sand. From the 1909 Annual Report of the Chief of Engineers, under the heading "Removing Sunken Vessels or Craft Obstructing or Endangering Navigation," comes the following description of the work performed by Virden and his diving company:

Removing Sunken Vessels or Craft Obstructing or Endangering Navigation-Removal of USS Housatonic in Charleston Harbor, South Carolina. Housatonic was a wooden man-of-war, belonging to the blockading squadron stationed off Charleston Harbor during the Civil War. The wreck was cut down by the government to a depth of 20 feet below mean water soon after the war.

An examination of the wreck was made at a cost of \$395.85; it was found that portions of the wreck still remained, and its position being very near the course of vessels entering or leaving the harbor, recommendation was made for the removal of the obstruction so as to leave a depth of 27 feet at mean low water, estimating the cost at \$12,000 dollars. Allotment of this sum was made September 14, 1908. Proposals were invited, and opened on November 21; award was made to the lowest bidder, William H. Verden, Lewes, Del., and a contract dated January 18, 1909, was approved by the Chief of Engineers on February 16, 1909.

Work was begun by the contractor on February 19. Under the provisions of the contract he was allowed to cut the wreck down without removing the pieces, if it should be found practicable to do this. He adopted this plan and blasted the boilers, which were practically all that remained of

the wreck, breaking them into pieces. He then announced that the contract had been completed. Examination by sweep proved that the required depth had not been obtained, and the contractor was directed to resume work. He did more blasting and again called for an examination.

After repeating this process several times, the contractor reached the conclusion that it was necessary to remove the broken pieces of boiler, which he did. After removing about four tons of old iron, mainly boiler iron, he again called for an examination, which was made, with the result that nothing above the required depth of 27 feet below mean low water was found. The contractor was then notified of this result, and removed his plant. Settlement has not been made for this work. The expenditures for this work were \$826.57 (USACE 1909:1316).

The remains of *Housatonic* were relocated during Clive Cussler's 1980-81 magnetometer survey to locate *H. L. Hunley*. Cussler's team reported that the remains were buried in the sand with the largest piece estimated to weigh 500 lbs. and that the wreckage was very scattered (*Housatonic* file, on file at MRD, SCIAA). In 1983, Robert Forster, a local Charlestonian, recovered an anchor from about 12 ft. of water in Breaches Inlet and believed it to be from *Housatonic*. A letter from the Naval Historical Center to Forster stated the anchor could have come from that time and may have come from *Housatonic*, but could offer nothing more conclusive (Richard Speer to Robert Forster, October 26, 1983, letter on file at MRD/SCIAA). Based on the known position of *Housatonic* the anchor was nowhere near the shipwreck. The present disposition of the anchor is unknown but the salvager planned to put the anchor in a park.

From May to June 1999, the NHC, NPS, and SCIAA collaborated on a project to investigate the remains of *Housatonic*. Archaeologists hoped to gather baseline information on the shipwreck including orientation of the hull, structural and artifactual conditions at the site, and most importantly, to examine the damage associated with the detonation of the torpedo by *H. L. Hunley*. Overburden of sand and mud ranging from 5-8 feet covered the entire shipwreck. Based on magnetic analysis, several test pits were excavated to determine the orientation and layout of the wreck. Many artifacts were recovered during the course of the excavation and included shoes, a pistol, fuses, coal, and a pencil. All recovered artifacts were brought to the NHC for conservation, analysis, and curation. Ship structure encountered included numerous copper fasteners, wood fragments, and water tanks. The position of two water tanks aided in determining that the remains of the ship lay NNE to SSW. Archaeologists conducted a survey utilizing numerous transects radiating out along the cardinal compass points from several datums to determine the extent and depth of wreckage using a 10-foot-long hydraulic probe. Additionally, the nature of each probe contact was recorded, that is, whether striking wood, coal, iron, shell, or nothing at all. Preliminary analysis of the results suggest that the several test pits occurred in the middle of the vessel and uncovered lower ship structure and components. Several distorted copper fasteners were recovered that indicated severe stress placed on them. Based on the project findings, the fasteners most

likely are indicative of the 1870s salvage activities, or resulting from the 1900s blasting operations. No sign of the damage caused by *H.L. Hunley* was identified during the excavations. The project did succeed, however, in determining the layout and orientation of the vessel, assessing the condition and preservation of the hull and its contents, and providing guidance to any future archaeological work at the site. A report of the project is under preparation by the NPS, entitled "USS *Housatonic* Site Assessment" is expected to be published in the next few years.

USS *Keokuk* (38CH271)

The 677-ton, double-turreted ironclad USS *Keokuk* was launched at New York Harbor by contractor Charles W. Whitney on December 6, 1862 (Figure 4.4). Commissioned in March 1863, *Keokuk* was placed under the command of Commander Alexander C. Rhind. The 159-foot-long vessel was soon armed with two XI-inch Dahlgren smooth bore cannons and ordered to join the South Atlantic Blockading Squadron at Port Royal, South Carolina ("Z" Files; ORN, ser. 2, vol. 1:120). After brief repairs at Hampton Roads, due to one of her propellers fowling in a line attached to a Virginia channel marker, she arrived at Port Royal on March 26, 1863 (Mooney 1991:628).

With the arrival of *Keokuk*, Admiral Du Pont was ready to launch his long planned attack on Charleston's outer defenses, planned for the first week of April. As the day of attack approached, *Keokuk*, and *Bibb*, were assigned the task of laying marker buoys to guide Du Pont's ironclads into the strongly fortified Confederate harbor. The

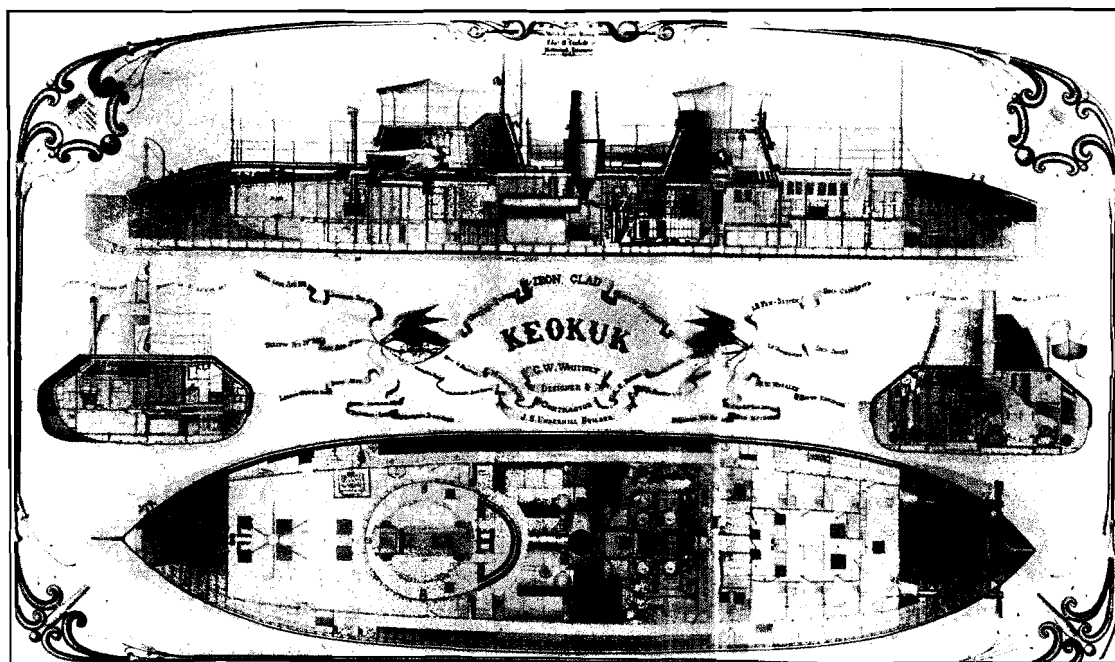


Figure 4.4: Ship plans of USS *Keokuk* (from Roscoe, *Picture History of the US Navy*, plate 716).

Federal ironclads crossed the Stono Bar on April sixth, but were unable to attack that day due to hazy weather that obscured targets and disoriented pilots (Mooney 1991:628).

The attack commenced around noon the next day, but difficulties in clearing torpedoes and other obstructions from the paths of the leading monitors slowed their progress considerably. Shortly after three o'clock, the lead ironclads came within range of Forts Sumter and Moultrie, and the battle was begun. Confederate obstructions and a strong flood tide made many of the ironclads unmanageable, and the orderly formation was soon thrown into confusion. With the Federal formation scrambled, *Keokuk* was soon compelled to run ahead of the crippled USS *Nahant* to avoid fowling her in the narrow channel. This mistake in judgment brought *Keokuk* to within 600 yards of Sumters guns, where she remained under a continuous fire for some 30 minutes (Mooney 1991:629).

The newly arrived ironclad was riddled with 90 direct hits, with fully one-fifth of them piercing her at, or below, the water line. She was withdrawn from the action and anchored overnight beyond range of Confederate guns, while her crew struggled with pumps to keep her afloat. At dawn the following day, as the seas were picking up, *Keokuk* took on more water and sank off Morris Island with no loss of life. Within days news of the loss appeared in the *Charleston Mercury*, where the following description of the vessel appeared, reportedly copied from a New York newspaper some weeks earlier:

The Keokuk, the invention of Mr. C. W. Whitney, an iron merchant of this city, is of an entirely novel construction. Her dimensions are as follows: Length over all, including the ram of five feet, 159 feet 6 inches; breadth of beam, 36 feet; depth of hold, 13 feet 6 inches; draft of water 9 feet. Her sides present a very peculiar appearance, being constructed at an angle of 37 degrees, so as to cause the shot to roll off. With the exception of a few inches of wood on deck, which is locked so as to keep it tight, some minor pieces between deck, and the necessary joiner work, the vessel is exclusively built of iron, with an armor extending some four feet below the water line, while her flush deck is about five feet above the water line.

The hull of the vessel, including frame and beams, are exclusively of iron. It is constructed of half-inch rolled iron plates. Three keelsons run the whole length, while two bulwarks, fore and aft, form the inner vessel, which enables the structure to float, should the outside be riddled with shot. Two bulwarks – one forward and one aft – can be filled with water in fifteen minutes, and emptied in forty minutes, so as to settle or raise the vessel as wanted in action as much as one foot. These compartments also serve as a security against a leak caused by the wrenching off of the ram. The hull is covered with an armor of bars of four one-inch iron set edgeways, one inch apart, and between each a strip of yellow pine, over which are three five-eighth inch plates, the whole riveted with 1 1/8 inch bolts, with eight countersink heads of about one foot apart.

The vessel has two fixed turrets, each carrying one gun, pierced with three port holes each, but the gun is on a revolving slide. They are built on a base of $\frac{1}{2}$ inch rolled plates, and covered in the same manner as the hull thus obtaining for the turrets a thickness of $6\frac{1}{4}$ inches. The port holes are provided with heavy shutters, so constructed as to work in two halves. The slides for the guns, which will be of 11 inch caliber, are placed 20 inches below the level of the deck, which secures a greater height for the turrets, which are of a conical form, 20 feet diameter at the base and 14 feet at the top. Their length is 8 feet 8 inches. They are braced by five 1-inch iron bars set edgewise. The size of the ports allows the guns 10 degree vertical and 8 degree lateral range. The ventilation of the turrets is admirably provided for by an arrangement by which the lower portion of the turrets can be opened, and as there is a communication between the two turrets a draft is produced, which removes the foul air generated inside.

The vessel will be propelled by two propellers and two engines of five hundred horse power. Both rudder and propeller are guarded by an overhanging guard of wrought iron on the after part. Mr. Whitney, who had conceived the idea of building this vessel about four weeks after the outbreak of war, is quite sure of her success, both as regards to easy navigation and proof against shot. She requires a crew of 100 men, and can carry in her magazines 200 11-inch shot, 150 11-inch shell, and the necessary powder. The propellers and engines of the Keokuk are so arranged as to allow one to work forward while the other can be reversed, so as to turn the vessel on her own pivot. The guns of the ship are worked on a pivot similar to the arrangement of the pivot guns on a gunboat. The ship sits on the water with all the grace of a regularly built wooden vessel, thus putting at rest all the fears expressed by many nautical men that she could not float.

Within hours following the sinking of his vessel, Commander Alexander Rhind penned the following report to Admiral Du Pont:

U. S. Flagship New Iron Sides, off Cumming's Point, S. C., April 8, 1863.
Sir: I have the honor to report that I got the Keokuk underway at 12:30 p.m. yesterday in obedience to the signal from the flagship and took a position in the line prescribed in your order of advance and attack. At 3:20. The flagship having made signal to disregard her motions, I ran the Keokuk ahead of my leading vessel to avoid getting foul in the narrow channel and strong tideway. I was forced in consequence, to take a position slightly in advance of the leading vessel of the line, and brought my vessel under a concentrated heavy fire from Forts Moultrie and Sumter at a distance of about 550 yards from the former.

This position taken by the Keokuk was maintained for about thirty minutes, during which period she was struck ninety times in the hull and turrets. Nineteen shots pierced her through at and just below the water line. The turrets were pierced in many places, one of the forward port shutters shot away; in short, the vessel was completely riddled.

Finding it impossible to keep her afloat many minutes more under such an extraordinary fire, during which rifled projectiles of every species and the largest caliber, as also hot shot, were poured into us, I reluctantly withdrew from the action at 4:10 p.m. with the gun carriage of the forward turret disabled and so many of the crew of the after gun wounded as to prevent a possibility of remaining under fire. I succeeded in getting the Keokuk to an anchor out of range of fire and kept her afloat during the night in the smooth water, though the water was pouring into her in many places. At daylight this morning it became so rough that I saw the vessel must soon go down.

Assistance being sent me, I endeavored to get the vessel round and tow up, and in that effort, at about 7:30 a.m., she went down rapidly, and now lies completely submerged to the top of her smokestack. The officers and crew were all saved, the wounded being put on board a tug a few minutes before the Keokuk went down. Owing to the loss of papers and the separation of officers and crew, I am unable to furnish an official medical report, but give as nearly as possible the casualties in the action of yesterday. Very respectfully, your obedient servant, A. C. Rhind, Commanding.” (Record Group 45, M625, Reel 206, National Archives).

The battered Federal fleet was hammered into a state of confusion and disbelief following the action of April seventh. All the ironclads had sustained some damage and were in need of repair. Little attention was paid the wreck of *Keokuk* by Union picket boats. It was during this period that several nocturnal trips were made to the wreck by Confederate naval officers to ascertain whether the cannons on board the sunken ironclad could be removed. Federal engineers attached to the fleet regarded the salvage of the guns by the Confederate forces to be impossible. The following report filed by Lt. Glassel, CSN, describes several trophies he had removed:

C.S. Gunboat Chicora, Charleston Harbor, April 13, 1863. General:
Having made a visit to the Keokuk this morning, with a view to observing the effect of your batteries upon her iron turrets, I succeeded in procuring the trophies, which it affords me much pleasure to forward to you, viz, two United States flags, two pennants, and three signal flags. Several other articles were also obtained – a rammer, sponges, lanterns, etc. – which are on board the Chicora. I am, general, very respectfully, your obedient

servant. W. T. Glassell, First Lieutenant, C. S. Navy (ORN, ser. 1, vol. 14:110).

Further Confederate nocturnal inspections concluded that the two XI-inch cannons in the sunken hull should be recovered. For several weeks numerous trips were made to the wreckage under cover of darkness. Within a month, the following article recounting the adventurous recovery appeared in the *Charleston Mercury*, much to the surprise of the Federals:

May 7, 1863, "The Guns of the Keokuk: The guns of this famous ironclad now lie on the South Commercial wharf. They consist of two XI-inch columbiads, and will soon be mounted for our defense, valuable trophies, no less than handsome trophies of the battle of Charleston Harbor. By order of General Ripley, Colonel Alfred Rhett, on the 16, after the departure of the ironclad fleet, examined the wreck, and reported the attainment of the guns practicable. Mr. La Coste, assisted by Adjutant Boylston and detachments of men from Fort Sumter, under different lieutenants, have effected the saving of these fine pieces of ordnance with much trouble. Latterly the Keokuk has been entirely submerged, and in rough water.

The turret had to be unbolted, or unscrewed, and taken off before the guns could be slung for removal. This was an unpleasant job of some difficulty, the labor being preformed under water, when the sea was smooth, and in the night time only. Those engaged in the undertaking, going in the small boat of the fort, were sometimes protected from the enemy by the presence of our gunboats; at other times not. One gun was raised last week, being removed by the old light boat. General Ripley himself, night before last, went down to superintend the removal of the second gun. Enterprise, even with scant means, can accomplish much.

Wreck Site History

During an early 1870s survey by the US Army Corps of Engineers, the wreck was found to have 11 ft. of water over it and a foot over the turret. The vessel, which was located on the southern end of Morris Island, was entirely out of the path of any vessel, except for perhaps a stray coaster bound south from Charleston. As the wreck lay out of the primary shipping channels, wreckers had not disturbed the site. Despite this report, the surveyor proposed to remove the wreck to a depth of 15 ft. (USACE 1871:581). Authority to salvage *Keokuk* was granted on February 3, 1873, and Benjamin Maillefert was awarded the contract to remove the wreck to 15 ft. of water. He paid the US Government \$50 for the privilege of removing the wreck, and probably sold the salvaged

items at auction (USACE 1871:727-8). By 1874, Maillefert had removed the wreck of the monitor *Keokuk* to the desired depth (USACE 1874b:4).

During the 1980 NUMA survey, the wreck of *Keokuk* was relocated in 15 ft. of water and covered over by eight feet of sand. *Keokuk* was located with a magnetometer and generated a 1900 gamma hit. NUMA reported that the *Keokuk* was resting 550 meters due west of its plotted position in 1863. Between 25-50% of the vessel was intact according to the divers (Submerged Vessel Synopsis-*Keokuk*, on file at MRD/SCIAA; State Site File).

USS *Kingfisher*

The 451-ton wooden sailing vessel *Kingfisher* was purchased by the United States Navy at Boston, Massachusetts on August 2, 1861. Within days following the 121 foot long *Kingfisher's* commissioning on October 3, 1861, she was fitted with four eight-inch Dahlgren cannons, by 1864 her armaments had been increased to four Dahlgrens, one twenty-pounder and one light twelve-pounder, and placed under the command of Acting-Lieutenant Joseph P. Couthouy (ORN, ser. 2, vol. 1:122). On the day of her commissioning she and her crew of 97 were ordered to Key West, Florida, for duty with the Gulf Blockading Squadron. On January 21, 1862, *Kingfisher* and *Ethan Allen* jointly captured the Confederate blockade-runner *Olive Branch* bound from Cedar Keys to the Bahamas with a cargo of turpentine (Mooney 1991:651).

Within a week following the capture of the Confederate blockade-runner, both *Ethan Allen* and *Kingfisher* were supporting a Federal expedition up the Manatee River where *Kingfisher* assisted in the capture of the Confederate sloop *Mary Nevis*. With the discovery of Confederate cavalry barracks in the area, sailors from both *Kingfisher* and *Ethan Allen* were sent ashore where they burned them to the ground (Mooney 1991:651). On February 22, 1862, while on duty in the Gulf of Mexico, the Confederate blockade-runner *Lion* was observed heading for the Atlantic Ocean. For the next three days *Kingfisher* stayed hot on the heels of the Confederate ship, and succeeded in overtaking and capturing her on February 25th (Mooney 1991:651). On the second of June 1862, two small boats from *Kingfisher* rowed up the Aucilla River, Florida, in search of drinking water. A Confederate raiding party surprised the eleven man expedition. In the short engagement that followed, two sailors were killed with the other nine being made prisoner. With unsanitary conditions and lack of clean drinking water, many of *Kingfisher's* crew came down with scurvy in the summer of 1862, causing Rear Admiral Lardner to order *Kingfisher* back to Boston. After the vessel had been repaired and the crew brought back to full strength, *Kingfisher* was ordered to join Admiral Dahlgren's South Atlantic Blockading Squadron (Mooney 1991:651).

The wooden bark was stationed in St. Helena Sound, South Carolina, where she distinguished herself for efficiency in reconnaissance work and operations against small parties of Confederates ashore. For the remainder of 1863, *Kingfisher* occasionally shelled Confederate troops ashore and sent small landing parties inland to capture food

for her crew and gather information. On March 28, 1864, *Kingfisher* grounded on Combahee Bank, filled with water and sank. The following report describing the events leading to her loss, and location, was filed by John C. Dutch, Acting-Master, Commanding:

Otter Island, South Carolina, March 30, 1864. Sir: I have the misfortune to state that the *Kingfisher* is aground on Combahee Bank. I got underway on the morning of the 28th, with a view of moving around into Coosaw Channel. She took bottom about two hours before high water, and before I could get anchors astern she had grounded so hard I could not start her. As soon as she grounded she commenced making water freely. Commenced lighting her at once, keeping our pumps at work the while, and used every effort to heel her off, but without avail. At 12 o'clock I sent an officer with a dispatch to Captain Reynolds. Continued to work getting stuff out of the ship until 9, or half past, at which time the water was above the berth deck on the starboard side.

Mustered all the people in the boats and came ashore on this island, as it was so rough we could not longer work our boats, and as the ship was filling could not stay aboard. I went to the ship again at 11 o'clock, being high water; found she had not changed her position in the least, and was full of water. Captain Davis, of the *Larkspur*, reported today at one o'clock. He can render us no assistance whatever on the ship, the tide ebbs and flows in her. She is so embedded in the sand that she does not move at any time of tide. She is heeled so much that her starboard guns and bulwarks are entirely under at high water. At low tide there is about 6 feet of water alongside. I do not believe the ship can now be got off without the use of steam pumps and a vessel alongside to keep her afloat.

The vessel commenced filling at about half flood, or when the tide had risen 2 or 3 feet above the copper on the starboard side. She has never thumped or rolled, or anything of the kind, to start a leak; do not believe there is a timber or sheet of copper started. We can save everything that can be saved with our boats, except her four broadside guns, anchors, and chains. These perhaps might be saved with suitable scows, but as the ship is heeled over so much do not know as it could be done there - certainly not unless the water is perfectly smooth. We unbent all the sails and slung the parrott rifle ready for hoisting into the boat this morning, but the weather is so rough we can not do so this tide. As soon as I get the rifle ashore will try and get her spars down. I do not believe this ship will break up or change her position, but bury herself in the sand.

Captain Davis has gone up the Ashepoo to take the ordinance and other stores out of the schooner, as she was loaded so deep we could not keep her down here in this rough weather. Shall fill the *Larkspur* up with

paymasters' and other stores, and dispatch her to Port Royal at once. Shall keep a double crew on board the schooner for blockading purposes, and keep a strong picket force on the upper part of the island. We keep our rifles and small arms loaded, ready to defend ourselves in case of attack. We consider ourselves perfectly safe, and have provisions for twenty or thirty days. With the schooner, launch, and howitzer, together with our riflemen, shall do the best blockade duty we can until further orders. I am very respectfully, your obedient servant, John C. Dutch, Acting Master, Commanding (Record Group 45, M-89, Reel 148, National Archives).

After efforts to save the stranded ship proved fruitless, she was stripped and abandoned on April 5, 1864 (Mooney 1991: 651).

Wreck Site History

There is no known location of this site, consequently there has not been any archaeological investigation or known sport diver activity on this site.

USS *Patapsco* (38CH270)

The 1,875-ton, single-turreted, ironclad USS *Patapsco* was launched at Wilmington, Delaware, on September 27, 1862, at a contract cost of \$400,000. Her side armor was reported to have been five inches thick with her turret armor measuring eleven inches ("Z" files, Washington Navy Yard). The vessel measured 190 feet from bow to stern, with a beam of just under 38 feet at her widest point. *Patapsco* was originally armed with a Dahlgren 15 inch rifled cannon and a 150 pound Parrot rifle. In October of 1864, two 12-pounders were added to the vessels armaments, but just how these cannons were mounted is not explained in the "Z" file documents ("Z" files, Washington Navy Yard).

Under the command of Commander Daniel Ammen, *Patapsco* was commissioned into the United States Navy on January 2, 1863, and immediately assigned to the South Atlantic Blockading Squadron. On March third, the vessel took part in the attack against Fort McAllister near Savannah, Georgia, and according to the ships log "were struck only once with no injury" ("Z" files, Washington Navy Yard). *Patapsco* was soon ordered to steam to Charleston Harbor where she took part in the combined bombardment of the city's fortifications on April 7, 1863. Under almost continuous fire during the remainder of April and into the months of July and August, she continued to operate against the fortifications in Charleston Harbor, and on the 8-9 of September 1863 supported the failed storming of Fort Sumter (Mooney 1991:224).

Throughout the fall of 1863 and into 1864, she remained on blockade duty off Charleston with her only real action, other than the occasional bombardment of the city's outer fortifications, being the capture of the Confederate blockade running schooner *Swift*

on February 9, 1864 ("Z" files, Washington Navy Yard). On the night of January 15, 1865, while covering several pickets boats engaged in dragging for submerged Confederate mines near the mouth of the harbor, *Patapsco* hit a torpedo that had been submerged by the Confederates some 24 hours earlier and sank in less than a minute, taking 62 of her crew and officers down with her (Wilcox 1966:74; Mooney 1991:224). From the following report filed by the *Patapsco*'s commanding officer comes several lines concerning the incident:

Flagship Harvest Moon, Charleston Roads, S. C., January 16, 1865. Sir: I have the honor to submit to you a report of circumstances connected with the loss of the ironclad *Patapsco* under my command, at 8:10 p.m. the 15th instant, by a torpedo. On the evening of the 15th instant we cast off from our buoy at the lower anchorage and proceeded up to our usual station, as advance monitor. We rounded to, and I immediately called along side the officers in charge of picket and scout boats. I directed them to select as many boats as had grapples and to push them up the harbor, using every effort to discover torpedoes or obstructions; the remaining boats to take position on our beams and quarters, keeping within 100 or 200 yards of the vessel.

The commanding officers of the tugboats were ordered to keep about the same distance ahead and on each bow. The object in assigning these positions was to avoid observation by the enemy and drawing their fire. I then allowed the *Patapsco* to drift up with the tide until nearly in a line from Sumter to Moultrie, the boats and the tugs keeping in their respective positions. From this point, which was the highest point obtained, we streamed down to within a few yards of the Lehigh buoy; then stopped and allowed the vessel to drift up, keeping in sight of the before-mentioned buoy. On proceeding down the third time, and then within between 200 and 300 yards of the buoy, we struck and exploded a large torpedo, or torpedoes, about 30 feet from the bow and a little on the port side.

The instant I discovered that we had been struck, I gave the order to start the pumps. In an instant more I discovered that the whole forward part of the vessel was submerged, and, there being no possible chance to save the vessel, I then gave the order to man the boats, but before even an effort could be made to do so the vessel had sunk to the top of the turret. The boat which hung at the port davits aft the turret was afloat before Acting Ensign A. P. Bashford and the quartermaster on the watch, who were with me on the port side of the turret, could get into the boat to clear the falls. It was by great exertion that Mr. Bashford and the quartermaster succeeded clearing the boat from the head of the davits.

When I left the turret to get into the boat I could discover no body on board, and the water was at the time ankle deep on the turret. My first

thought after this Providential escape was the safety of such of the survivors as we could pick up. I had the good fortune of saving eleven of the crew. Owing to the disposition of the boats and tugs, which I had previously made to provide against accidents, all those persons who had escaped up from below and those that were on deck were rescued to the number of 48 – 5 officers and 38 men. I would respectfully state that at no time did I apprehend any danger whatever from torpedoes, as it was generally supposed that they were sunk above the line from Moultrie to Sumter, and therefore did not conceive that the safety of the vessel or the lives of those on board were being jeopardized.

In conclusion, I would state that the cool intrepidity displayed by Lieutenant Sampson, my executive officer, and Acting Ensign Bashford, the only two officers belonging to the ship who came under my notice, deserves the highest praise. I have since been informed that the third assistant engineer, D. G. Davis, remained nobly at his post when the ship went down. Accompanying this report I send you the statement of Lieutenant W. T. Sampson, executive officer. I am, very respectfully, your obedient servant, S. P. Quackenbush, Lieutenant-Commander, U. S. Navy (ORN, ser. 1, vol. 16:176).

By the time that *Patapsco* was destroyed, Confederate fortifications around the city were near collapse, and ammunition being so scarce that not even a single shot was fired by Southern gunners at the source of the commotion. On the following morning *Patapsco*'s smoke stack was observed poking up through the water by pickets at Forts Moultrie and Sumter. This was of little consolation to the Confederates, however, for Charleston was abandoned within a month (Wilcox 1966:74).

Wreck Site History

A survey of Charleston Harbor, authorized by Section 2 of the Act of Congress making appropriations for the repair, preservation, and completion of certain public works on rivers and harbors, & c., approved July 11, 1870, was conducted by Captain William Ludlow, US Army Corps of Engineers. He found the wreck of *Patapsco* partially blasted by unspecified wreckers with 15 feet of water over it. Ludlow found the channel-way by the shipwreck sufficient for navigation and determined that the wreck should not hinder navigation (USACE 1874a: 3). A couple of years later the wreck was considered a menace to navigation and a contract was let with Benjamin Maillefert to remove the wreckage to a depth of 25 ft. mean low water over the wreck of the monitor. Maillefert was to receive the proceeds from auctioning the salvaged materials from the monitor. At the close of the fiscal year 1871-1872, salvage operations had reduced the wreck to a depth of 19 ft. (USACE 1872: 652). When Maillefert began operations, he reported that the pilothouse and the deck over the engine-house had been removed, and the turret partially turned over by wreckers prior to his operations. During the operations

to break up *Patapsco*, Maillefert forwarded recovered human bones to the Army where they were buried at Ft. Moultrie (Bearss 1968). In 1873, Maillefert reported:

The wreck was found standing upright on a level hard sandy bottom, 30 ft. below low water line, a sand-bar had, however, formed forward, or at her bow, reaching to level of the deck, and at the stern, 5 ft. below the deck, so that the armored overhang was just level with the sand. This bar extended but a short distance on each side Owing to the wrecking parties having already operated upon it, the wreck was found in quite a distorted condition The pilot-house had also been removed by the wreckers, but owing to its great weight, while transporting it to Charleston, it broke its heavy chains and was lost . . . subsequently found and recovered. . . [Maillefert] Operation was carried on systematically, by first removing the entire deck, after which the machinery was taken up, with much difficulty, however, as the hull found entirely filled with sand and mud. Next the boiler, powder-magazines, and their contents, were in turn taken up. . . several copper tanks were found to contain ready-made cartridges, perfectly dry Next the armored sponsons, or overhangs, on each side were broken up into sections, averaging 25 ft. in length The next labor was directed against the revolving iron turret (USACE 1874a:7-8).

Wreckage of *Patapsco* was relocated by the NUMA survey in 1981 (Submerged Vessel Synopsis-*Patapsco*, on file at MRD/SCIAA). During the initial ground-truthing a diver surface-collected a large coal fragment from the site (*Patapsco* State Site file). In 1985, two salvagers from Florida, Howard Tower and Larry Tipping, expressed an interest in salvaging the site in early 1985. In preparation of issuing a potential salvage license, SCIAA requested use of the US Army Corps of Engineers, Charleston District's side scan sonar and crew to survey the remains of *Patapsco* (Alan Albright to F.L. Smith, January 18, 1985, letter on file at MRD/SCIAA). Side scan sonar operations were undertaken January 25, 1985 with USACE staff, Tipping and Tower, and SCIAA staff. They located the remains of the wreck and made several passes over the site (Larry Tipping to Mary Ann Sullivan, [nd] 1985, letter on file at MRD/SCIAA). On February 23, a SCIAA archaeologist and Tower dove on the site with the objective to relocate, identify, and delimit the site. The divers encountered several indeterminate objects of encrusted iron concretions and pieces of wood approximately 10 to 12 inches wide, and some structure standing two feet off the bottom, and bits of coal. The bottom was composed of sand, shell and clay, with mud in depressions. Cold and currents curtailed dive operations to meet the objectives (*Patapsco* Dive Report, David Brewer, February 23, 1985, report on file at MRD/SCIAA; Hobby diver report Lic. #357 [H. Tower], March 1, 1985, report on file at MRD/SCIAA).

In a March 1985, letter to the Navy seeking permission from the Navy Department to work on the site, Tower proposed excavating the wreck under the supervision of SCIAA (Howard Tower to Judge Advocate General, Navy Department,

March 24, 1985, letter on file at MRD/SCIAA). On April 8, 1985, the Office of the Judge Advocate General denied permission to excavate the wreck citing:

In view of the long-standing policy of the Department of the Navy not to permit salvage operations to be conducted on sunken former U.S. Navy ships which are the final resting places for crewmembers, your request for permission to excavate on ex-USS *PATAPSCO* must be denied for that reason (R.J. McCarthy to Howard Tower, April 8, 1985, letter on file at MRD/SCIAA).

Subsequently, Tower dropped his plans to excavate at the site. In the late 1990s, plans to widen the channel into Charleston Harbor created a dilemma, as the exact position of *Patapsco* was uncertain. Clarification by SCIAA of the wreck's position erased fears that the monitor was in the impact zone of the widening project.

Robert B. Howlett

Unfortunately, very limited information was found regarding this vessel used by the Federal navy as a lightship off Charleston. However, a newspaper article, entitled, *The Sole Survivor of a Wreck Rescued*, sheds some light on the fate of the vessel:

The Sole Survivor of a Wreck Rescued. On the 10th of December Colonel Mulford's dispatch boat, the *Eliza Hancox*, while on its way from Port Royal to Charleston, just as darkness was approaching, discovered off seaward a large fragment of a wreck. Upon making toward it a human being was seen moving upon it, and endeavoring to attract attention to his perilous situation. A boat was lowered and the man having been brought on board and warmed, told a most thrilling story of the wreck of which he was the sole survivor.

His name was John R. Cruse, and he had been a hand on the *R. B. Howlett*, of Philadelphia, which had been recently anchored in the channel-way off Charleston, and used as a light-ship. Her crew consisted of the captain, James Brewer, the mate, A. H. Dean, and four hands. The vessel had been wrecked the previous night. At first her anchor was broken through the force of the gale, and she began to drift toward the northern bar. It was not long before she struck and went to pieces.

Cruse managed to get on a piece of the poop-deck with Dean, the mate, and the two were carried out to sea, being frequently washed off from their frail raft by the breakers off Stono Inlet. Dean having been bruised on the head by a plank when he was thrown into the water, survived only a short

time. Cruse, availing himself of his companions clothing, lashed the corpse to the wreck, having under contemplation the necessity which might arise of his having to feed upon the poor mates body. When he was rescued he had been already thirty-two hours without food (*Harper's Weekly*, January 21, 1865)

Wreck Site History

There is no known location of this site, consequently there has not been any archaeological investigation or known sport diver activity on this site.

First and Second Stone Fleets

In the spring of 1861, the newly formed Confederacy was in desperate need of military supplies. With little more to trade but cotton, it was critical to the Southern war effort that this important trade commodity reached overseas ports safely. To prevent the export of cotton and import of war materials and medicine, a Federal blockade of all Southern harbors was enacted in April of 1861. Among the most important ports in the South were Savannah, Georgia, and Charleston, South Carolina. A Union naval base had been established at Port Royal, South Carolina, following the occupation of the port in November. From there, it was an easy task to supply Union warships anchored off both Charleston and Savannah. The fleet was far from adequate for an effective blockade, and in spite of its efforts, Southern blockade running continued to be successful (Withington 1958:43).

With the problems of the blockade well known, it occurred to Gustavus V. Fox, Assistant Secretary of the Navy, that it might be feasible to scuttle vessels in the harbor channels at Charleston and Savannah, and thus effectively seal them off from European munitions and supplies. With the approval of Fox's plan, Gideon Welles, Secretary of the Navy, sent the following order to George D. Morgan, the Federal purchasing agent on duty in New York:

Navy Department, October 17, 1861. Sir: The Department is desirous of obtaining twenty-five old vessels, of not less than 250 tons each, for the purpose of sinking on the bar at Savannah. You are authorized to obtain suitable vessels in conjunction with Mr. Richard Chapell, of New London, Conn., in the manner following:

1. Purchase the twenty-five vessels, after suitable examination, as secretly as possible before any knowledge is obtained that Government is in the market.
2. Land all unnecessary articles and sell them at your leisure to the best advantage.

3. Prepare the vessels for delivery off Savannah, and contract with proper parties for said delivery to the naval officer in command of that port.
 4. Have a pipe and valve fitted under skillful direction, so that after anchoring in position the water can be readily let into the hold.
 5. Load them with blocks of granite to utmost extent, considering their safe transit down the coast.
 6. Leave one anchor and chain on board ready for use and such sails and gear as are necessary to sail them to their destination.
 7. The officers and seamen employed on this duty will be brought home by and at the expense and subsistence of this Department.
 8. Let this duty be preformed with the utmost dispatch, and let the vessels sail in fleets of six at a time.
 9. Notify the Department of the probable time of each departure.
- Respectfully Gideon Welles (ORN Ser. 1, vol. 12:416).

The number of vessels to be purchased was subsequently increased by a “Second fleet” making a grand total of approximately 45 ships. Most of the ships were old whalers from New London, Connecticut, and New Bedford, Massachusetts. The American whaling industry had long since seen its best days, having peaked in the 1850s. Most people had turned to using kerosene in lamps instead of whale oil by the 1860s. For these reasons, most of the fleet was old, unserviceable and in poor condition (Mooney 1991:429). Some of these vessels were nearly a hundred years old by 1861. One vessel, *Corea*, originally served as a British supply vessel during the Revolutionary War.

With fifty cents a ton being paid for “blocks of granite,” to be used as sinking ballast, the supply of cut stone quickly dwindled around the harbors initiating many New England farmers to dismantle their old stone walls and cart them off to the city for a handsome profit (Mooney 1991:430). With the ships purchased, loaded with stone, and ready for a voyage south, the following letter was sent to Flag Officer DuPont, then commanding the South Atlantic Blockading Squadron:

Navy Department, November 7, 1861. Sir: The Department has already obtained and fitted the twenty-five ships for the harbor of Savannah, and only awaits a dispatch from you to send them forward. Twenty are also being purchased for the harbor of Charleston, and you will see that like preparation is made there to receive them. It is believed that a new channel now exists, bearing about due east from the light. If this can be thoroughly closed, and only a few vessels sunk in the intricate channel of Sullivan’s Island, Charleston as a harbor, will no longer exist.

The Bienville may be retained with your command if she has not already left. The intercourse between the rebel states and Havana and New Providence has increased to a very great extent, and the Department has directed a steamer to be stationed off Havana to break up that end of the

traffic. The rebels boast of running the blockade on stormy nights with the assistance of the lights of our fleet. The Department will furnish you with all the hulks you may require for any part of the coast under your command. Respectfully Gideon Welles (ORN ser. 1, vol. 12: 417).

The *Dictionary of American Naval Fighting Ships* provides some background history of several of the ships attached to the first stone fleet:

Corea had some historical distinction, having been originally an armed British Navy supply ship which came to this country during the Revolution loaded with stores. A group of fishermen were determined to capture the recently arrived supply ship:

A storm arising, she sought shelter in Long Island Sound. This fact soon became known to our Yankee fishermen, and they determined to capture her, and accordingly about a hundred of them, well armed, left New Bedford in a small vessel for that purpose. Coming in site of *Corea* all hands, except four men and a boy, were sent below. The vessel soon reached the fishing ground, and, to all appearance, the five on deck were soon engaged in innocent piscatorial employments. *Corea* ran down toward them and fired a gun, at which summons our fishermen stood for the store ship, and coming within hail were ordered alongside. Grumblingly they obeyed and were despoiled of their fish, while *Corea*'s crew crowded around curious to see the prize. At this juncture one of the captive fishermen threw some fish out of one of the ports upon the schooner's deck and at the signal the secreted men swarmed up from below. Before the astonished Englishmen could recover their senses their vessel was a prize. She was taken to New Bedford and discharged, and some years after the war was added to the whaling fleet.

Fortune was born in 1822, whaled out of Plymouth until 1844, then out of New Bedford and New London until her purchase by the navy. She was designated "Flagship" of the New London section of this first contingent. A war correspondent with the South Atlantic Blockading Squadron wrote that:

She looked rusty and venerable enough to have claimed a century as her age. Her sails were yellow and her rigging innocent of any coating of tar... Still with all her want of beauty and the freshness of youth, it seemed sad to think that she was to be put to so ignominious an end after a long career of usefulness: but she is to go.

Garland was designated "Flagship" of the New Bedford section perhaps because of her history as a privateer prior to her whaling days. Her last-trip master and former owner,

Rodney French, although he had never before captained a vessel, was designated honorary "commodore." He "armed" *Garland* with a "Quaker" gun, carved from her spar, painted black, and mounted on a gangway port amid ship, with a saluting cannon strapped atop of it. He fired it to everyone's delight upon departure from New Bedford, but when he did so upon *Garland's* arrival at Savannah he got a prompt not-so-delighted rebuke from Commodore J.S. Missroon, the naval officer in charge of the blockade there.

Herold, according to Starbuck was originally out of Boston and was nearly 100 years old at the time of her purchase for the stone fleet.

Tenedos was built ship-rigged in 1806 and altered to a bark in 1855. *Tenedos* had been laid up since 12 May 1860. She was described by Herman Melville in his poem *The Stone Fleet: An Old Sailor's Lament* as "a glorious good old craft as ever run...An Indian ship of fame was she, Spices and shawls and fans she bore: a whaler when her wrinkles came...till, spent and poor, her bones were sold."

Maria Thesesa was built at New York in 1807. The logbook of her last voyage kept by first mate James A. Stubbs, is in the G.W. Blunt White Library of the Marine Historical Society, Inc., Mystic, Connecticut. Commencing 9 November and ending 31 December 1861, the entries tell how the New Bedford whalers of this contingent were assembled, manned, sailed south for Savannah, and eventually sunk in Charleston harbor, and of how the masters and crews were subsequently returned home.

Patomac had been laid up in Nantucket since 17 September 1857, the terminal date of her last reported whaling voyage. She was described as being "so old and rotten that she was mere cement in place, yet she brought a good price because she was copper fastened."

With the fleet assembled and ready to sail, George Morgan, the New York agent who purchased the fleet on behalf of the Navy Department, sent the following letter to Flag-Officer DuPont, commanding the South Atlantic Blockading Squadron:

New York, November 18, 1861. Sir: Under the direction of the Secretary of the Navy, I hand you herewith a list of twenty-five vessels loaded with stones and prepared to sink. Also a copy of agreement in the shipping articles of said vessels. Also copy of letter handed to each master from his government. If the weather is good, all the vessels will sail on the 20th instant. Respectfully yours, Geo. D. Morgan (ORN Ser. 1, vol. 12:418).

While Union naval officers planned to scuttle the recently purchased ships at both Savannah and Charleston, General Robert E. Lee, then military commander of Charleston, was sending the following orders to Captain Buchanan of the Confederate Navy:

Charleston, S.C. November 11, 1861. Sir: It is my desire that you proceed to Savannah, Ga. And confer with Flag Officer Tattnall as to the most expedition and practicable mode of blocking up the channel leading towards Savannah, and whether any defenses can be thrown up to prevent the passage of the enemy through those channels. Respectfully your obedient servant R.E. Lee General Commanding (R.G. 45, M625, #414, National Archives).

With General Lee's order obeyed, three old ships were hastily scuttled in the channel leading to Savannah, thereby blocking access to incoming and outward bound ships (Withington 1958:51).

Although Flag-Officer S.F. DuPont had been fully advised of the plans and departure of the whalers, it is apparent from the following report that the orders failed to reach Commodore J.S. Missroon, senior officer at Savannah:

U.S. Ship Savannah, Near Tybee Island, December 5, 1861. Sir: I have the honor to report that there have arrived near this place seventeen ships and barks (chiefly old whale vessels) up to this time, with information that many more are on their way, and may be daily expected. They are all laden with stone; but few good vessels among them, and all badly found in every respect, especially in ground tackle, few having more than one chain and anchor; one of them (the Richmond) no anchor, and now riding by our steam anchor.

All these vessels have reported to me under a uniform printed order from their owners or agents, requiring them to proceed and to give up their respective ships to the senior officer of the United States blockade off Savannah; to withdraw all articles from them not wanted by the Navy; to take the receipt of the senior officer for their respective ships; and to return; that the Navy Department would furnish conveyance for the masters and crews to New York. Having received no information of the coming of these vessels, and having dispatched the information of the arrival of several of them to you yesterday by the Augusta for your orders, I have so informed the masters, and have not yet taken charge of any of the vessels.

Several of these vessels have arrived in a sinking condition. The Meteor parted her only chain and went ashore yesterday at 7:30 p.m. on the south side of the channel, before succor could reach her from the Pocahontas. The ship Lewis is also ashore and bilged. The ship Pheonix struck in trying to enter the harbor, and was towed in, leaking badly, with loss of rudder. It being certain she will exhaust her crew and would sink where it

was desirable she should not, I had her towed where she makes a good breakwater and bridge for landing on Tybee Island from the shipping, and where she now lies.

The ship Archer also struck three times on the night of the third instant, off Savannah Bar Shoals, and is leaking badly, and said to be unfit now to go to sea. This large and unexpected accumulation of ships within a very limited circle, and their very insufficient ground tackle, render this anchorage unsafe both for themselves and the vessels of the squadron, particularly of this ship, in the event of storms from the northward and northwest. Their early disposition on that account would be very desirable.

Each of these ships has one and some of them two whaleboats that might be of service in your operations. I may use them to land troops on Tybee. Your orders would be desirable in regard to the spars and sails of such vessels as you may plant here. The work on board and duty ashore are seriously felt by officers and crews of our vessels, and our sick reports are increasing. Very Respectfully, your obedient servant J.S. Missroon.” (ORN Ser. 1, vol. 12:419).

As has been stated earlier, the original plan was to block the channel to Savannah. This idea, however, was quickly abandoned when it was discovered that the Confederates themselves had already scuttled three old ships in the river channel with the idea of preventing access to Savannah by the Union fleet. Flag Officer DuPont wrote to Secretary Fox that the Confederate general “Tattnall is doing the work for us.” (Withington 1958:51). The plan for sinking the old whalers was thus changed to Charleston and the “stone fleet” was mobilized at the naval base at Port Royal, South Carolina.

Under the command of Flag-Officer DuPont’s Chief of Staff, Captain Charles Henry Davis, the old New England whaling fleet weighed anchor and set off from Port Royal on December 17, 1861, on what would be their last voyage. From the following report, filed by Captain Davis some days later it would seem that the operation was a success, and that the southern entrance to Charleston had been sealed:

U.S. Flagship Wabash, Port Royal Harbor, S.C., December 21, 1861. Sir: On returning from the bar off Charleston, where I have been occupied in sinking the stone ships sent out by the Department for this purpose, I have the honor to submit the following report: During the service, which lasted from Tuesday, the 17th instant, until today, I have been very much favored by weather, and consequently the moving of the ships from Port Royal to Charleston, the preparations there, and their final disposition on the bar of

the main channel, although consuming time, have not been attended with any serious obstacle of difficulty.

In all this work I have been ably assisted by Commanders Gordon and Goldsborough and by Lieutenants Commanding Stevans and Balch, and have derived much valuable information and important aid from the skill, local knowledge, and zeal of Acting Master G.H. Bradbury and Mr. Godfry, who acted as pilots, both of whom are worthy of your highest confidence. Accordingly its hardly necessary to recite details of duty that have nothing in them either remarkable or interesting.

On the night of my arrival off Charleston the light-house was blown up, by which the purpose of my visit was essentially promoted. After the bar had been sounded out, two ships were sunk, one on the eastern and one on the western limit of the channel, which served to limit the field of operations. After all the ships that were to be sunk, sixteen in number, had been brought here and in position to be easily moved, they were towed in by the smaller steamers and placed upon and inside the bar in a checkered or indented form, lying as much as possible across the direction of the channel, in several lines some distance apart, and they were made so nearly to overlie each other that it would be difficult to draw a line through them in the direction of the channel which would not be intercepted by some of the vessels. There were several principles which guided me in choosing the place and the manner for sinking the vessels:

1. The bar was selected because it is the principal and culminating point of the natural deposit in this line. By adding the materials contained in the hulks to those already placed there by nature, it may be expected that the natural forces which aggregate the latter will tend to keep the former in their assigned position.
 2. By putting down the vessels in the intended form it was intended to create a material obstruction to the channel without seriously impeding the flow of water. If it were possible to build a wall across the channel, the rivers, which must flow to the sea, would undoubtedly take another and similar path; but if, on the contrary, the blocking up of the natural channel is only partial, the water may retain a part of its old course and require the addition only of a new channel of small capacity.
 3. Lastly, the mode of sinking the vessels is intended to establish a combination of artificial interruptions and irregularities, resembling on a small scale those of Hell Gate and Holmes' Hole, and producing, like them, eddies, whirlpools, and countercurrents, such as render the navigation of an otherwise difficult channel hazardous and uncertain.
- Very respectfully, your most obedient servant, Charles Henry Davis, Captain, U.S. Navy, Captain if the Fleet (R.G. 45, M-89, National Archives).

With the southern entrance to Charleston Harbor effectively blocked, General Lee sent the following report to Richmond outlining the current situation then taking place in his theatre of operations:

Headquarters, Coosawhatchie, S.C., December 20, 1861. Sir: It has been reported to me by General Ripley that the enemy brought his stone fleet to the entrance of Charleston Harbor today and sunk between thirteen and seventeen vessels in the main ship channel. The north channel and Maffitt's Channel are still open. This achievement, so unworthy any nation, is the abortive expression of the malice and revenge of a people which it wishes to perpetuate by rendering more memorable a day hateful on their calendar [Lee is pointing out in his report that December 20, 1861 is the first anniversary of South Carolina leaving the union]. It is also indicative of their despair of ever capturing a city they design to ruin, for they can never expect to possess what they labor so hard to reduce to a condition not to be enjoyed. I think, therefore, it is certain that an attack on the city of Charleston is not contemplated, and we must endeavor to be prepared against assaults elsewhere on the Southern coast. I have the honor to be your obedient servant, R.E. Lee, General Commanding (ORN, ser. 1, vol. 12:423).

From the following excerpt taken from the Christmas eve edition of the *Charleston Mercury*, it would appear that many considered the stone fleet's sinking as a waste of time:

On the occurrence of the first heavy northeaster, after the sinking of the wrecks, the force of the wind, the heave of the sea and the action of the quick-sands, will, according to all previous experience, dissipate the Yankee obstructions with a rapidity nearly as great as that of the late terrible conflagration [the Charleston fire of 1861]....The permanent closing of Charleston harbor by sinking vessels at the entrance we consider an impossibility; and nothing but a government mad with folly and revenge would attempt it. This attempt of the Yankees, however, will have one good effect, in tending to quiet the nerves of any excitable citizens who may have supposed that the Lincolnites intended an attack on our city from the sea.

Although some in Charleston looked at the scuttling of the Stone Fleet as "folly," many in the north, as well as in Europe, considered the blocking of the southern passage into Charleston Harbor to be permanent (Mooney 1991:429). From the following lines taken from the December 26, 1861, edition of the *New York Times* come the following lines:

The main channel of approach to Charleston Harbor has been destroyed ... Thus another strong blow has fallen upon the headstrong people of South Carolina, the effect of which must be more humiliating than any they have yet received. They have no means of resenting it, and their haughty-rebellious spirits must fret and chafe beneath the weight of the heavy hand which has been laid upon them. . . . The Charlestonians must have felt themselves chagrined beyond measure at the mischief which had been done them. The wrecks were sunk about two miles and a half from shore in plain sight from the batteries on Morris Island, Forts Sumter and Moultrie, and from the flagstaffs of which the rebel colors were visible.

The sinking of the first stone fleet of 17 vessels left eight from this fleet which Captain DuPont reported he "had applied to a very useful purpose." The stone fleet's crews, 250 in number, were assigned to the steamer *Empire State* for transportation back north (Withington 1958:60). The blocking of the main channel left three other channels giving access to Charleston Harbor, the most important of these being Maffitt's, or the Sullivan's Island Channel. To seal this second entrance the following orders were issued to Commander S.W. Gordon, Commander of the Blockading Fleet off Charleston:

Flagship Wabash, Prot Royal Harbor, January 14, 1862. Sir: Acting Master Bradbury will report to you for proper covering while carrying out my instructions in reference to closing Maffitt's Channel at the best point with the number of vessels at his disposal. It is important to know how far the batteries extend on Sullivan's Island. If, as formerly reported, they are still in great strength beyond the narrow part of Maffitt's Channel, the obstructions must be placed where the vessels run between the main and the Rattlesnake Shoal. I have added the Ottawa, Lieutenant Commanding Stevens, to your force for this service, and have given to Captain Stevens, and Acting Master Bradbury such detailed explanations, with the maps in hand, as will enable them to carry out most effectually the intentions of the Government. Respectfully, S.F. DuPont, Flag-Officer (ORN, ser. 1, vol. 12:511).

From the *Dictionary of American Naval Fighting Ships* comes the following histories on several ships attached to the second stone fleet:

America, while an India merchantman in 1833, logged a record run of 89 days from Boston to Calcutta, 14,500 miles, via Cape of Good Hope. She began whaling out of New Bedford in 1835.

Edward was reported by Morgan as being of 274 tons. She is listed elsewhere in official records, however, at 340 tons, which checks with an *Edward* of 339 92/95 tons recorded in the New Bedford Ship Register as having been "sold to U.S. Government in 1861."

There is a second whaler named *Edward* of 274 tons, but she is shown in whaling records as having been whale hunting throughout the Civil War and as having been finally captured and burned by the Confederate privateer *Shenandoah* in 1865.

Jubilee was a merchantman believed to have been several times incorrectly referred to in official records, because of similarity of names as *Jupiter*.

Majestic is listed as a bark in some official records, as a ship in others. Whaling sources list her as a ship.

Marcia was a merchantman.

Margaret Scott was altered from a ship to a bark in 1855. Upon the completion of her last whaling voyage in July 1861, she was sold to owners who began secretly refitting her to run slaves. They were detected, tried, and convicted. Upon condemnation the vessel was seized by the U.S. marshal at New Bedford and auctioned off to the Navy for the stone fleet.

Messenger was Salem's last whaler. She is listed as ship rigged in whaling records.

Peri was a merchantman. Referred to once as a bark in official records, at all other times as a ship.

Stephen Young was a merchantman.

Valparaiso is listed as a bark in whaling records.

William Lee was Newport's last whaler and was referred to by the *New York Herald's* war correspondent as a "fine old ship."

Of the vessels listed above and on the previous page, *Edward*, *India* and *Valparaiso* were spared, and refitted as store ships (*India* and *Valparaiso*) and a floating machine shop (*Edward*) From the following report it would seem that the second stone fleet was scuttled exactly where it was intended:

USS Augusta, Off Charleston, January 26, 1862. Sir: I have the honor to report that the remainder of the stone fleet have been got into position and sunk to-day. I think they are all exceedingly well placed, and they will effectually block a deep and excellent passage to the north of the Rattlesnake Shoal. Acting master West, by his energy and zeal; Acting Master Bradbury, by these qualities, added to a thorough knowledge of Charleston Bar and vicinity; the commanders of the Pocahontas and Penguin, by boldly towing with their ships the stone vessels in very shoal water, and all attached to the blockading ships here, have zealously contributed to bring about this result. The chartered steamers Cahawba

and Marion were active in aiding the stone vessels during the gale and otherwise did good service. The missing bark Peri not having returned, I shall tomorrow send the Penguin to the S. and W. in search of her, with directions to be back in thirty-six hours. She will place Messrs. West and Bradbury on board the Port Royal light-boat if it should not interfere with her mission. I am, very respectfully, your obedient servant, E.G. Parrott, Commander.” (R.G. 45, M-625, reel 463, National Archives).

The names of the vessels which were then available for the second mass sinking were never recorded. The following list of thirteen, however, appearing in *The Dictionary of American Fighting Ships*, is obtained by eliminating all not otherwise accounted for, *Bogota, Dove, Jubilee, Majestic, New England, Newburyport, Noble, Peri, Margaret Scott, Mechanic, Messenger, Stephen Young* and *Timor*.

By the time the second sinking of vessels in Maffitt’s Channel had taken place, both England and France were reacting harshly to the news of the earlier sinkings in Charleston’s main channel (Figure 4.5). From the following quote copied from the February 1, 1862, edition of the *Charleston Mercury* (originally taken from the *London Times* and *Paris Moniteur*) comes proof of how disgusted European nations were at the news of the destruction of Charleston Harbor:

The Stone Fleet Blockade. The London Times reiterates its denunciation of the stone blockade of Charleston harbor, and says, among the crimes which have disgraced the history of mankind, it would be difficult to find one more atrocious than this. Even the fierce tribes of the desert will not destroy the well which gives life to the enemy. The Times protests in the strongest terms against such proceedings, and asserts that no belligerent has the right to resort to such warfare. The Paris Moniteur, of the 11th, says that a feeling of profound regret and indignation has been aroused in England as well as France by the vindictive act of destroying the port of Charleston.

Although the *New York Times* seems to have endorsed the sinking of the Stone Fleet, it appears that overseas protests did not fall on deaf ears, for in the January 30, 1862 edition of the *Times*, appeared the full text of an English editorial scathingly attacking and denouncing the action as “a violation of all the laws of war.”

It seems obvious that such exaggerated protests coming from England and France were due in part to maritime trade interests, which stood to gain greatly from a lucrative trade with the Confederacy. With so much grumbling coming from the other side of the Atlantic, William Stewart, the United States Secretary of State announced that “to suppose that the plan was meant to destroy the harbor permanently. It was only a

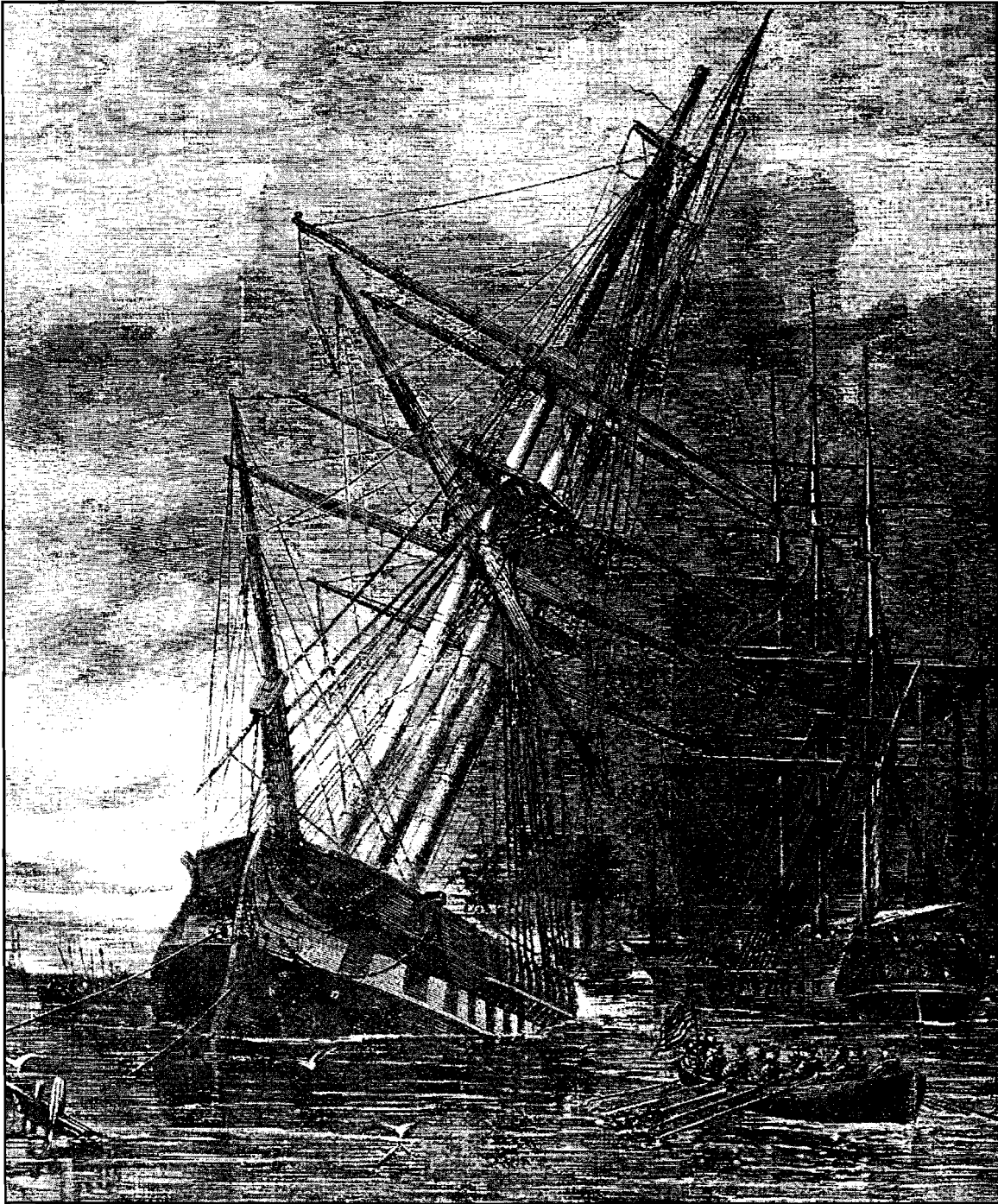


Figure 4.5: Sinking of the Second Stone Fleet in Maffitt's Channel (from Harper's Weekly).

temporary measure to aid the blockade, and it was well understood that the United States would remove the obstructions after the war is over." On February 10, 1862, Seward further assured the British Foreign Office that, "all the vessels laden with stone, which had been prepared for obstruction the harbors, have already been sunk; and it is not likely that any others will be used for that purpose" (Mooney 1991: 437).

From all the evidence that has come forward pertaining to the sinking of the Stone Fleets, it would appear that those who voiced the opinion that the scuttled ships would soon be disbursed and destroyed by winter storms were correct. The sunken vessels soon began to break up and float away, piece by piece, leaving their cargoes of New England granite to spread over and eventually settle deep into the sand. The wrecks in the main channel inconvenienced but did not prevent the Union Navy's subsequent activities against Charleston, for in time, as had been expected by many experts, a new natural channel was soon formed to one side of the obstructions (Mooney 1991:437).

Wreck Site History

There has been no known archaeological investigations or sport diver activity on the First and Second Stone fleet sites. Current thought posits that the wrecks are buried under a substantial amount of sediment. Two wrecks in Port Royal Sound, the Skull Creek Wreck (38BU723) and the Station Creek Wreck (38BU2080), are believed to be vessels that were intended for the stone fleets. The Station Creek Wreck might be the *Edward*, destined for use in the Second Stone Fleet, but instead was diverted, along with the *India*, to become a floating machine shop at Port Royal. The Skull Creek Wreck is an unidentified vessel, but perhaps another vessel from the stone fleets that was unable to continue to Charleston. These two wrecks are discussed more fully in Chapter 7.

***Stono* (former US gunboat *Isaac Smith*) (38CH880)**

The 171-foot-long, Confederate blockade-runner *Stono* was originally built at the New Jersey shipyard of Lawrence and Foulks in 1851. The vessel started her career as the eleven gun, United States gunboat *Isaac Smith*, purchased by the United States Navy on September 9, 1861, and had been attached to the South Atlantic Blockading squadron soon after the start of the Civil War (Spence 1995:238). While patrolling on the Stono River (just south of Charleston Harbor), the vessel was attacked by Confederate forces and taken as a prize. The following news article copied from the January 31, 1863, edition of the *Charleston Mercury* describes the event:

Capture of an Abolition Gunboat – The cheering, but not altogether unexpected, intelligence of the capture of a gunboat in the Stono River, was received in the city yesterday evening shortly after eleven o'clock. Rumors were in circulation that an attack upon the gunboats that had been cruising in Stono undisturbed, and marauding along its banks, would be made in pursuance of a plan conceived by the commanding officer of this post.

Heavy firing was heard in the city about four o'clock. This is the hour at which it is believed the attack was commenced. The gunboat first attacked was the John P. Smith [name mis-quoted], a three masted steamer, carrying eleven guns, and a crew represented at from one

hundred fifty to two hundred men. After a sharp engagement of one hour, in which the boats crew suffered heavily, she was unconditionally surrendered and taken possession of by our forces. Another gunboat, which came to the assistance of the John P. Smith, was driven off badly crippled.” (Charleston Mercury, January 31, 1863).

Three days later, the *Charleston Daily Courier* reported the event with further details:

The gunboat Isaac Smith – A large number of persons visited this vessel, lying at Commercial Wharf, during Friday. She has the appearance of having been a freight steamer, purchased by the Lincoln Government, and fitted up as a gunboat. She is a substantially built vessel, and can be easily repaired and made very serviceable in our harbor. The fortunate shot which stopped her progress, and caused an unconditional surrender, penetrated clean through the steam pipe or drum, about two feet from the upper deck. This does not injure the engine.

She is badly shattered in several other places, one shot having entered at the side, and going through the officers quarters, making a very wide breach. It seems almost miraculous how any of them escaped with their lives. The officers quarters were very neatly arranged, and fitted up with every convenience. The doors of the pilot house were plated with four inch iron, and exhibit evidence of the damaging effect of the fire of our sharp-shooters, under command of Captain Mitchel.

One of the shots which went through the pilot house struck the negro pilot on board, and as he was reeling outside on the deck another shot took effect upon him, killing him instantly. The Isaac Smith has on board a large quantity of coal, sufficient to have lasted her for two or three months (Charleston Daily Courier, February 2, 1863).

Soon after her capture, the vessel was repaired and turned over to the Confederate Navy, where she was eventually outfitted as a blockade-runner and renamed the *Stono* (Wise 1998:322). On June 5, 1863, while attempting to run out of Charleston with a load of cotton, the vessel was chased back over the Charleston Bar by the USS *Wissahickan* and wrecked on Bowman’s Jetty.

Wreck Site History

In 1871, a proposal was made to remove *Stono* and other blockade-runners wrecked on Bowman’s Jetty (USACE 1871:582). A contract was entered into with Mr. Joel Griffin, September 30, 1872, for removal of 125 linear feet of Bowman’s Jetty and

the wrecks to a low-water depth of 20 feet. The stone removed from the jetty was to be piled up on the inshore end of the jetty (USACE 1871:727). A diver was sent down to investigate the wrecks and found that *Minho*, *Stono*, and *Prince Albert*, and another unnamed wreck, were deeply embedded in sand with portions of the wrecks exposed due to the scour of the tide (USACE 1873a:730-1). An 1874 report stated that in 1873 the salvagers removed from the east side of the jetty, and lying close to it, the wrecks of *Stono*, *Prince of Wales*, and *Juno* (USACE 1874a:5).

In 1985, a group of Florida and South Carolina salvagers led by Howard Tower obtained SCIAA Salvage License 32 to salvage blockade-runners off Bowmans Jetty. Salvage activities on the wrecks lasted until 1990. The group proposed defining the remains of the shipwrecks, recovering artifacts, and conducting historical research. The license stipulated a 50/50 division of the artifacts between the state and salvagers. The wreckage of *Stono*, *Minho*, and *Prince Albert*, and possibly others, were found intermixed at the end of the jetty. The wrecks lay on a slope ranging in depth from 20-30 ft. of water.

Remains of *Stono's* stern half, the only wooden wreck among the other iron-hulled blockade-runners, ran East to West over a distance of approximately 120 ft. The East end was buried under a sand mound. Extant hull structure survived up to the turn of the bilge in places with a maximum breadth of 25 ft. A 40-foot section of the hull extended West from the sand mound with portions of the hull rising a foot or two off the bottom. At the West end a conglomerate of a boiler and other pieces of smaller machinery marked the visible terminus of the wreck. Outer hull planking consisted of an inner course of strakes and an outer layer of sacrificial wood a couple inches thick sheathed in copper. Sandwiched between the wood was a layer of animal hair and tar. Copper spikes and drift pins also littered the site. A huge, crumpled lead sheet weighing approximately 200-300 lbs. was also found that may have been the interior lining of the powder room. A number of artifacts were retrieved over the course of the salvage project including small machinery parts, fasteners, coal, a lead sounding weight, among other miscellaneous items. The group offered for sale a number of these and other artifacts including copper and lead sheathing, copper spikes, and sheathing nails.

Two anchors lying approximately 70 ft. from *Stono* were also removed from the site. The anchors, believed to be associated with *Stono*, were recovered and turned over to Patriots Point Naval and Maritime Museum in Mt. Pleasant. Many artifacts were also recovered from the other adjacent sunken blockade-runners. In 1989, Hurricane Hugo struck Charleston Harbor and on-site inspections afterwards found a substantial amount of sand overburden covering previously exposed sections of the wreck. Subsequent post-Hugo excavations by the salvagers found historic artifacts intermixed with more modern debris (Salvage License no. 32 file, on file at MRD/SCIAA).

USS Weehawken (38CH272)

The Passaic-class Monitor USS *Weehawken* was an improved and enlarged version of the original *Monitor* that had engaged the ironclad CSS *Virginia* at Hampton Roads. Commissioned on January 18, 1863, and placed under the command of Captain John Rodgers, *Weehawken* was soon enroute to her theatre of operations off the South Carolina coast. She arrived at Port Royal on February 5 following a brief stop over in Norfolk, Virginia, for repairs suffered in a sudden gale that had blown up off the New Jersey coast (Mooney 1991:190). Within days after her arrival in Port Royal, Rear-Admiral Samuel F. DuPont ordered *Weehawken* to join the blockading fleet then anchored off Charleston.

On the morning of April 7, 1863, *Weehawken* had the honor of leading the Union fleet in the first major naval assault against Confederate fortifications in Charleston Harbor (Coker 1987:240). Unfortunately for Admiral DuPont, the attack failed miserably, soon costing him his command, and his battered fleet withdrew after only 40 minutes, with his lead monitor *Weehawken* taking a reported 53 hits from Confederate gunners (Mooney 1991:190). Shortly after the failed attack, Rear-Admiral John A. Dahlgren, until then commandant of the Washington Navy Yard, replaced Admiral DuPont as commander of the squadron. During the engagement *Weehawken* had also struck a submerged torpedo resulting in minor damage.

After repairs, the ironclad was ordered to Wassaw Sound, Georgia, to intercept the anticipated arrival of the recently completed Confederate Ironclad CSS *Atlanta* (Mooney 1991:190). On the morning of June 17, *Atlanta*, and two escort steamers, showed themselves and were immediately confronted by both *Weehawken* and *Nahant*. In the confusion that followed, CSS *Atlanta* ran hard aground and had her pilothouse shot away by *Weehawken*'s guns after only five shots fired. Within 15 minutes after the fierce engagement had erupted, the battered *Atlanta* hoisted a white flag and surrendered. News of the easy victory electrified the North and Captain Rodgers was soon a national hero, receiving commendations from both Abraham Lincoln and Naval Secretary Gideon Welles (Mooney 1991: 190).

With Rodgers new found fame came his promotion to Commodore and command of the new Union ironclad steamer *Dictator*. *Weehawken* was soon placed under the command of Captain E. Simpson. Shortly after the one sided engagement with CSS *Atlanta* had been decided, *Weehawken* (under Captain Simpson), resumed operations against rebel strongholds in and around Charleston Harbor. On September 7, 1863, Admiral Dahlgren ordered *Weehawken* to deploy in the narrow channel between Fort Sumter and Cumming's Point, where she promptly grounded taking concentrated fire from every Confederate battery that could train their guns on her. The battered ironclad was floated off the following day with the help of several tugs, and her crew quickly received a hearty "Well Done!" from Admiral Dahlgren for "outstanding defensive gunnery while aground" (Mooney 1991:191).

From the pounding that the ironclad had taken on September 7-8, the vessel was quickly ordered to Port Royal for repairs and did not rejoin the fleet off Charleston until the October 4. The next two months on blockade duty were uneventful; the crew of *Weehawken* doing little more than ride at anchor at her station off Morris Island. This mundane duty changed radically, however, when a moderate gale hit the blockading fleet on the morning of December 6.

For reasons unknown at the time, *Weehawken* started taking on water in her forward compartment and quickly signaled the other vessels in the fleet that she was in trouble and desperately need assistance. Attempts to beach the ironclad failed and she suddenly sank in 30 feet of water some five minutes after raising the alarm to the ships of the fleet, carrying down with her 31 crewmen (Mooney 1991:191). From the following report submitted to Admiral Dahlgren by Captain Simpson, who was absent from his vessel at the time of the disaster (Wilcox 1966:68), comes early theories as to why *Weehawken* was lost:

U. S. Ironclad Passiac, Off Morris Island, South Carolina, December 6, 1863. Sir: I respectfully submit my opinion of the cause of the sinking of the Weehawken: From the testimony that I have been able to collect, it appears that between 11 a.m. and meridian the windlass room was full of water; the forward hatch was then closed, and no water could find its way in except through the hawse hole. At this time the centrifugal pump did not work, as there was not enough water aft to make it "fetch." This indicated a want of free communication through the limbers. It seems as if this difficulty was overcome, for some time afterwards the water rose to about 4 inches of the fire-room floor, which would make it 26 inches below the grate bars when the centrifugal pump was in operation, discharging steadily its 2,000 or 3,000 gallons of water per minute.

No apprehension seems to have been felt at this time as to the danger of sinking; the vessel was noticed to be settling, but the commanding officer desired the presence of the captain, and commenced to signalize to that effect. At this instant the water suddenly rose in the vessel and she commenced to settle forward. The signal "in want of assistance" was made immediately and she went down. My conclusion is that the sinking of the vessel was not occasioned by the water that found its way into her through the hawse hole, for it seems clearly proven that free communication was established through the limbers between the hawse hole and the centrifugal pump, and I conceive that the centrifugal pump is able to discharge all water that could enter by the hawse hole.

I believe that the injuries that the vessel had received, in service, particularly while aground under the fire of the Sullivan's Island batteries (assisted, perhaps, by the straining produced by being beached at Port Royal) had so strained her that the rivets were loose on some of her

bottom plates, and the rough sea that was running at the time of the disaster must have been sufficient to open the plates and admit the water. From all that I can learn it was no gradual accumulation of water that caused the vessel to sink, but it was almost instantaneous; this could alone be caused by such reason as I have assigned. I merely submit this hurried paper with view to rendering some slight aid toward assigning a reason for the terrible disaster. Very respectfully, your obedient servant, E. Simpson, commanding.” (ORN, ser. 1, vol. 15:164).

From the court of enquiry following the disaster, it was revealed that *Weehawken* had recently received a large quantity of ammunition that had been innocently stowed in the forward compartments of the vessel, thus causing the ironclad to tilt forward. When the storm hit, water entered through a hole in one of the compartments and continued to accumulate until the vessel swamped. From the court of enquiry comes the following in regard to the accidental sinking:

The opinion of the court on the facts in the case, as here detailed, is that the causes of the sinking of the *Weehawken* were:

1st. The additional weight of ammunition that had been lately put on board of her, leaving her trim so little by the stern as not to allow sufficient inclination for water to get to the pumps freely.

2nd. The neglect to close the hawse hole and the delay in closing the hatch over the windlass room, which permitted the rapid accumulation at the forward extremity of the vessel of sufficient water to bring her nearly on an even keel.

3rd. The large amount of water that was permitted to come into the vessel under the turret through the XI-inch port and down the berth-deck hatch, which assisted to tip the bows of the vessel.

4th. The amount of water which, owing to the immersion of the forward part of the vessel, came in under the plank-sheer.

5th. The absence of all effort to relieve the forward part of the vessel from its depressed position by rolling shot aft or moving any weight from the bow.

The court does not consider that it has any positive evidence that the hull of the *Weehawken* is ruptured; extensive openings were apparent under the plank-sheer, but there is nothing in the testimony to indicate a rupture of the hull, except the evidence of one witness, who states that he found the beams started in 2 inches, as shown by the paint marks having separated that distance from the ceiling. The court is unable to account for this appearance; all other points in the evidence are reconciled in the statement of the facts in the case as already set fourth. It remains of the court to express its opinion on the merits of the case, and it recognizes the propriety of further military proceedings in the case. E. Simpson,

Lieutenant-Commander and Presiding Officer of the Court of Enquire (ORN, ser. 1, vol. 15:168).

Although Admiral Dahlgren wished to raise *Weehawken* with the aid of the navy divers at Port Royal, the effort was soon decided to be unfeasible, and the vessel was abandoned.

Wreck Site History

During the early 1870s, a survey of the harbor found *Weehawken* had been heavily blasted by unknown parties to a depth of 11 and a half feet below the surface of the water. The engines had been removed and pieces of the turret, composed of 12-inch iron, and the pilothouse, composed of 10-inch iron, were lying inside the hold of the vessel along with the boilers. The sand was banked up on both sides of the wreck. Aft of the wreck the bottom had been cut out for a distance of 40 feet, and the stern, pointed to the west, had broken off and fallen, but was still attached to the remainder of the wreck by the lower parts. The surveyor suggested that the wreck should be, as nearly as possible, removed (USACE 1871: 581). A contract was entered with Benjamin Maillefert on September 20, 1872 to remove *Weehawken* and by 1873, the wreck was removed to a depth of 20 ft. at low water (USACE 1873a: 727-728). Judging from the numerous entries in his salvage logs, it could be assumed that most of the wreck was carted away as scrap (Maillefert logs on file at the South Carolina Historical Society).

A 1975 newspaper article related that the Patriot's Point Authority was interested in raising *Weehawken* and displaying the vessel in a pool of filtered harbor water. The article stated that a proposed joint project with Patriot's Point, SCIAA, Smithsonian Institution, and US Navy would work to raise the shipwreck. The article also noted, however, that the project requires ". . . cooperation of several government agencies and money-lots of money" (Ripley 1975: 1-A & 2-A). The project was never realized.

POSTBELLUM (1865-1940s)

USS *Hector*

On May 12, 1908, the Congress of the United States appropriated \$1,575,000 to purchase three colliers, with cargo-carrying capacities to exceed 7,000 tons dead weight each (Figure 4.6). The Secretary of the Navy being able to make such purchases issued a circular stating the particular features required and the maximum time the Navy would wait for delivery. The Maryland Steel Company was the lowest bidder offering to build the three ships for \$1,138,000, and to make delivery of them in ten, eleven and twelve months. These vessels, *Mars*, *Vulcan* and *Hector*, were delivered to the government in 1909, with *Hector* being commissioned on October 22, 1909.

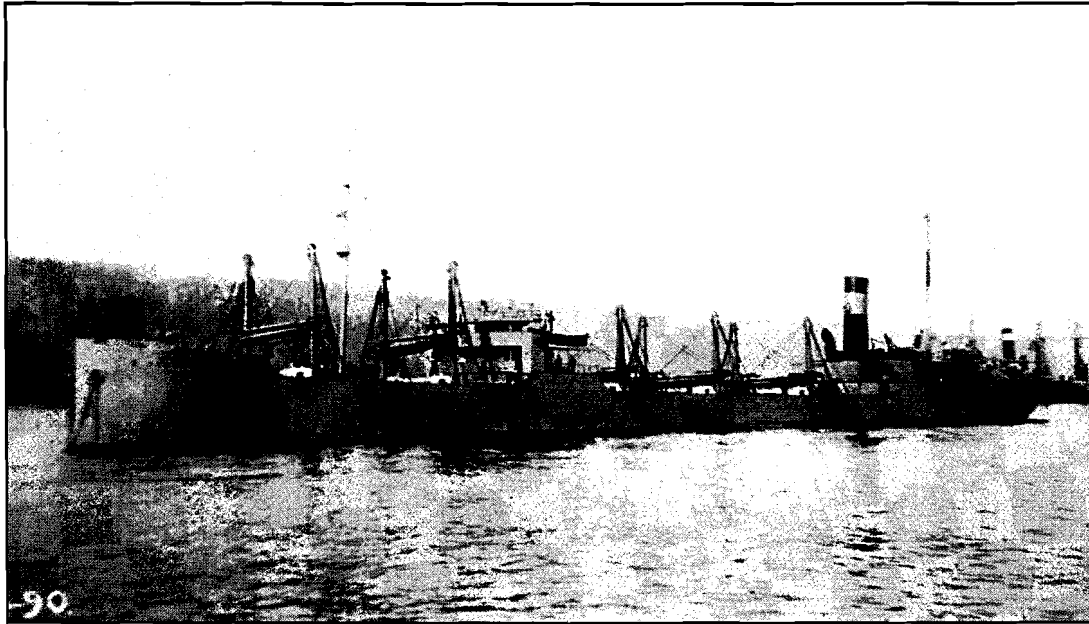


Figure 4.6: USS Hector (from Naval Historical Center).

Soon after her commissioning, the 403-foot-long vessel was ordered on special service with the Atlantic Fleet, with her homeport at the Norfolk, Virginia Naval Base (*Hector* File located in the Ship Histories branch at the Navy Historical center). From that port the *Hector* served as a fuel ship, ferrying freight and fuel up and down the east coast and down to the Caribbean, especially Guantanamo Bay and Santo Domingo. On the July 15, 1916, while proceeding on her usual duties as a collier from Charleston to the Caribbean, *Hector* encountered a fierce gale and was driven ashore off Cape Romaine, South Carolina. The vessel sank three days later (Moody 1991; US Department of the Navy [DoN] 1916:91).

From the *Annual Reports of the Navy Department for the Fiscal Year 1916*, comes the following entry regarding the loss of the collier *Hector* (Figure 4.7):

The USS Hector, a naval collier of 11,230 tons displacement was damaged in a storm of the greatest violence on July 14, 1916, and went ashore on the coast of South Carolina. There was fortunately no loss of life, as all officers, and crew, and passengers were taken off by vessels which went to the assistance of the *Hector* in answer to her distress calls sent out by radio. The vessel broke in two after going ashore. Although the wreck was in a very exposed position there appeared to be a reasonable chance for successful salvage operations, by which the two ends of the vessel could be raised separately and be taken to the navy yard, Charleston, for rejoining and repair.

Salvage operations were continued until the end of October without success, owing to abnormally bad weather. After November the danger of

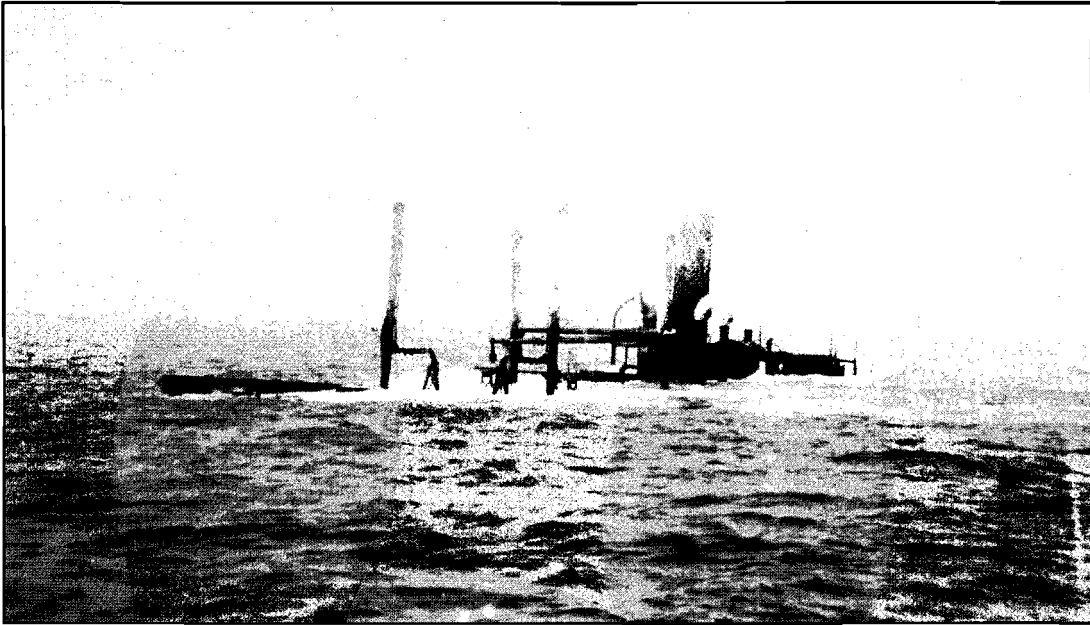


Figure 4.7: Stern of USS Hector sunk off Cape Romaine (from Naval Historical Center).

winter storms precluded further work. An estimation of the wreck will be made as early as the spring as the weather permits, and further efforts to salvage the vessel will then be made, the conditions appear to warrant such action (DoN 1916:66).

Wreck Site History

The site is located approximately 10 miles off Cape Romaine, marked by a buoy. The wreck rests in approximately 10 meters of water. Sport divers have visited the site periodically over the years. According to a shipwreck diver, the wreck consists of various sized components strewn about the bottom, with relief from the bottom about three to four meters in some areas. Evidently, nowhere is there evidence of a contiguous hull (Gentile 2003:74).

MODERN (1940s to present)

Patrol Vessel *YP-481*

The wooden hulled, 48-foot-long patrol vessel *YP-481* (ex-*Princess Mary*), was built at St. Augustine, Florida, in 1939. With the start of World War Two, the Navy launched a program of purchasing pre-war vessels and converting them for military use. On July 2, 1942, *Princess Mary* was purchased from her owner, Roseina Poliveira, and immediately sent to Savannah, Georgia for military conversion. On August 27, 1942, the renamed district patrol vessel *YP-481* was placed in service at Charleston. In April of 1943, the *YP-481* accidentally ran aground at the mouth of the harbor and remained

beached until April 25 when she was removed from the rocks and beached at “Section Base.” A board of survey was created to evaluate the condition of the patrol boat and came to the conclusion that the “Vessel was beyond economical repair.” *YP-481* was removed from the Navy list of commissioned vessels on July 28, 1943. (*YP-481* history file located at the Navy Historical Center, Washington Navy Yard).

Wreck Site History

There is no known location of this site, consequently there has not been any archaeological investigation or known sport diver activity on this site.

CHAPTER 5

ANALYSIS OF INVENTORY

The intent of this chapter is twofold, first, to categorize, quantify, and qualify the navy shipwrecks as a group, and two, to describe the natural and cultural environment of the shipwrecks in South Carolina. Weaving together these dual purposes will serve to aid in structuring analysis of the shipwrecks as a research and management resource. Several analytical categories were developed to help characterize the wrecks by historical period, cause of shipwreck, location, environmental context, and if any salvage or archaeological activity has occurred on a shipwreck. A discussion follows on the natural and cultural environment and resulting potential and known impacts to these wrecks sites residing on state bottomlands. The intended outcome of this chapter is to provide guidance for the researcher and manager in making decisions concerning future financial, personnel, or institutional commitments to studying or managing these particular sites. Possible research and management avenues of inquiry benefiting from this discussion include determining the historical and archaeological significance of these shipwrecks, prioritizing shipwreck investigations and surveys, judging potential artifactual content based on past salvage work and environmental context, among others. These research and management themes are multi-scalar, providing guidance at the state level where the interest in these shipwrecks lies within their context in South Carolina history, and at the federal level where the interest lies in placing this sub-set within the broader context of navy shipwrecks world-wide.

Historical Periods of United States Navy Shipwrecks

The greatest number of shipwrecks date to the Antebellum period in South Carolina history. One shipwreck dates to the Colonial era, *Queen of France*. Forty-three of the shipwrecks date from the Antebellum period and include the *Ferret* and *Gunboat No. 157*, which date to the early 1800s, while the remainder of the shipwrecks are associated with the Civil War that include the 1st and 2nd Stone Fleets, *Marcia*, *Dai Ching*, *Harvest Moon*, *Housatonic*, *Keokuk*, *Kingfisher*, *Patapsco*, *Robert B. Howlett*, *Stono*, and *Weehawken*. One shipwreck dates to the Postbellum period, *Hector*, and another shipwreck dates to the Modern period, *YP-481*. Chart 5.1 illustrates the percentages of shipwrecks by historical period.

Causes of United States Navy Shipwrecks

Navy ships lost in South Carolina were typically the result of scuttling to serve as a blockade of a waterway. The *Queen of France* was scuttled in the Revolutionary War in the Cooper River as a defensive move against the British fleet. During the Civil War, the Union blockaders sank 31 vessels in two separate endeavors, the 1st and 2nd Stone Fleets, to block the channels leading into Charleston from use by blockade-runners. Eight vessels were lost due to groundings: *Ferret*, *Gunboat No. 157*, *Kingfisher*, *Stono*, *Hector*, *YP-481*, *Marcia*, and *Robert B. Howlett*. Enemy action during the Civil War accounted for five losses, which included *Housatonic*, *Harvest Moon*, *Patapsco*, *Dai Ching*, and *Keokuk*. A rough sea state

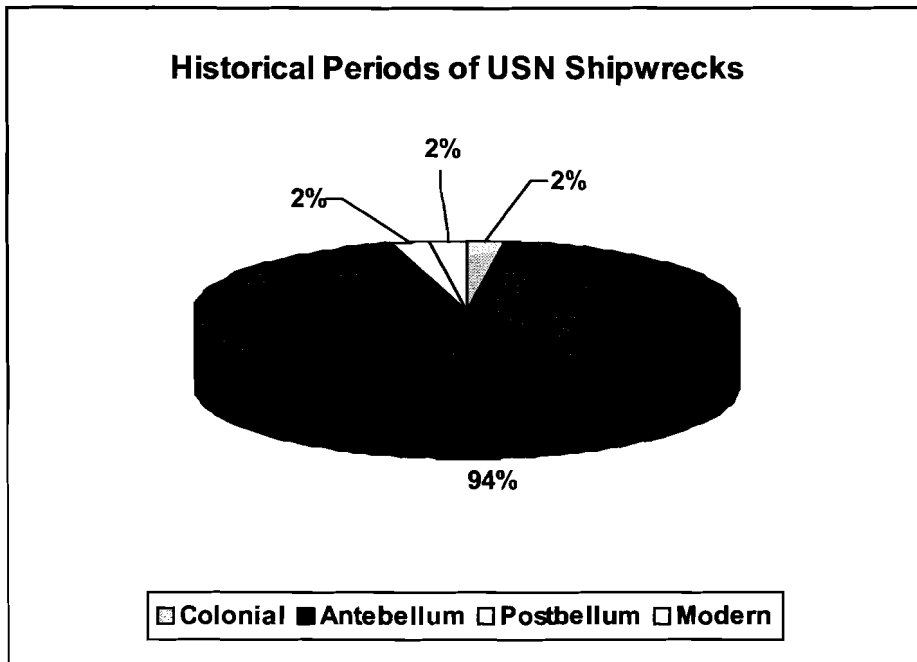


Chart 5.1: Pie chart showing historical periods of USN shipwrecks.

caused *Weehawken* to founder and sink while at anchor. Chart 5.2 illustrates the percentages of causes of shipwrecks in state waters.

Geographical Distribution of United States Navy Shipwrecks

The majority of the shipwrecks lost in South Carolina were lost off of Charleston Harbor, a major theater of operations during the Civil War. Forty shipwrecks occurred in Charleston Harbor, including the 31 associated with the 1st and 2nd Stone Fleets, *Housatonic*, *Keokuk*, *Patapsco*, *Robert B. Howlett*, *Stono*, and *Weehawken*. The other three include *Queen of France* from the Revolutionary War, *Gunboat No. 157* from the early 1800s, and *YP-481* from the 1940s. The remaining six wrecks are located along the coast and include *Marcia* wrecked in Port Royal Sound; *Dai Ching* in the Combahee River; *Kingfisher* in St. Helena Sound; *Hector* off Cape Romaine in the Atlantic Ocean; *Harvest Moon* in Winyah Bay; and *Ferret* in Stono Inlet. Chart 5.3 illustrates the percentages of wreck locations.

Environmental Situation of United States Navy Shipwrecks

The majority of shipwrecks in South Carolina waters are located in the Atlantic Ocean with the balance in an estuarine or riverine environment. Forty wrecks are in the Atlantic Ocean and include *Ferret*, *Gunboat No. 157*, 1st and 2nd Stone Fleets, *Marcia*, *Housatonic*, *Keokuk*, *Kingfisher*, *Robert B. Howlett*, *Weehawken*, and *Hector*. Five shipwrecks are located in an estuarine, or bay environment: *Queen of France*, *Stono*, *Patapsco*, *Harvest Moon*, and *YP-481*. Only one shipwreck, *Dai Ching*, is located in a river. Chart 5.4 illustrates the percentages of the environmental situation of the shipwrecks

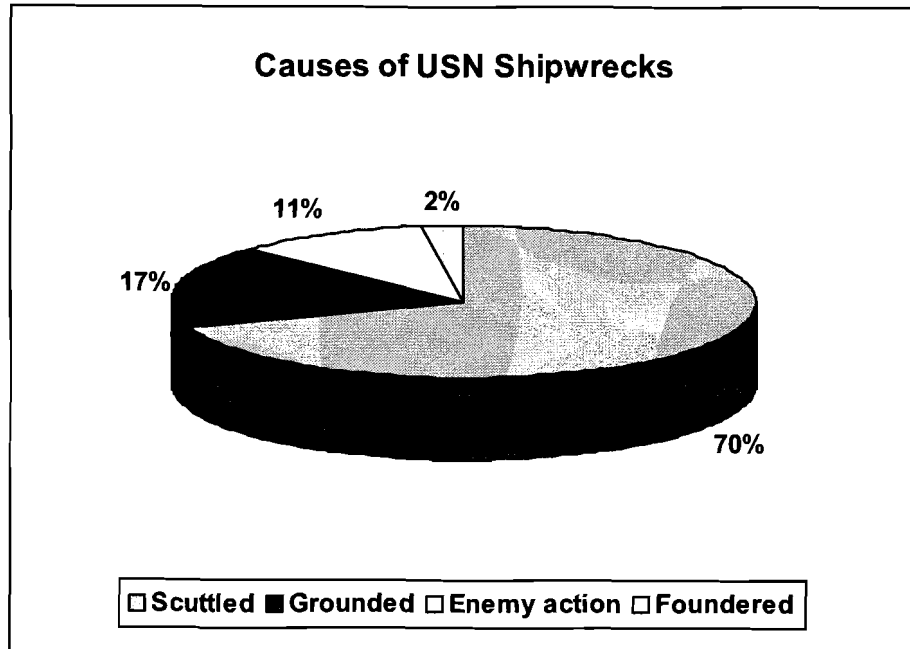


Chart 5.2: Pie chart showing causes of USN shipwrecks.

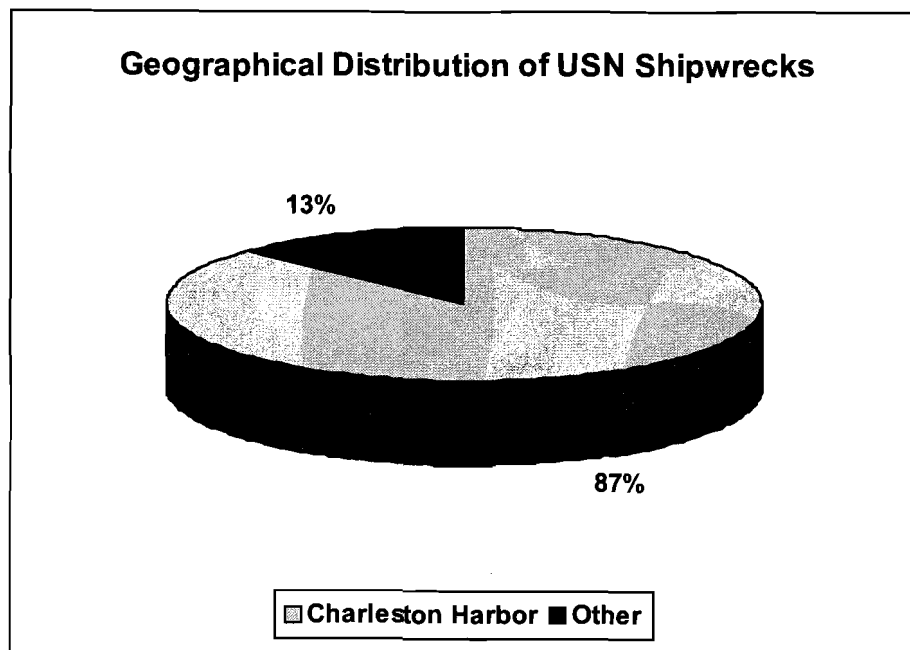


Chart 5.3: Pie chart showing geographical distribution of USN shipwrecks.

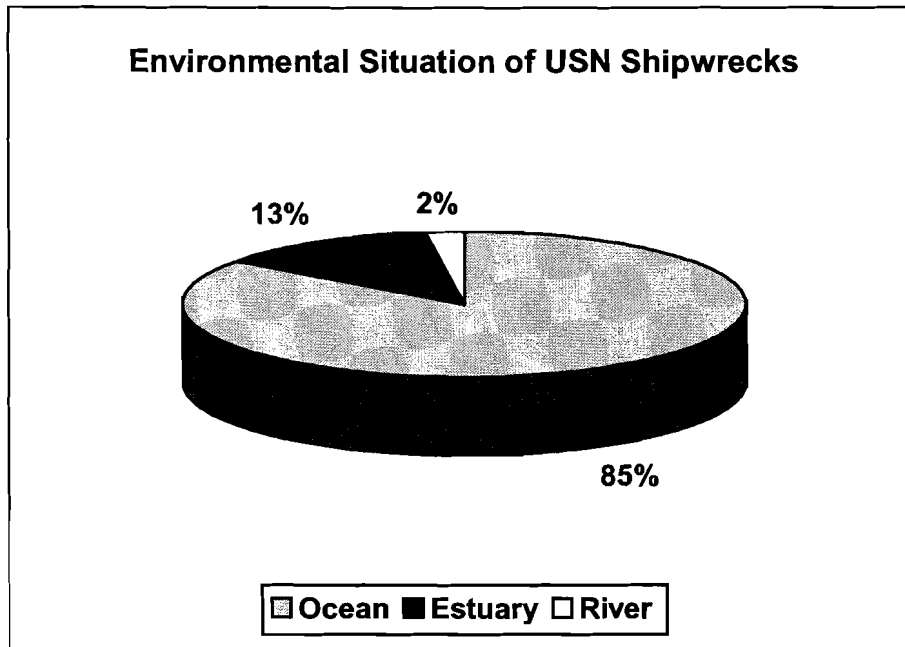


Chart 5.4: Pie chart showing environmental situation of USN shipwrecks.

Known Site Locations of United States Navy Shipwrecks

The general locations of most of the naval shipwrecks in the database are known. The location of the 31 vessels of the 1st and 2nd Stones fleets are marked on period charts, but no DGPS coordinates have been obtained to record their locations to modern coordinates. The location of eight wrecks are known for certain which includes *Weehawken*, *Stono*, *Patapsco*, *Keokuk*, *Housatonic*, *Dai Ching*, *Harvest Moon* and *Hector*. The location of seven shipwrecks remain unknown and include *YP-481*, *Robert B. Howlett*, *Kingfisher*, *Marcia*, *Gunboat No. 157*, *Ferret*, and *Queen of France*. Chart 5.5 illustrates the percentages of known site locations.

Known Salvage or Archaeological Investigation of United States Navy Shipwrecks

Salvage, for this analysis, is defined as the physical removal of structure or objects from a shipwreck, and is sub-divided by temporal activity at the site: contemporary or modern. Contemporary salvage means removal of materials from the ship shortly after it sank, for example, by Union or Confederate forces recovering cannons and other items. Modern salvage means a lengthy interval between sinking and salvage, for instance the 1870s USACE removal of Civil War wrecks from state waterways. Archaeological investigation is defined as any intrusive physical disturbance of a site for scientific reasons. Of the 46 shipwrecks in the inventory, 35 have suffered no contemporary salvage operations, modern salvage activities, or archaeological investigations. *Harvest Moon* was the only shipwreck extensively salvaged by Union forces immediately after its sinking, although the Confederates did salvage two guns from *Keokuk* shortly after it sank. There was some contemporary salvage of *Dai Ching*, *Kingfisher*, and *Housatonic* following their loss. The

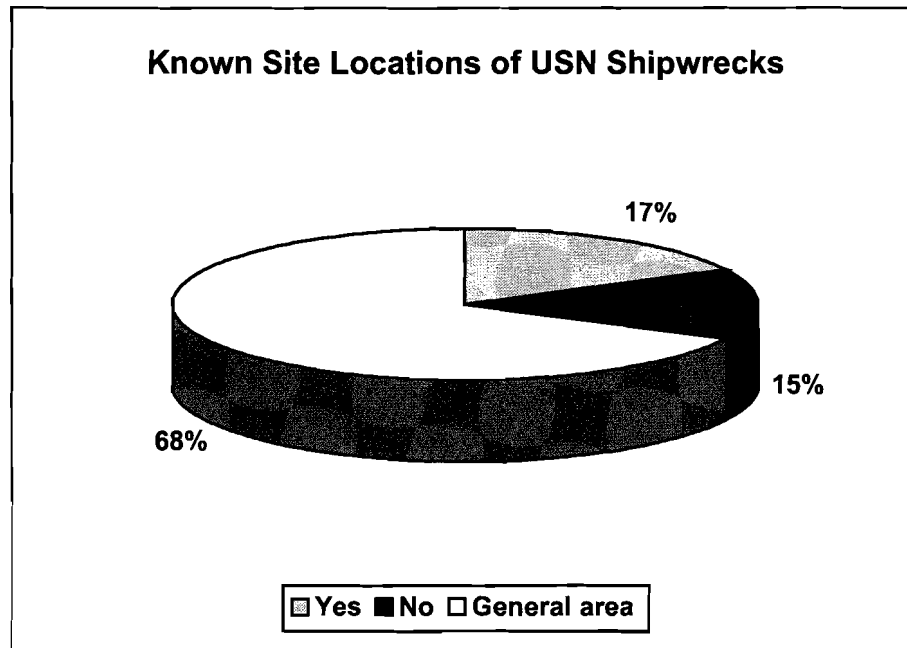


Chart 5.5: Pie chart showing known site locations of USN shipwrecks.

Union monitors *Patapsco*, *Weehawken*, and *Keokuk* suffered extensive salvage operations in the 1870s. *Stono* was also heavily salvaged in the 1870s and then salvaged under a SCIAA salvage license from 1985-1990. *Housatonic* also underwent major salvage operations in the 1870s and early 1900s and is the only navy shipwreck that has undergone archaeological inquiry. The *Harvest Moon*, *Patapsco*, *Keokuk*, and *Weehawken* have undergone limited archaeological inquiry, essentially operations to discern the layout of the remains by avocational groups. SCIAA has conducted non-intrusive remote sensing operations on those sites, as well as *Dai Ching*. Shortly after *Hector* sank, the Navy attempted salvage operations to recover the halved-ship, but was thwarted by foul weather. No records were uncovered that determined what if anything was removed from the shipwreck. Table 5.1 denotes what human intervention has occurred on each wreck site.

Environmental Context, Geographic Location, and Accessibility

South Carolina can be divided into five landform regions: Blue ridge, Piedmont, Sandhills, Inner and Outer Coastal Plain, and Coastal Zone. These regions define a varied topography from moderately high mountains to some of the flattest areas in North America (Kovacik and Winberry 1987:13). The Coastal Zone of the state comprises approximately 185 miles of coastline and encompasses the nearshore margins of the coastline, extending some 10 miles (16 kilometers) inland from the coastline. For management purposes the Coastal Zone also encompasses South Carolina's Territorial Sea, which extends three miles from the coast with reference to land exposed at mean low water.

The entire Coastal Plain and Coastal Zone is underlain by sedimentary rocks that were laid down over tens of millions of years. This layer slopes seaward from the Fall Zone, some 100 miles inland, where it is only a few feet thick to the coastline where it exceeds

Table 5.1: Salvage or archaeological investigations of USN shipwrecks.

Vessel Name	Contemporary Salvage	Modern Salvage	Archaeological Investigation
<i>Queen of France</i>	No	No	No
<i>Ferret</i>	No	No	No
<i>Gunboat No. 157</i>	No	No	No
<i>First Stone Fleet</i>	No	No	No
<i>Second Stone Fleet</i>	No	No	No
<i>Marcia</i>	No	No	No
<i>Dai Ching</i>	Yes	No	Yes
<i>Harvest Moon</i>	Yes	No	Yes
<i>Housatonic</i>	Yes	Yes	Yes
<i>Keokuk</i>	Yes	Yes	Yes
<i>Kingfisher</i>	Yes	No	No
<i>Patapsco</i>	No	Yes	No
<i>Robert B. Howlett</i>	No	No	No
<i>Stono</i>	Yes	Yes	Yes
<i>Weehawken</i>	Yes	Yes	No
<i>Hector</i>	Yes	No	No
<i>YP-481</i>	No	No	No

3,500 feet in thickness. The Coastal Zone itself can be divided into three zones. The northernmost 60 miles of coastline is made up of a largely unbroken strand built on a 100,000-year-old barrier sand formation. South of the strand is the Santee delta, the largest river delta on the east coast, extending some 20 miles along the South Carolina coast. From the Santee delta to the Savannah River the South Carolina coastline is dominated by the Sea Island complex made up of erosion remnant islands and barrier islands

Into the Coastal Zone flow the numerous rivers and streams that drain the state. The Savannah, Santee, and Pee Dee, the three major river systems in the state, have their headwaters in the Blue Ridge Mountains and drain approximately 80 percent of the state's area. Heavy sediment loads made up of silts and clays characterize the waters of these rivers and others like the Ashley, Edisto, and Combahee that drain the Piedmont. In contrast, the streams originating in the Coastal Plain carry little sediment but are characterized by dark tannic-stained water originating in swamps (Kovacik and Winberry 1987:20-27).

The wrecks in the purview of this management study, that is United States Navy wrecks, are located on the inner continental shelf of the South Carolina Coastal Zone. As noted earlier, while the sites are distributed along the southern 125-mile stretch of coastline, the majority of US Navy shipwrecks (40) occurred in the immediate environment of Charleston Harbor with the remainder (6) being distributed in a variety of coastal environments. The remainder of this chapter will address the potential threats to the US

Navy shipwrecks in South Carolina waters and the factors affecting potential preservation of those wrecks.

Potential Threats and Factors Affecting Preservation

It is generally accepted that the best conditions for site preservation occur in deep, cold water with little movement or protected by an oxygen-limiting barrier of sediments or biota (Trubey 2001:203). South Carolina cannot claim this kind of site preservation-friendly environment, however, various zones in the state can provide localized environments that foster preservation of a range of cultural materials. A wreck site is simply the product of a sequence of events, which began with the design and construction of the vessel, the cultural and environmental factors that precipitated the demise of the vessel (the wrecking process), and the cultural and environmental factors that affect the wreck thereafter (Breen et al 2001:86). For the 46 US Navy shipwrecks known, or believed to have been lost in South Carolina waters, various amounts of information on the construction and operational history of each craft are generally available, as are the reasons and circumstances of the loss of each vessel. It is what has occurred on the site from the moment the stricken vessel impacted the sea bottom until its remains are located and observed at a later date (potentially from 30 to 220 years for the naval sites in South Carolina) that determines the degree of survival of a wreck and, hence, the amount of useful information that an archaeologist has to work with while investigating a site. Attempts to describe and explain this process have been postulated by the late Keith Muckleroy (1977a, 1977b, 1978 and 1998), among others and the concepts are used on virtually every archaeological shipwreck investigation today.

Natural and Cultural Impacts

Numerous natural and cultural factors affect the preservation of shipwrecks and other submerged cultural sites. Natural factors are probably the most complex and difficult to understand. Over time, a wreck site will eventually become stable, reaching equilibrium with its environment. The environment in which a wreck is deposited may aid in the preservation of the site, but may also adversely impact the site. A ship that settles to a rocky seafloor in a dynamic environment like a surf zone will likely disintegrate and become dispersed fairly rapidly. Conversely, a shipwreck that settles into a silty bottom and rapidly becomes buried will more likely survive the rigors of time relatively intact with a commensurate high preservation rate of a wide range of artifacts. Cultural impacts, such as dredging or artifact collecting, oftentimes more destructive than natural deterioration, can wreak havoc on an otherwise intact shipwreck. Each natural or cultural factor discussed below varies in its ability to aid in the preservation or destruction of a shipwreck site.

Sediments

Of the natural factors, without a doubt, the nature of the seabed deposit is the primary factor that determines the survivability of a shipwreck site (Muckleroy 1998: 272; Oxley 1998:523). The Navy shipwrecks in South Carolina are located predominantly in two types of environments—the nearshore environment within three miles of the coast, and the riverine and estuary environment. For the most part these environments provide a protective mantle

of fine to coarse sediments over the site that effectively exclude oxygen and shield the sites from other dynamic influences. Much of this material was transported from the upland and Piedmont regions of the state in the major rivers flowing to the coast. However, there is evidence that the zones comprising the central and southern barrier islands are currently receiving little sand from fluvial sources (Brown 1977:262-263) likely due to the number of low-load-sediment-bearing rivers flowing into those zones (Kovacik and Winberry 1987:27). Included in these latter zones are Charleston Harbor, St. Helena Sound, and Port Royal Sound, all of which were formed at the mouths of black-water rivers.

The sands and other sediments on the coast, notably in the Charleston area, tend to migrate southward along the coast through a process called longshore sediment transport eroding some barrier islands and accreting others (FitzGerald, Fico, and Hayes nd:5). The net result of this transport appears to keep the shipwrecks, located off the coast, buried and therefore protected as evidenced on the sites of USS *Housatonic* and *H.L. Hunley* (Murphy et al. 1998), USS *Keokuk* and USS *Weehawken*. This concept was borne out by results of sediment analysis over the *Hunley* site, which demonstrated that the predominantly sand matrix mixed with fines was laid down in "discrete strata, hard and compact" (Murphy et al. 1998:97). Further evidence of continued burial are the whaling vessels of the two Stone fleets sunk across entrances to the Charleston channels during the Civil War and USS *Patapsco*, which has apparently been accreting in spite of its proximity to the dredged channel. While the construction of the Charleston jetties in the 1870s altered the dynamics of the area in which these sites are located (FitzGerald, Fico, and Hayes nd), these sites have remained buried to this day.

Erosion, Currents, and Waves

In the riverine areas of the state and along the coastal fringes of the barrier islands erosion is a very real threat to shipwreck sites. Erosion occurs when the stabilizing fabric of sediments overlying and surrounding a site begin to wash away. This threat can best be characterized as localized in scope and may be caused by natural riverine and ocean dynamics, accelerated by poor land management practices, natural wave action and waves caused by boat wakes, or human intervention in nature's natural dynamics. During a recent shoreline survey of the rivers flowing into Port Royal Sound 32% of archaeological sites revisited showed evidence of having suffered extensive erosion (Spirek et. al. 1999:134).

On the coast, waves and tidal action constantly alter the beaches, prevailing currents wash materials offshore and alter the islands' shapes, and storms often bring sudden changes to the coastal areas. Two dynamic examples of these actions occur at Hunting Island, located at the entrance to St. Helena Sound and on Morris Island, at the entrance to Charleston Harbor. At Hunting Island, the beach along the center of the island erodes annually more than 10 feet. However, the northern end of the island has lost almost two miles of shoreline in the past two centuries (Foley, Nylund, and Hutto 1993:13). Generally, the northern ends of barrier islands experience erosion while the southern ends accrete. However, on Morris Island this situation is reversed due to the presence of the Charleston jetties, which have substantially altered the sediment transport patterns in the area (FitzGerald, Fico, and Hayes nd:1).

Tidal currents have the ability to transport sediments over great distances and can have a significant impact on exposed submerged sites and sites in intertidal environments. However, their impact on submerged buried sites is usually negligible. While relatively low-velocity currents can move fine sediments, a current of at least several knots is required to move coarse sand. The tides along the South Carolina coast are semidiurnal, with two high waters and two low waters each day. In the entrance to Charleston Harbor, the mean tidal range is 1.6 meters, which increases to 1.9 meters during the spring tidal cycle (FitzGerald, Fico, and Hayes nd:4). Between the jetties maximum ebb velocities exceed maximum flood velocities by 1.7 times.

Waves, too, have the ability to disturb the seafloor. However, the effectiveness of waves to move water over a site is dependant on the speed and duration of an onshore wind, as well as the fetch or distance of open water over which the waves must travel before reaching the coast. Also, wave energy decreases rapidly with depth, being only 1/23rd of its surface strength at a depth of one-half its wavelength. This led the late Keith Muckleroy (1978) to conclude that, wave-induced sediment motion is primarily a feature of shallow-water sites. In South Carolina, deep-water waves primarily approach the coast from the northeast to the southwest with an average height of 4.3 feet (1.31 meters) along the southern coast (FitzGerald, Fico, and Hayes nd). It is therefore reasonable to assume that the naval wrecks located in areas of high-energy wave action, like the surf zone on beaches and offshore bars will be subjected to the greatest adverse impact from waves.

These natural forces, either alone or in combination, can have a devastating effect on submerged or intertidal shipwreck sites. However, results of work by Muckleroy in the 1970s suggests that, "it is the variety of disturbing forces acting on a site, coming from a number of different directions, which is more significant than their force" (Muckleroy 1998:273). Also, except for wrecks in high dynamic environments "once initial deposition has been made, these forces have little impact on the subsequent history of the remains" (Muckleroy 1998:273). This supposition can be extrapolated to apply to the Navy shipwrecks around the Charleston Harbor area and indeed for most of the Navy shipwrecks in the state.

Since shortly after the Civil War, some 45 tropical storms and hurricanes have affected the South Carolina coast. In 1989, one of these hurricanes, Hugo, made landfall at Charleston, thereby passing directly over the Navy shipwrecks in the area. Hugo brought with it 137 mph winds and a four-to-six-meter-storm surge over these sites. In spite of these forces raging in the proximity of the shipwrecks, the submarine *H.L. Hunley*, which was buried beneath from one to two meters of sediment, remained undisturbed by Hugo, and indeed by all storms since the submarine's sinking in 1864 (Murphy et al. 1998:41, 97-99). However, the wrecks of several blockader runners at Bowman's Jetty, located at the mouth of Charleston Harbor, suffered from extensive shifting of sands from Hugo that covered substantial portions of the wrecks that were previously exposed. Salvagers investigating the *Stono* site, at Bowman's Jetty, six months after Hugo, reported that the hurricane had scrambled together modern items such as soda cans and clothing with historical artifacts (Salvage License no. 32 file, on file at MRD/SCIAA).

Biological Degradation

Marine organisms often affect the integrity of submerged sites, especially those with wooden components. Marine borers, such as shipworms (*Teredo navalis*), and freshwater borers, such as gribbles (*Limnoria lignorum*), degrade a wooden structure by leaving the wood riddled with tunnels. The ubiquitous oyster colonies in Port Royal Sound and the various tidal estuaries of the coast also impact intertidal sites by covering both wooden and iron-hulled shipwrecks. More investigation needs to be carried out to understand the relation of oysters to the integrity of submerged archaeological sites. Oyster coverings may prove beneficial to archaeological sites by sealing them from outside destructive forces such as waves and currents, and perhaps from the insatiable shipworm. The oyster mantle may also obscure intertidal sites from casual observation that may serve to minimize impacts by curious beachcombers. Two other local marine species that affect submerged wooden structure based on empirical observation include sheepshead (*Archosargus probatocephalus*) and stone crabs (*Menippe mercenaria*). Both of these animals tear into exposed wood: the fish in search of food, and the shellfish to make a burrow.

The site environment also determines the amount of structure exposed to marine organisms. Sediments in which a hull is buried may deprive organisms potentially destructive to a wooden hull of oxygen. The degree of compactness of the sediments and factors such as sediment composition and sediment grain size determine the amount of oxygen deprivation. For example, loose, large grained quartz sands will allow more oxygen to penetrate below the sediment thereby causing the upper portions of the hull to become more vulnerable to oxygen breathing organisms than a hull encased in fine, compact oxygen depriving mud. This is called the Reoxygenation Discontinuity Potential, or Redox, which determines the amount of buried hull available to organisms requiring oxygen, that is, shipworms. For example, the interior of the *H.L. Hunley* was filled with stratified sediments that were composed of variable concentrations of fine sediments in the strata, thereby effectively sealing off the interior from the destruction of shipworms and other aerobic influences on the organic materials within the hull. There are, however, sulfide organisms also working on the shipwreck as well that require no oxygen (Franklin et al. 1991:57). Given that the majority of marine organisms cannot survive in oxygen deficient environments it is reasonable to conclude that, once a wreck has become encapsulated in sediments that create an anaerobic environment these organisms will cease to have a deleterious effect on the site.

Chemical Decomposition

A wide range of factors affects chemical decomposition at a site. Many of the historical archaeological sites, notably the Navy shipwrecks in this inventory, consist of composite materials, such as iron, wood, copper, brass, and steel. The interaction between disparate metals produces a galvanic process on a macro scale that causes the less noble metal, for example, iron, to corrode and sacrifice itself for the more noble one, for example, copper. In this example, if iron and copper were in contact, the iron would corrode more

quickly in preference to the copper. This process can also occur at a micro level within artifacts composed of a single metal. In those cases the process would occur between differing grades of metal or in objects containing impurities (Hamilton 1976, 1996). Salt water in and around the site acts as an electrolyte supporting the galvanic process, and the amount of salinity of the water greatly affects the degree and rate of corrosion.

It has been estimated that iron corrosion rates in seawater are 10 times faster than in air (Hamilton 1976:8, 1996:42). Corrosion due to salinity affects all the Navy shipwreck sites in the South Carolina inventory. However, the rate of corrosion due to electrochemical processes can be retarded by numerous factors, including the sediments into which a shipwreck is deposited, stabilization of metallic surfaces through the buildup of corrosion products, and through the surfaces becoming covered in biota. Evidence of these processes has been documented on the *Hunley* site (Murphy et al. 1998:109-117) and on USS *Arizona* (Lenihan et al. 1989:144), as well as being noted on numerous submerged sites in South Carolina (e.g. Spirek et al. 1999). Many of the shipwrecks contained in the South Carolina inventory are constructed of metal. Consequently, monitoring the extent of corrosion and rate of the process on those sites would be a priority to further study of those shipwrecks.

Landscape Modifications

Human impacts to the coastal region of South Carolina derive from the alterations of the intertidal landscape and the bottomlands for residential, commercial, recreational, and navigational improvements. Major categories comprising the economic base of the state that drive development include military facilities, tourism and recreation, agriculture, forestry, and fisheries. Changes to the land and bottomlands have affected numerous archaeological sites, causing their destruction, and hastening negative environmental processes, often reducing a site's detectability by electronic equipment and visual means.

Residential impacts to the tidelands of the State include the building of recreational facilities, for example, docks or piers, and improvements to stabilize the shore with bulkheads, groins, or rip rap. Yearly, the U.S. Army Corps of Engineers, Charleston District and the Office of Coastal Resource Management, Department of Health and Environmental Control, and SCIAA review thousands of permit applications for intertidal development projects. Each of these construction projects has the potential to impact sites lying close along the shoreline. Luckily, few of the shipwrecks in the inventory have the potential to be directly affected by land modification. The *Stono* (ex. USS *Isaac Smith*), which lies close inshore near Bowman's Jetty on Sullivan's Island, could be affected by any future modifications to the foreshore fronting Fort Moultrie.

Dredging

Dredging has altered the bottomlands of the state's waterways and offshore areas and potentially has impacted submerged archaeological sites. Retrieval of phosphate rocks, improvements to navigation, and beach renourishment have occurred since the late 1800s to modern times. Each of these endeavors had, and continues to have, the potential to destroy or damage a submerged archaeological site. Phosphate mining occurred primarily in the

rivers of the state. Using a hopper-type dredge, phosphate companies removed the overburden of sediments, several feet thick, to reach the phosphate deposits below. Presumably, shipwrecks or other cultural materials resting on the lens above the phosphate rocks could have been adversely impacted by their complete removal or possibly damaged.

Navigation improvements have altered the bottomlands of many of South Carolina's inlets and sounds, which are characterized by sand bars off their entrances. Port Royal Sound was periodically dredged for naval purposes in the 1890s. However, in September of 1954, the River and Harbor Act authorized the U.S. Army Corps of Engineers to maintain a channel from the ocean through Port Royal Sound to the State Ports Authority wharf at Port Royal. The initial project was completed in 1959. Maintenance dredging continues as needed to maintain the various controlling depths and widths of the channel (Freeman 1982:1-8, 9). The work during this period was performed by a hopper dredge and dredged material deposited at two offshore sites, seven and 12 miles offshore.

In Charleston Harbor, channel dredging began in the mid-1800s, but it was not until 1874 that the first massive sediment removal was undertaken. The U.S. Army Corps of Engineers constructed two stone jetties in the late nineteenth century to "concentrate water discharge from the harbor to maintain scouring action." However, neither the jetties nor sand removal were sufficient to prevent silting of the ship channel, which had to accommodate vessels of increasing draft. Consequently, regular maintenance dredging was instituted, with the removal of more than 230,000 cubic meters of material per year between 1928 and 1944 (Murphy et al. 1998:43).

In 1942, much of the flow of the Santee River was diverted through Lake Moultrie into the Cooper River increasing the flow of that river from an estimated three to 20 cubic meters per second up to 425 cubic meters per second. As a result, Charleston Harbor experienced massive silting and shoaling causing a twenty-fold increase in maintenance dredging (Kovacik and Winberry 1987:27-29). After the U.S. Army Corps of Engineers determined that the problems were caused exclusively by the increase flow of fresh water into the harbor that effectively blocked the movement of sediments out of the harbor, they initiated a rediversion of 80 percent of the flow back into the Santee River.

The Charleston jetties were constructed between 1886 and 1896. They were designed to provide a stable entrance channel for vessels entering and departing the harbor through maintenance dredging to a constant depth, and by channeling bottom flow between the 4,700 and 5,825-meter-long stone structures, thereby allowing sediments to be carried offshore. However, in doing so, the jetties created profound changes to the delta's natural sediment transport patterns and altered natural wave energy and tidal currents. Essentially, the area northeast of the jetties accreted, while the landforms southwest of the jetties began to severely erode. This effect can best be seen at the south end of Morris Island, which lost between 500 to 1,100 meters of shoreline from 1900 to 1973. This erosion effectively moved the location of the Morris Island Lighthouse from 640 meters onshore in 1900 to 360 meters offshore by 1970 (FitzGerald, Fico, and Hayes nd: 1-15). However, the effect also caused the former main ship channel, which ran to the southwest of the harbor, to accrete thereby further burying the wrecks of USS *Weehawken* and USS *Keokuk*. The accretion of sediments



Figure 5.1: Sonogram showing wreckage of CSS Georgia, in upper left corner, and dredge scour marks on river bottom (courtesy Georgia Department of Natural Resources).

north of the jetties was witnessed during work on the *Hunley* and USS *Housatonic*, which, by the 1990s, were buried beneath from three to eight feet of sediment.

The jetties also radically altered the salinity of water entering many of the naval wreck sites off Charleston. Prior to jetty construction, the harbor had an asymmetrical ebb-tidal delta with the main channel paralleling Morris Island. The jetties and dredging of the intervening channel redirected the flow of fresh water from the three rivers entering the estuary through the sluice formed by the rock structures and away from the naval shipwrecks that lay to either side of the channel. This would have effectively increased the salinity of the water on the sites and potentially altered the stability of the sites. Navy shipwrecks in other estuarine environments, like Port Royal Sound and Winyah Bay, have the potential to be similarly affected by dredging and other human modifications of natural systems. A graphic example of how dredging can affect a shipwreck site, in this case CSS *Georgia*, which straddles the South Carolina and Georgia stateline in the Savannah River, can be seen in Figure 5.1.

Beach renourishment, or the dredging of sand from near shore borrow sites and pumping it on to eroding beaches, has a high potential to affect shipwreck sites. The operation usually involves a cutter head dredge pumping sand onto the beach while heavy earthmoving machinery distributes the deposits (Figure 5.2). Archaeological sites on both



Figure 5.2: Beach renourishment operations on Hilton Head Island oceanfront (SCIAA).

the borrow site and the beach may have been adversely affected by this operation. Currently, submerged cultural resource surveys are requested by SCIAA and other state regulatory agencies, to examine the presence or absence of underwater material culture prior to dredging. Usually in these cases, avoidance of a submerged cultural resource is the chosen course of action to prevent damage to both the underwater object and to the cutter head if the object is a large one. Currently, no known Navy shipwrecks in the state have the potential to be affected by this operation.

Artifact Collecting

There are three types of collecting that occur in the state: intertidal beachcombing, state-licensed hobby diving collecting, and illegal activities. Intertidal beachcombing has occurred for probably as long as people have lived along the shoreline. Artifacts of interest include prehistoric artifacts, that is, points and pottery, and historic materials such as bottles, ceramics, and ordnance, among other items of interest. Illegal removal of artifacts from shipwrecks occurs, and of course, is rarely reported or prosecuted. In 1998, however, a diver removed a prehistoric canoe from the Cooper River, which was subsequently recovered by SCIAA in cooperation with law officers from the SC Department of Natural Resources, and stabilized. That situation highlights the problem of recovering artifacts with no forethought or plan of their future disposition.

In 1976, legislation was implemented that created the hobby collecting license program. This program sanctioned licensed divers to collect fossils and cultural materials in state waters in exchange for a monthly report detailing their finds and where they were found. Review of 340 hobby diving reports from 1976 to 1998 in Port Royal Sound by 162 licensed sport divers and instructors revealed that more than 1,000 miscellaneous artifacts were retrieved under license from local waters. In addition, five watercraft remains were reported to SCIAA during this period. Primary interest by licensed divers in the rivers and state waters, however, has always been fossil collecting, although there is a strong interest in collecting from artifact deposits in the waters off known terrestrial sites, such as forts, plantations, and wharves. Shipwreck diving in South Carolina is mainly concentrated off Myrtle Beach in federal waters where for years divers have collected trophies from two Union ships that sank off the Strand.

Trends in the hobby diving license program suggest that fewer licensed sport divers are impacting submerged cultural resources in the state than during previous years. Currently, there are only 262-licensed sport divers in the state. This number is substantially lower than the 1,000 sport diving collectors licensed during the early 1980s throughout the state, as well as out-of-state licensees. This trend towards less active licensed hobby collecting is a result of several factors. During the onset of the program in 1976, and during the explosive growth of licensed divers in the early to mid 1980s, program managers pushed the issuance of licenses, oftentimes at the expense of quality reporting. From 1989 to current times, an emphasis has been placed on better recording to obtain data that could be used in archaeological reports rather than solely on the numbers. As part of this new focus, the sport diving program has developed field training courses and avocational projects undertaken by sport divers under guidance from SCIAA that highlight data collection rather than artifact collection. Stricter controls over hobby reporting have also improved the quality of the quarterly reports (formerly monthly) by making them more accurate. For example, if a report was submitted with inadequate information, such as location and descriptive information, they are now returned for clarification. And, if divers fail to report quarterly, the next license renewal is denied unless there were extenuating circumstance. Another factor in the downward trend in the number of licensed sport divers is the introduction of package dive trips to out-of-state locations, such as the Caribbean and Florida, resulting in less in-state river diving. In any event, to collect in state waters is a privilege and there are certain responsibilities to the resource that the diver and the manager must adhere to ensure that useful archaeological information is obtained.

Pollution

One area of archaeological resource management that has been under studied is the affect of pollution on archaeological sites. Large industrial complexes are found primarily in Charleston and Georgetown, where discharge from those facilities may adversely affect Navy wrecks in or near those estuaries. Another source of pollutants is from the use of agricultural pesticides, herbicides, and fertilizers that run-off the fields and into the waters. Non-point pollution, for example, oil from roads, also enters the local waters. No long-term studies about the effects of pollutants on archaeological sites have been undertaken, but,

archaeologists believe that pollution, whether chemical or biological, must affect submerged cultural sites one way or the other.

Commercial Fisheries

South Carolina's commercial seafood industry earns approximately 200 million dollars a year, shellfish accounting for more than three-quarters of the catch value. While all the coastal counties participate in the industry, certain areas dominate components of it. Shrimping accounts for more than one-half the value of the seafood catch, while shrimpers out of Charleston and Beaufort land over 80% of the state's shrimp catch (Kovacik and Winberry 1987:179), although catches have been decreasing recently. Of the many aspects of the commercial fisheries industry, shrimping has the greatest potential for adversely affecting the state's Navy shipwreck sites because the large wooden "doors" that keep the nets open drag along the seafloor behind the shrimp boat. The majority of the state's Navy shipwrecks lie within a few miles of the coast, precisely the area in which shrimpers operate. Luckily for the resource, shrimpers try to avoid shipwrecks and other objects protruding from the seafloor that could snag and destroy their nets, and keep records of known snags. However, in 1999 archaeologists found wire components of a shrimp net entangled in a partially buried buoy that once possibly marked the resting place of USS *Housatonic*, indicating that submerged cultural sites cannot always be avoided.

Salvage

Of the cultural impacts to the sites contained in the South Carolina inventory, salvage has been the most significant. There is herein a distinction made between legitimate marine salvage and treasure hunting. Several of the Navy shipwrecks were subject to contemporary salvage efforts. Notable among those were the Union vessels that sank as a result of engagements during the Civil War. References to contemporary efforts to salvage these vessels are contained in chapters Four and Seven, and include immediate Union attempts on USS *Housatonic*, USS *Harvest Moon*, and USS *Kingfisher*, as well as Confederate salvage of USS *Isaac Smith (Stono)* and components of USS *Keokuk* and USS *Dai Ching*. Those chapters also document aborted or failed attempts at salvaging vessels like USS *Weehawken* and USS *Hector*.

Several of these warships were later the subject of salvage during efforts to clear the Southern harbors of sunken vessels and other debris of war in the wake of the Civil War. In South Carolina, USS *Housatonic*, USS *Keokuk*, USS *Weehawken*, and USS *Patapsco* fall into that category. In 1999, the remains of USS *Housatonic* were physically investigated by the Naval Historical Center, National Park Service, and the South Carolina Institute of Archaeology and Anthropology and the results of the previous salvage efforts witnessed first hand (Conlin 2004).

The majority of the shipwrecks in the inventory have been spared the indignity of being subjected to treasure hunting. This has been not through lack of intent by would-be treasure hunters and other illegitimate salvagers. However, as noted above, most of the sites

are protected by a thick mantle of sediment and are located in areas that have made investigation or salvage untenable except to the most persistent groups. Prior to passage of the state's 1976 Underwater Antiquities Act, USS *Harvest Moon* was subjected to two investigations by salvage groups. Evidently, the salvagers did not recover any artifacts from the site.

Prior to passage of the South Carolina Underwater Antiquities Act of 1991 (See Appendix A), the state could, and did, issue licenses to salvage shipwrecks and other submerged cultural sites located in state waters. The only salvage licenses issued to work on Navy shipwrecks in the state were granted to applicants wanting to work on USS *Harvest Moon* in the mid-1970s and the *Stono*, a blockade runner formerly the USS *Isaac Smith*, during the late 1980s. In the former case, no artifacts were recovered. However, artifact recovery from the *Stono* was fairly extensive and represented a cross-section of the blockade-runner's cargo. An account of those efforts is contained in Chapter Four. This was also the case with the US Army steamer USS *Boston*, which was partially salvaged in the 1980s (See Chapter Seven).

In both the cases of *Stono* and *Boston*, artifacts were divided between the salvagers and the State following the percentages prescribed by the legislation. This process underscores one of the tragedies of treasure hunting—that artifact collections recovered from a single-site context are often dispersed preventing researchers from accessing the complete collections. Furthermore, shipwreck salvage is rarely, if ever, conducted using sound archaeological principles and methods, resulting in a consequent loss of information and generally adversely impacting the site.

The State's 1991 Underwater Antiquities Act requires that all excavations of submerged cultural sites in State waters be under the direction of an underwater archaeologist who must conduct the work to accepted archaeological standards. Since that year there have been no further salvage attempts on shipwrecks in the state.

Archaeological Investigation

Archaeological investigations of shipwreck sites pose a threat to their preservation. Any invasive process that disturbs a shipwreck site has the potential to hasten the destruction of that site by disrupting the site's equilibrium with its immediate environment. This is especially true of excavation, which may strip away areas of sediments that protect the site, exposing those components of the site to degradation from mechanical, chemical, and biological factors.

To date, most post-excavation preservation efforts in South Carolina have focused on two techniques. The first process involved recovering the wreck to conserve the hull, as was done with the Brown's Ferry Vessel (38GE57) in the mid-1970s (Albright and Steffy 1979; Amer and Hocker 1998; Leader 1992; Steffy 1988) and the *H.L. Hunley* (38CH1651), raised in 2000 (Murphy et. al. 1998). A second technique involved reburying the site and its components in an attempt to return the structure to an anaerobic state of equilibrium with its surrounding environment. This technique was effectively used with the Hunting Island

Vessel (38BU157) (Amer 1992), the Malcolm Boat (38CH803) (Amer et al. 1993) and the Ingram Vessel (38CT204) (Amer et al. 1995).

Recovery of a shipwreck has the advantage of placing the preservation of the vessel under human control. Both the process and results are demonstrable and can be documented. However, the many disadvantages, not the least of which is cost, preclude that option in all but the most extreme circumstances. Reburying a site is relatively inexpensive and the current preponderance of evidence suggests that a reburied site will eventually reach a state of equilibrium with its surrounding environment. However no studies on the subject have been able to adequately address the truly long-term ramifications of that option. Consequently, archaeologists must carefully consider the potentially positive and negative repercussions before committing to irretrievably altering a submerged cultural site in the name of research or public education. Of the shipwrecks in the South Carolina inventory it is highly unlikely that any of them would be subject to recovery.

Since the mid-1990s, the Maritime Research Division has begun utilizing non-invasive techniques to investigate and assess the U.S. Navy shipwrecks in the inventory. Since the acquisition of the ADAP III marine remote sensing survey system, the Division has set a course to locate and assess submerged cultural resources in state waters using non-intervention techniques. This strategy, outlined elsewhere in this report, allows the Division to assess submerged sites and make management decisions about the sites without disturbing them. However, physical investigation of shipwreck sites is still an important aspect of the Division's management role. At the turn of the millennium, after several years of drought conditions in the state, archaeological sites that were formerly submerged are becoming exposed by lowered water levels in the rivers. Two recent examples occurred on the Great Pee Dee River where, in the summer of 2002, the Division investigated a wreck that had not been exposed since the 1950s. A similar circumstance occurred a few miles upriver of that site, where the remains of CSS *Pee Dee* were also exposed. Fortunately, none of the shipwrecks in the inventory of Navy shipwrecks in the state is affected by the drought conditions and most are buried beneath substantial quantities of sediments.

Summary

In general, US Navy shipwrecks in South Carolina waters date from the Antebellum period, have not been salvaged, are situated in an ocean environment, with their locations generally known, and have not been disturbed since their sinking. The scuttled First and Second Stone fleets tilt the analysis to this observation. Ignoring these purposefully sunk vessels, along with *Queen of France*, reveals that the next greatest reason for sinking is because of grounding, followed closely by enemy action. Pre-Civil War wrecks have suffered little or no salvage activities, while the Union vessels underwent extensive salvage operations during and after the war. Causes of sinking and any subsequent salvage operations have ramifications that affect the structural integrity and artifactual content of each shipwreck.

Several factors affect ship and artifact preservation, with the main factor being the site's environmental location, which for the majority of the shipwrecks in the database is in

the ocean, with the remainder in an estuarine setting, and one wreck in a river. Based on the known wrecks, those in the ocean are deeply buried in a cocoon of sediments, while only *Patapsco* and *Stono* in a bay setting are partially exposed to the elements. Review of the database also reveals that the locations of the majority of the shipwrecks remain unknown, and therefore, these sites remain undisturbed by vandals seeking a trophy for the mantelpiece. The environment in which each wreck is situated affects each Navy shipwreck on South Carolina bottomlands. Natural factors, including sediment composition, waves, currents, and biological degradation, along with cultural reasons, namely artifact collecting, pollution, and dredging, influence the potential archaeological character of the wrecks. This chapter serves as a foundation for guiding future management and research strategies, in which all of these discussed factors, and others, must be accounted for when embarking on initiatives to study and preserve this sunken naval legacy in South Carolina.

CHAPTER 6

MANAGEMENT OF UNITED STATES NAVY WRECKS IN SOUTH CAROLINA

State and Federal management policies and practices regarding US Navy shipwrecks in South Carolina waters have evolved over the years. State management issues over the years have included salvage, title, and archaeological research opportunities. Federal management options have followed traditions, laws, and treaties developed over the years concerning submerged naval property. Matters of salvage, ownership, and human gravesites, among others, have been the focus of attention directed towards Federally-owned submerged properties, usually in a case-by-case manner. With the advent of the NHC's Underwater Archaeology Branch, the Navy now exerts more active management responsibility and initiative towards their sunken historical property. In turn, under the aegis of the Department of Defense Legacy Resource Management Program, the NHC has turned to the states to aid in developing a management plan as co-stewards of these national treasures. In the end, the state-by-state inventory and assessment will assist in developing a coherent overall management strategy in protecting Navy sunken properties around the globe. The following chapter discusses Navy policy regarding shipwrecks, and other cultural resources, and provides a historical sketch of South Carolina's management policies over the years towards US Navy shipwrecks. Additionally, the chapter contains tables to aid in assessing the potential eligibility of these sites to the National Register of Historic Places, as well as in determining the potential scientific, educational, and recreational benefits of each shipwreck, which in turn will help in devising management options.

United States Navy Policy Regarding Shipwrecks

The Department of the Navy (DoN) maintains custody of all its ships and planes, whether seemingly abandoned, regardless of the years since last operational use, or lost in United States, foreign, or international waters. Only a specific act of Congress can divest the DoN of its titles or claims to this property. A myriad of international laws and treaties, and Federal laws support governmental ownership of property unless specifically disposed of through beauracratc means. The primary law directing the DoN, and other Federal agencies, to consider the historical and archaeological significance and management of these properties is the National Historic Preservation Act of 1966 (16 USC. 470). The NHPA directs Federal agencies to manage their cultural resources in such a way to minimize negative impacts with a preservation goal in mind. Issues and considerations surrounding these cultural resources, especially shipwrecks that the agency must take into account include, the presence of human remains, unexploded ordnance, and potential re-use of military weapons. The passage of the Abandoned Shipwreck Act of 1987 (43 USC. 2101-2106), giving title to abandoned watercraft to the states, excludes naval property that has not been abandoned (Neyland 1996). The branch of the DoN that guides compliance with the NHPA and other laws is the Naval Historical Center, based in the Washington Navy Yard, Washington, D.C.

In several instances, issues concerning title and war graves regarding naval shipwrecks in South Carolina have occurred. In 1975, SCIAA requested title to Civil War shipwrecks, which was rejected by the Navy. Title, as well as the status as a war grave, was also a major focus of the controversy surrounding the discovery of *H.L. Hunley*, a Confederate submarine. The General Services Administration of the Federal government and DoN claimed title to the submarine based on the law of succession of sovereignty, in this case from the Confederate government. In other words, the Federal government's claim of title was based on their right to assume ownership of all Confederate government-owned property (Neyland 1996). The State claimed ownership based on the presence of the submarine in state waters. Eventually, both parties came to a satisfactory agreement, in which the Federal government retains title and the State assumes the right to display the submarine.

The issue of war graves prevented excavation of USS *Patapsco* by a salvager in 1985. The remains of *Patapsco* and the crew had been disturbed in the 1870s by salvagers under permit to the U. S. Army Corps of Engineers. Recovered human remains were forwarded to Fort Moultrie for burial. Apparently, the family members of the deceased crew raised no objections to the salvage operations, unlike the family members of the deceased crew of *Tecumseh*, wrecked in Mobile Bay. In the case of *Tecumseh*, family members of that ironclad raised fervent objections to the blasting and disturbance of the gravesite of their relatives. The Federal government rescinded the salvage contract and to this day the ironclad lies undisturbed in Mobile Bay Pass (Neyland 1996).

With the advent of the Underwater Archaeology Branch of the NHC in 1993, the preservation of submerged naval property has become a focal point of carrying out the DoN's mandates under the NHPA. The management policy guiding the NHC is firmly rooted in Federal and international law and treaties that have been tested in courts of law. However, the Navy has entered into agreements with outside parties to investigate the remains of shipwrecks under its purview. The example of the French excavation of CSS *Alabama* is a case in point, and demonstrates an effective partnership between the Navy and a foreign government in examining a naval legacy shared by both countries. The NHC does issue permits to investigate Navy-owned property, that is shipwrecks or aircraft, on the basis of the potential educational, scientific, or recreational benefits derived from such an endeavor (Neyland 1996). The excavation of USS *Housatonic* was one such endeavor, involving the NHC, NPS, and SCIAA in their quest to learn more about the events surrounding the vessel's destruction by *H.L. Hunley*. This project set a precedent for NHC and SCIAA cooperation to further each institution's mission to preserve and protect the submerged naval legacy in South Carolina waters.

Management History of Navy Wrecks in South Carolina

Management of shipwrecks in South Carolina evolved from the inception of state law in 1968 to address pressures exerted by salvagers, to the present time in which these unique submerged cultural resources are managed by both Federal and State legislation. Salvor and archaeological interest in the naval wrecks in state waters has waxed and waned over the years. State managers entrusted with the preservation of these particular

shipwrecks, first the Department of Archives and History and then SCIAA, were bound by State law in their responses to potential salvagers. However, whenever Federal law superseded State legislation the managers acted accordingly to ensure the protection of these sites. From a management perspective, the early shipwrecks from the Revolutionary War to the early 1800s and the modern ones from the twentieth century have received little management oversight. This is primarily due to a lack of knowledge as to the location of Revolutionary War and early 1800s shipwrecks, and that the more modern ones have attracted little attention from sport divers. The Navy wrecks bearing the brunt of salvager and sport diver interest, however and consequently managerial concerns, were those shipwrecks from the Civil War.

The first State legislation to address shipwrecks occurred in 1968, which was devoted primarily to regulating shipwreck salvage activities and issuance of licenses. The law gave administration of the act to the SC Department of Archives and History (SCDAH), and SCIAA acted in an advisory capacity. In 1969, the legislation was amended at the request of SCDAH to make SCIAA the administrator of the law. The law was sparked by the discovery of the Civil War blockade-runners *Georgianna* and *Mary Bowers* by Shipwrecks, Inc., a company directed by E. Lee Spence. The organization was also the recipient of the first salvage license issued under the new legislation. Assuming control of the salvage process, SCIAA's director and staff immediately began working on regulations and guidelines for the oversight of the license (Stephenson 1975:56).

The situation in 1969 demonstrated the need for a staff position specializing in underwater archaeology. By the suggestion of SCIAA, the General Assembly, in 1972, enabled the position of a state underwater archaeologist, and in 1973, Alan Albright was hired to perform that duty. He assumed primary managerial responsibility for the salvage licenses, with guidance from the director, and directed research and management of submerged cultural resources in the state. In 1975, Albright was formulating a plan for studying the Union warships off Charleston. The direction in which they were headed was to record the sites and to recover portions of the shipwrecks for display in appropriate institutions (Stephenson 1975:95). In a letter dated August 1, 1975, Dr. Robert Stephenson, then director of SCIAA, began laying the foundation for this plan by asking the US Navy to consider a request, "that ownership and control of all United States Naval vessels lost in state waters during the Civil War be transferred to the Institute of Archaeology and Anthropology. . ." His request was made to ensure the protection of these vessels, primarily *Weehawken*, *Keokuk*, *Dai Ching*, and *Housatonic*, from sport diving depredations until the naval research program was implemented (Robert Stephenson to J. William Middendorf, II, Secretary of the Navy, August 1, 1975, letter on file at MDR/SCIAA). The Navy responded to this request by respectfully stating that they would retain title to these shipwrecks in their best interests (Adm. E. A. Grinstead to Robert Stephenson, September 8, 1975, letter on file at MRD/SCIAA). Following this rejection of their request, SCIAA's plan to study the Navy warships never materialized in any formal manner. For the next decade, the research of naval wrecks in state waters would be driven by private enterprise sanctioned by SCIAA.

The first US Navy ship to attract modern salvager or avocational archaeological interest was *Harvest Moon*. Several groups from the late 1950s to 1975 expressed an interest in raising the vessel for display in Georgetown. None achieved this goal, but they did provide some information regarding the condition of the shipwreck. SCIAA, in 1974, issued salvage license number 20 to The Confederate States Historical Foundation, Inc. This organization's stated purpose was to raise the vessel. However, these plans never materialized. The wreck has lain undisturbed since 1975.

In 1969 and again in 1974, two groups expressed an interest in salvaging the remains of *Dai Ching*. In 1969, The Palmetto Historical Research Society completed an application to receive a SCDAH salvage license to salvage the *Dai Ching*. The group wanted to salvage artifacts from the wreck for display in South Carolina institutions. A stated reason for the project was to keep unspecified out-of-state concerns from salvaging the shipwreck and selling the artifacts. In 1974, E. Lee Spence and the Sea Research Society wrote a series of letters to SCIAA, General Services Administration, and the Navy, about their interest to salvage the gunboat. Both of these endeavors went no further than generating paperwork.

In 1980, the National Underwater Marine Agency (NUMA), created by novelist Clive Cussler, in cooperation with SCIAA, began a project to search for the remains of the submarine *H.L. Hunley* off Sullivan's Island and Isle of Palms, and other Civil War shipwrecks in Charleston Harbor. They intended to conduct remote sensing surveys using a proton magnetometer and a sub-bottom profiler to locate the submarine and its victim, USS *Housatonic*. During the first year of the project, they successfully relocated the remains of *Housatonic* and some magnetic anomalies bearing the potential to be the *Hunley*. They also relocated the remains of the ironclads *Weehawken* and *Keokuk*, off Morris Island, and *Patapsco* off Fort Sumter (Cussler 1981:27-32). In 1981, NUMA, again working under a license from SCIAA, returned to continue the *Hunley* survey and to ground-truth previously recorded anomalies, and secondarily to locate other Civil War-period shipwrecks. The search to locate the submarine proved unsuccessful, but did succeed in obtaining additional information about *Keokuk* and *Weehawken*. Magnetic anomalies at the supposed locations of several Confederate ironclads identified only modern iron or steel debris. The venture also pinpointed the location of several blockade runners under the beach and out at sea (Browning and West 1982). The location and information about each of the wrecks was entered into the South Carolina Archaeological Site Files.

Shortly after *Patapsco's* rediscovery by NUMA, Florida salvager Howard Tower and a partner began to dive the wreck and expressed an interest in salvaging the wreck. Tower wrote to the DoN's Judge Advocate General's office asking about excavating the wreck in cooperation with SCIAA in early 1985. The office turned down Tower's request to excavate, based on the long-standing policy of not disturbing war graves. In anticipation of commencing excavations, SCIAA and Tower had obtained use of the US Army Corps of Engineers side scan sonar to gather some acoustic data of the site. Tower and SCIAA divers briefly investigated the site and found exposed structure and some

cannon projectiles. Due to the Navy's position and denial of his proposal, Tower dropped his interest in salvaging the vessel.

Denied the opportunity to excavate *Patapsco*, Tower and several associates directed their attention to the blockade-runners wrecked off Bowmans Jetty. Shipwrecks recorded in this area included, *Minho*, *Prince Albert*, and *Stono* (formerly USS *Isaac Smith*). They found a jumble of ship structure, machinery, coal, and artifacts strewn along the bottom of the jetty. Tower applied for and received salvage license number 32 from SCIAA in 1985 under the premise that these were private vessels engaged in blockade running. Working under the license stipulations, Tower and his group salvaged a number of artifacts, recorded exposed sections of the wrecks, and conducted historical research of the ships. SCIAA and the salvor split the artifacts during the lifetime of the salvage license, which concluded in 1990. All artifacts from the three wrecks obtained by SCIAA from the split are located at the South Carolina State Curation Facility.

In 1991, the South Carolina Underwater Antiquities Act was amended to include more stringent regulations and guidelines regarding excavating shipwrecks and other submerged cultural sites in the state. The main emphasis of the law dealing with excavation focused on obtaining quality archaeological recording by requiring the applicant to hire a professional underwater archaeologist. The underwater archaeologist was required to be present on site and to guide the excavation. Since the passage of the new law, there has not been any salvage activity on shipwrecks in the state. There has been some limited investigations at the site of the Confederate's Mars Bluff Naval Station on the Great Pee Dee River under a SCIAA Intensive Survey license. Artifacts recovered by the group, including shells, shot, and miscellaneous tools, are on display at a museum attached to the principal organizer's gun shop in Myrtle Beach.

The final hunt for *Hunley* by NUMA began again in 1994 and continued into 1995. The project was organized as a joint effort by NUMA and SCIAA. This arrangement alleviated the need for the NUMA group to obtain a license and provided an opportunity to share resources with SCIAA. NUMA conducted the remote sensing operations while SCIAA provided the ground-truthing team. Equipped with DGPS and a proton magnetometer, the NUMA team re-surveyed the areas previously completed in 1980 and 1981. A number of anomalies were detected and ground-truthed before the discovery of the submarine approximately 400 meters further out to sea from *Housatonic*. Following the announcement of the discovery, the State of South Carolina and Federal government reached an accord for the management responsibilities of the submarine. Provisions in the agreement vested title to the Federal government, but the right for display in perpetuity to the State. The submarine was recovered in the summer of 2000 and resides at the Warren Lasch Conservation Facility until eventual relocation to a purpose-built museum following conservation.

The first professional archaeological investigation of a Navy shipwreck in the State occurred on USS *Housatonic* in 1999. In an effort to learn more about the sinking of *Housatonic* by *Hunley*, the NHC, NPS, and SCIAA joined forces to investigate the remains of the sunken warship. Funded by Federal, State, and private monies the

investigation succeeded in gathering structural and environmental information about the shipwreck. Artifacts recovered during the excavations will form part of the *Hunley* exhibition. In the meantime they are being curated at the NHC. An upcoming NPS/NHC/SCIAA report titled "USS *Housatonic* Site Assessment" will discuss the results of the project.

As legislated by the South Carolina Underwater Antiquities Act of 1991, amended in 2002, SCIAA issues licenses for the collection of cultural materials and ecofacts from state-owned bottomlands. These hobby licenses permit the holder to recreationally collect cultural artifacts, that is, bottles, pottery, pipes, etc., and ecofacts, that is, fossils, that are collected by hand and not by mechanical means. Artifact collecting from shipwrecks is also sanctioned, albeit with a requirement that only ten artifacts may be recovered from the site and that no ship structure, fittings, fasteners, or machinery may be removed (S.C.C.L. 54-7-670(G)2). In return for the privilege of recovering state-owned artifacts or ecofacts, licensed divers are required to submit a quarterly report of their collections. By these means, SCIAA tracks the amounts and types of artifacts collected, site locations, and knowledge of newly-discovered shipwrecks. Information concerning fossil collecting is handled by the SC State Museum. A review of these quarterly reports reveals that only two Navy shipwrecks have been collected from in the past, *Patapsco* and *Stono* (formerly USS *Isaac Smith*). Collection of a limited number of artifacts under license occurred during the reconnaissance dives on these two shipwrecks, undertaken by Howard Tower in the mid-1980s, and consisted mainly of some coal and musket balls.

Submerged cultural resource management in South Carolina has matured from the days of merely overseeing salvage licensing to actively pursuing a course of investigation and management options in concert with the custodian of Navy shipwrecks, the NHC. Navy wrecks in state waters have not suffered much at the hands of modern salvagers or hobby divers intent on putting a piece of history on the mantelpiece. Most are shrouded in a protective cocoon of sediment overburden or in the ignorance of their location. A lack of cultural pressures, therefore, have minimized an active management response aimed at preserving these resources. With the advent of a more aggressive policy to manage this sunken legacy by the NHC in the early 1990s, the need for a comprehensive, cohesive, and coherent management plan of naval shipwrecks in South Carolina has materialized. Partnered with the NHC, SCIAA's development of a management plan addressing the scientific, educational, and recreational values of these naval shipwrecks will serve to help the Federal agency meet its responsibilities under the National Historic Preservation Act of 1966.

National Register of Historic Places

The National Register of Historic Places program was authorized by Congress in 1966 to encourage the preservation of cultural resources important in America's history. Later, Congress authorized enlargement of the program to include vessels, canals, shipyards, and shipwrecks (Delgado 1985:1). As a component of the National Historic Preservation Act of 1966 (NHPA) (16 USC. 470), the National Register seeks to coordinate and assist private and public efforts to identify, evaluate, and protect historic

and archaeological resources. Diverse properties are eligible and listed in the National Register that includes districts, sites, buildings, structures, and objects that are significant to American history, architecture, archaeology, engineering, and culture. The National Register is administered by the NPS (<http://www.nationalregisterofhistoricplaces.com/>. 6 March 2002). Nationally significant shipwrecks are also potentially eligible as a National Historic Landmark, another program of the Federal NHPA legislation (Delgado 1985:20).

The National Register type of historic vessels eligible for nomination that is pertinent to this report is Category 5-Shipwrecks. Several criteria are used to determine the eligibility and significance of a shipwreck for nomination to the National Register. These criteria are:

- A. must be associated with events that have made a significant contribution to the broad patterns of our history; or
- B. must be associated with the lives of persons significant in our past; or
- C. must 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. have yielded, or may be likely to yield, information important in prehistory or history.

Each criterion also has several areas of significance to consider under each category including agriculture, engineering, and military for Criterion A; links to a famous person along with several applicable topics shared with Criterion A for Criterion B; architecture, art, and engineering for Criterion C; and information that can be extracted from the remains of a vessel, typically a shipwreck, but can also be floating, for Criterion D (Delgado 1985:6-8). There are three potential recommendations for inclusion in the National Register: Eligible, Not Eligible, and Potentially Eligible.

Recommendations for inclusion in the National Register are herein made for each of the Navy shipwrecks in South Carolina waters (Table 6.1). Each of the shipwrecks, or assemblages of shipwrecks, that is the first and second Stone Fleets, is potentially eligible for nomination to the National Register. The military significance of each wreck and period of operation makes each worthy of nomination to the National Register. Significance regarding ship architecture is applicable to at least five of the shipwrecks, especially USS *Keokuk*, an experimental ironclad design during the Civil War. The first and second Stone Fleets, comprised of purchased whale ships, *Marcia* and *Robert B. Howlett*, are representatives of ships having a dual careers as commercial watercraft prior to their use to meet the exigencies of war. Only one ship, *Harvest Moon*, merits significance due to its association with a famous person. The warship was the flagship of Admiral John A. Dahlgren, commander of the South Atlantic Blockading Squadron at the close of the Civil War, who was onboard when the ship struck a torpedo in Winyah Bay.

Table 6.1: USN shipwrecks and potential inclusion into National Register of Historic Places.

Vessel Name	Criterion	Significance	Eligibility
<i>Queen of France</i>	A, C, D	Military, Architecture	Potentially Eligible
<i>Ferrett</i>	A	Military	Potentially Eligible
<i>Gunboat No. 157</i>	A, C, D	Military, Architecture	Potentially Eligible
First Stone Fleet	A	Military, Commerce	Potentially Eligible
Second Stone Fleet	A	Military, Commerce	Potentially Eligible
<i>Marcia</i>	A, D	Commerce, Military	Potentially Eligible
<i>Dai Ching</i>	A, D	Military	Potentially Eligible
<i>Harvest Moon</i>	A, B, D	Military, Significant Person	Potentially Eligible
<i>Housatonic</i>	A, D	Military	Potentially Eligible
<i>Keokuk</i>	A, C, D	Military, Architecture	Potentially Eligible
<i>Kingfisher</i>	A, D	Military	Potentially Eligible
<i>Patapsco</i>	A, C, D	Military, Architecture	Potentially Eligible
<i>Robert B. Howlett</i>	A, D	Commerce, Architecture	Potentially Eligible
<i>Stono</i>	A, C, D	Military	Potentially Eligible
<i>Weehawken</i>	A, C, D	Military, Architecture	Potentially Eligible
<i>Hector</i>	D	Military	Potentially Eligible
<i>YP-481</i>	D	Military	Potentially Eligible

Potential Scientific, Educational, and Recreational Value of United States Navy Shipwrecks

Determination of the potential scientific, educational, and recreational value of each navy shipwreck will aid in shaping management policy regarding future inquiry and promotion of public access to these submerged cultural resources (Table 6.2). Each of the shipwrecks has some scientific and educational benefit based on its historical period, although its inherent values will be tempered by the extent of remaining structure and artifacts. Since many of the shipwrecks remain undiscovered, the potential of these wrecks to contribute to the historical and archaeological corpus of knowledge regarding the naval heritage of the Nation and South Carolina may never be realized.

Recreational desirability of wreck sites include, easy and predictable access, historical significance, archaeological integrity, and photogenic quality, among other virtues to promote public access to submerged cultural resources. The recreational value of the majority of the wrecks is unknown due to no known site location. Others are buried and therefore allow no physical human presence on the site. The only three known wrecks with visible structure are *Patapsco*, *Stono*, and *Hector*. The first two wrecks are situated in the harbor entrance to Charleston and are swept by powerful currents and plagued by near-zero visibility. Their recreational value would be limited by

Table 6.2: Determination of scientific, educational, and recreational value of USN shipwrecks.

Vessel Name	Scientific	Educational	Recreational
<i>Queen of France</i>	Yes	Yes	Unknown
<i>Ferrett</i>	Yes	Yes	Unknown
<i>Gunboat No. 157</i>	Yes	Yes	Unknown
First Stone Fleet	Yes	Yes	None
Second Stone Fleet	Yes	Yes	None
<i>Marcia</i>	Yes	Yes	Unknown
<i>Dai Ching</i>	Yes	Yes	None
<i>Harvest Moon</i>	Yes	Yes	None
<i>Housatonic</i>	Yes	Yes	None
<i>Keokuk</i>	Yes	Yes	None
<i>Kingfisher</i>	Yes	Yes	Unknown
<i>Patapsco</i>	Yes	Yes	Low
<i>Robert B. Howlett</i>	Yes	Yes	Unknown
<i>Stono</i>	Yes	Yes	Low
<i>Weehawken</i>	Yes	Yes	None
<i>Hector</i>	Yes	Yes	High
<i>YP-481</i>	Yes	Yes	Unknown

these factors, which in turn should restrict access to sport divers experienced in current and darkwater diving. Essentially, these two sites would force the diver to concentrate on maintaining control in this rugged environment rather than allowing for a pleasurable dive in which they could take photographs and enjoy the surroundings.

The potential for public access to both of these sites is certainly feasible, especially in light of Maryland's underwater archaeological preserve on the submarine *U-1105*, in Chesapeake Bay, in similar conditions but much deeper water. The *Hector*, on the other hand, is situated approximately 10 miles off the coast of Bulls Bay. Sport divers have visited the wreck over the years, mainly accessing the site from Myrtle Beach. Of all the wrecks reported in this report, USS *Hector* has the best recreational potential with its shallow depth and relatively good visibility.

CHAPTER 7

GEOGRAPHICAL INFORMATION SYSTEM (GIS) OF UNITED STATES NAVY SHIPWRECKS

Introduction and Objectives

The purpose of this chapter is to describe the SCIAA Maritime Research Division's (MRD) remote sensing operations that were conducted in partial fulfillment of a Department of Defense Legacy Resource Management Program grant. On September 2, 1998, the University of South Carolina entered into an agreement with the United States Navy Naval Historical Center to research, inventory, study, and assess submerged shipwrecks of the United States Navy in South Carolina waters. Between 1999 and 2003, the MRD conducted remote sensing operations in four areas of the State where US Navy vessels were known to have been lost. Charleston Harbor and its approaches were targeted because of the intense naval activity and loss of naval warships that occurred during the Civil War. The Division also undertook survey operations in Port Royal Sound. Located some 60 miles south of Charleston, Port Royal Sound was another center of naval activity from 1861 to 1865, and areas of the Sound were used to supply and repair ships of the North's South Atlantic Blockading Squadron. Two shipwrecks were investigated in the Sound proper, the Skull Creek Wreck (38BU723), in Skull Creek, and the Station Creek Wreck (38BU2080), a newly discovered site near the entrance to Station Creek. Staff of the MRD also completed a survey of USS *Dai Ching*, a Civil War period US Navy gunboat sunk in the Combahee River in the Ashepoo/Combahee/Edisto (ACE) Basin. Winyah Bay was selected for a specific survey of USS *Harvest Moon*, a steamboat that had served as Admiral Dahlgren's flagship at the time of its loss. The Division also investigated a Union Army gunboat and a Union Army transport, both owned by the General Services Administration (GSA) and not included in the US Navy database. The MRD decided to investigate both these army vessels because of their involvement in combined operations with the navy during the Civil War. A survey in Whale Branch River, to locate the remains of the Army gunboat USS *George Washington*, was completed in 2003, and a magnetic and acoustic survey of the Army transport USS *Boston*, sunk in the Ashepoo River, was made that same year.

The purpose of the surveys was to verify known wreck positions and areas of naval activity and to gather baseline data of the sites. Information gathered includes magnetic, acoustic, and bathymetric data, results of probing and direct site observations, and environmental conditions of the sites. A second goal was to locate naval sites whose locations were previously unknown. To accomplish these goals, the MRD used a combination of historical data, results of previous archaeological work, electronic remote sensing equipment, and ground-truthing techniques.

SCIAA Marine Remote Sensing Equipment

The electronic ensemble to search for Navy shipwrecks and naval usage areas consisted of the ADAP-III marine archaeological prospecting system developed by Sandia Research Associates, Inc (Figure 7.1). This electronic marine remote sensing system incorporates a Geometrics G-880 cesium magnetometer, a Marine Sonic 600 Khz side scan sonar, a Cetrek Combi digital fathometer, and a Trimble AgGPS132 Differential Global Positioning System (DGPS). Three onboard ruggedized-computers, utilizing either Microsoft's Windows 95 or Windows 98 operating system, manage the digital acquisition of position, depth, sonar, and magnetometer data. Two auxiliary screens present real-time guidance to the helmsman to ensure accurate survey transects or to navigate towards a specified target. A 24Kw Honda generator provided onboard power to the equipment. The system was operated aboard SCIAA's primary research vessel, the 24 ft. C-Hawk.

The Geometrics G-880 cesium magnetometer consists of a towed-array sensor equipped with a flotation device, deflector, and 300 ft (91.4 meters) of cable. Survey protocols for the magnetometer specified towing the sensor not less than 60 ft (18.28 meters) behind the DGPS antenna to prevent magnetic interference from the boat. The flotation device was always deployed with the sensor due to the shallow waters of the survey areas and the potential for snagging exposed shipwreck components or for catching the bottom. Magnetometer data was recorded at a one second sample rate at a sensitivity of 0.01 nT using Magsea software from Sandia Research Associates, Inc. Output from the Magsea software included a LOG file that recorded ship coordinates, sensor layback coordinates, magnetometer reading, speed over ground, and course over ground. An XYZ file was also generated that stripped the LOG file to contain only the coordinates and magnetometer readings.

The magnetometer is the primary archaeological prospecting tool used by marine archaeologists to search for shipwreck sites. The magnetometer measures the earth's ambient magnetic field through scalar measurements. This measurement is expressed as the Total Field intensity in nano-Teslas or gammas (nT or γ) that is variable from 20,000 to 100,000 nT on the earth's surface. In South Carolina the ambient Total Field intensity ranges from 40,000 to 50,000 nT. Local disturbances caused by geological features or man-made objects add to or subtract from the ambient magnetic field and are called magnetic anomalies. Man-made objects that affect the marine magnetic field include ferro-magnetic materials, such as iron or steel, and rock ballast concentrations high in magnetite.

The G-880 cesium magnetometer uses cesium vapor (non-radioactive Cs133) and a light source to agitate the cesium atoms to a high level. The high state of agitation is then reduced by a RF (radio frequency) de-pumping coil. The rate of the energy transition or "pumping de-pumping" from a higher to lower level is determined by the strength of the ambient magnetic field. This process is known as Zeeman splitting. This transition is then digitally quantified to measure the local magnetic field around the sensor. Several factors can degrade the reading that includes sea swells, magnetic effects



***Figure 7.1: Components of ADAPIII Marine Archaeological Prospecting System.
Left, computers; Right, sensors.***

of the vessel, lack of control or knowledge of the sensor's position, and other survey errors that limit the magnetometer's performance. Despite these limitations, the cesium magnetometer has a very high sensitivity and rapid sample rate that yields precise measurement of the local magnetic field, which is especially applicable to marine archaeological prospecting.

Many factors also determine the detection and strength of a magnetic anomaly including mass of the source, sensor to source distance, and orientation of the sensor to the source to name a few. While interpretation of magnetic anomalies is not an exact science, the amplitude or strength, signature, i.e., whether a dipole, monopole, or multi-component, and duration aid in determining whether an anomaly is a result of a single-source or a cluster of magnetic objects. These considerations among others are taken into account to determine whether a magnetic anomaly portends an archaeologically or historically significant cultural object that warrants further investigation.

The Marine Sonics Technology, Ltd. side scan sonar system consisted of a dual-channel 600 KHz towfish, 300 ft (91.4 meters) of cable and Sea Scan PC proprietary software to operate the sonar. The sonar sensor was hung off the port side of the research vessel approximately 3 ft (0.9 meters), where it could be easily lowered or raised as appropriate to avoid hitting the bottom or snagging exposed wreckage. Range of the sensor's acoustic signal was typically set to 20 meters. The side scan sonar, basically works by sending out acoustic sound waves towards the bottom and then records the strength of the echo returns from the sea floor. In this case, the 600 kHz frequency range was employed, as it is ideal for generating details of exposed features on the bottom. The towfish emits continuous narrow beam sound pulses perpendicular to the survey swath. These pulses pass through the water and are then reflected back from the bottom or from an object. The signal strength is recorded and drawn line by line to create a sonar record of the bottom. The operator manipulates the towfish signal via software on a dedicated onboard computer. The MST sonar files generated during the course of the survey are reviewed using Sea Scan PC Review proprietary software.

Data from both the Cetrek Combi fathometer and Trimble AgGPS132 DGPS unit were logged using GPSlog software from Sandia Research Associates, Inc. Depth data were collected four times a second and tagged with DGPS coordinates to furnish bathymetric information of a survey area. No correction programs were utilized to account for the daily tidal fluctuation or heave from waves. The time stamped data, however, allows for subsequent manual correction to determine an approximate depth using published predicted tidal variation for a particular anomaly. During the Charleston Harbor survey, differential correction for the DGPS unit was provided by a subscription service, Racal-Landstar differential correction system, to ensure sub-meter accuracy of position. For the remainder of the survey, differential correction was obtained by the Coast Guard Maritime Differential GPS (DGPS) Service that broadcasts correction signals on marine radiobeacon frequencies to improve the accuracy and integrity of GPS signals. This service provides a minimum 10-meter accuracy, with typical positional error of DGPS around 1 to 3 meters (<http://www.navcen.uscg.gov/dgps/default.htm>, 9 January 2004). The software generated a LOG file containing coordinates, depth, speed

over ground, course over ground, etc. The DGPS unit, connected to a light bar that displayed course and survey parameters, provided guidance to the helmsman to ensure accurate coverage of a survey area. All survey DGPS positions correspond to the World Geodetic System 1984 (WGS84) datum (which corresponds to North American Datum 1983 [NAD83]) and were logged in Universal Transverse Mercator (UTM), Zone 17 coordinates.

Geographical Information System (GIS) Processing

Following data collection, the magnetometer XYZ files were post-processed using Gradient Analysis, a proprietary software application from Sandia Research Associates, Inc., to strip the Total Field magnetic data into a simple plus or minus gradient reading. In this case, a 2-point gradient half-width was chosen to smooth the data. This process entailed subtracting each Total Field reading from the one before it to record the difference of each reading, which results in the removal of the ambient earth's magnetic field to obtain the residual values of potential anomalies of interest. For example, just referencing the magnetic information, a typical magnetometer data stream would appear like this: 49983.9960, 49983.9960, 49983.9840, 49983.950. Applying the Gradient Analysis software would transform the magnetic data into: 0.0, 0.0, -0.018, +0.034. This edited magnetometer data was then entered into Microsoft Excel to create a DBaseIV database containing positional coordinates and magnetometer readings. Total Field readings of the magnetometer data were also post-processed into a DbaseIV database form as well. Depth data from the LOG files were post-processed through Microsoft Excel to create a DbaseIV database comprising positional coordinates and depth reading in meters. Once the magnetometer and depth data was edited and converted to a DBaseIV database, the information was added to Earth Systems Research Institute, Inc.'s ArcView 3.2 software, a Geographic Information System (GIS) program. The magnetometer and depth data then underwent additional editing to remove magnetic spikes, faulty depth readings, turns, etc. to ensure accurate information to begin the analysis process.

GIS is a computer system capable of using multiple, spatially referenced databases to produce maps that graphically depict that data. It provides a user with the ability to collect, store, edit, manipulate and depict the large amounts of data generated by marine remote sensing surveys. The results are presented graphically, allowing patterns to be recognized easily by rapid manipulation of scale and overlying themes or layers. GIS becomes an especially useful tool for shipwreck management where one must analyze not only the spatial relationship of shipwrecks in a broad area, but also examine the relationship of diverse information within each site or survey block. The ArcView application was used to visually express the spatial relationships of the collected digital survey information by which to analyze, manipulate, and assimilate the magnetometer, bathymetric, and sonar data.

Two ArcView extensions, Spatial Analyst and Image Analysis, added increased functionality to the core program by providing the means to contour the magnetic and bathymetric data and to place sonograms and historic charts into the GIS database. All contours were generated in Spatial Analyst using the Kriging method. These added

utilities created the ability to overlay the magnetic contours on a georectified sonogram and to determine any spatial correlations between magnetic and acoustic anomalies. The only limitation to the analysis of the magnetic and acoustic data was that, by nature, a survey transect by boat is a constant series of steering corrections to maintain a pre-determined survey line. This typically results in a transect looking like a connected series of "S", which can be minimized by the skill of the helmsmen. The resulting sonogram, however, is simply outputted as a rectangle with minimal evidence of the swishing back and forth of the boat and consequently the sonar sensor. When georeferencing the sonogram into ArcView, the image is handled as a rectangle and situated in a "best-fit" solution. This results in an imperfect representation of the true survey area covered by the sonar. The geographic location of an anomaly can, however, be maintained to some degree of accuracy by focusing attention on its accurate placement, rather than the sonogram as a whole. When interpreting the overlaying magnetometer data this limiting factor of the sonar data must be taken into account.

To build the GIS database of a particular shipwreck, for example *Patapsco*, or for the Port Royal Sound survey areas, a view with several themes, or layers was constructed. A view in ArcView is essentially the drawing board on which various themes or layers are added to construct a map. Themes in the project's database consisted of raw and processed magnetometer and depth data. Contour themes, depicting magnetometer intensity and bathymetric depth, were derived from the magnetometer and depth data. Variations of the magnetic contours by differing gamma scale enhanced data interpretation. Sonograms were geo-referenced so that magnetic and acoustic anomalies might be correlated. Additionally, historic charts were geo-referenced to place them to modern coordinate systems, as well as aerial images downloaded from the NASA website. Underlying nautical charts from NOAA and 7.5 USGS topographical charts, along with South Carolina Department of Natural Resource Digital Ortho-Quarter Quads (DOQQs), spatially referenced the survey data to the present marine landscape. Themes were also created from polygons, lines, and points deriving from the survey data and historical images to construct shape files depicting survey coverages, modern landscape features, and historic landscapes. Each theme or layer of data can be turned on or off depending on the desired outcome of analysis. The main utility of ArcView is to construct maps, or Layouts, based on the above themes to visually and spatially depict the survey data for analysis and illustrative purposes.

Curation and Post-Processing

Post processing of all survey data was accomplished both in the field and back at the office. In the field, archaeologists curated the raw electronic data by writing the files to CDs directly from the onboard computers. Data from each CD was transferred to a Dell Latitude portable computer which contained the ArcView software and other programs necessary to allow the archaeologist to analyze the survey data from that day and use that information to plan the next survey task to be accomplished. Once a survey was completed, the electronic data from the CDs were downloaded to a Hewlett Packard Kayak desktop computer, and a Dell Dimension 4400 computer, where the data from

each survey could be integrated into the GIS project. Once a survey was post-processed the resultant data was archived to CD through ArcView.

Marine Remote Sensing Surveys

Survey Methodology

Preparation for each phase of the survey took place at SCIAA in Columbia. Based on available data, areas in which to place survey blocks were determined using results from previous surveys, historical chart locations, and information from the state site files. This information was then correlated with nautical charts and state quadrangle maps, as well as tide and current information. Based on this data, which was displayed in a GIS format, computer software was used to generate survey blocks that encompassed the known or suspected locations of each shipwreck site to be investigated. A series of waypoints were entered into the onboard navigation computer that enabled us to navigate to the survey location. Once in the field, survey lanes were generated using the onboard navigation computer, with beginning and ending X-Y coordinates to accommodate the approximate survey block area.

In general, 15-meter lane spacing was used throughout the survey to accommodate good magnetic data collection and provide sufficient overlap of acoustic imagery to adequately cover the survey area. With the side scan sonar set on two-channel operation using the 20-meter scale, this provided a greater than 100% overlap. In general, magnetometer and side scan operations were run concurrently, which necessitated maintaining a four-to-five-knot towing speed. For the larger survey blocks in the approaches to Port Royal Sound, a six to seven-knot speed was maintained with only the magnetometer sensor deployed. The majority of the targets were known to lie in shallow depths ranging from four to eight meters (mlw). Hence, we decided to tow the magnetometer sensor on the surface. Similarly, the sonar sensor was suspended from a spar off the port side of the C-Hawk, and adjusted below the water's surface as circumstances dictated.

Where warranted, and assessable, the MRD also investigated targets using direct techniques. Several sites were investigated using a hydro-probe to assist researchers in gathering additional information with which to characterize the cultural and environmental aspects of each site. MRD staff also ground-truthed several magnetic and acoustic anomalies, excavating down to, or otherwise recording information about each target.

Charleston Harbor

During 1999 and 2000, the MRD conducted remote sensing operations in Charleston Harbor and its approaches during five discrete episodes (Figure 7.2). On January 27 and 28, 1999, the MRD attempted to conduct a survey over the sites of the

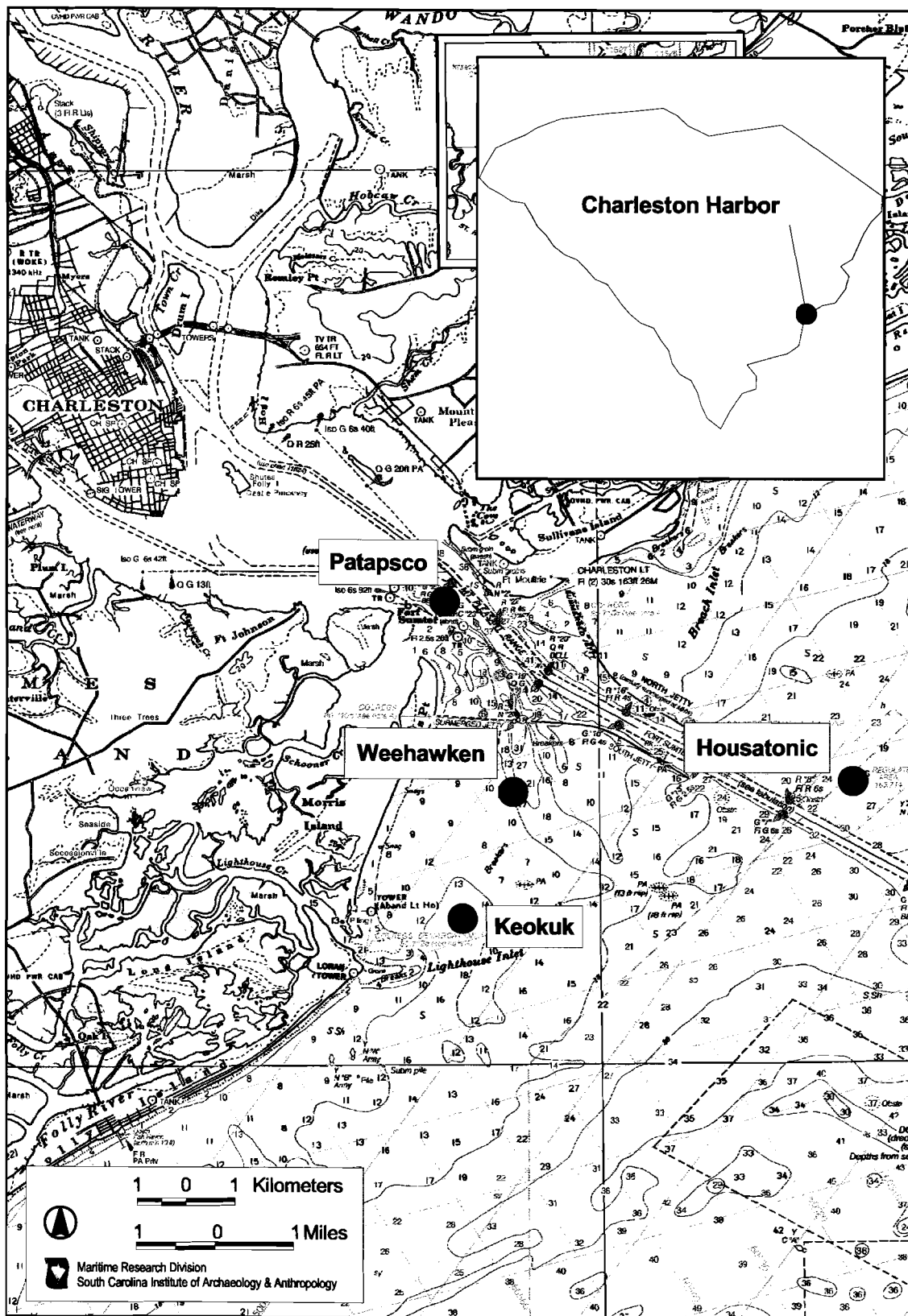


Figure 7.2: Naval wrecks surveyed during project in Charleston area (NOAA chart 11521, scale 1:80000, 1999).

Hunley and *Housatonic*. The purpose of the survey was twofold. The first goal was to relocate the sites and verify that the seabed over the *Hunley* site had not been disturbed through human intervention. A second goal was to test the MRD's newly acquired ADAP III marine survey equipment. Since receipt of the system in June 1998, MRD had experienced ongoing problems and inconsistencies with data acquisition. This continued to plague the system until a complete re-installation of the computer software and hardware upgrades during 2000 solved most of the problems.

The results of the fieldwork in 1999 were less than encouraging. On January 27, 1999 the MRD set up waypoints around the *Hunley* site to survey a block that would enclose the buried submarine. While the day was sunny and clear, three-foot seas threatened to build during the day. The *Hunley* was located in a shoal area north of the main shipping channel for Charleston at a depth of approximately 27 feet (8.3 meters) (mlw). As waves cross this area, they build in height causing a very choppy sea that can impede the efficient operation of the survey equipment. It is especially deleterious to the side scan sonar sensor that must, in that shallow water, be towed near the surface to produce adequate coverage of the survey tracks. While the state of the sea became questionable for survey work, lack of reliable GPS data and a non-functioning generator conspired to cause us to abort the survey for that day. The state of the seas worsened the following day and, along with generator failure, the situation caused us, once again, to abandon the survey after running only one lane through the point of steepest magnetic gradient on the *Hunley* site.

In May 1999, the MRD conducted a second survey over the *Hunley/Housatonic* area. The survey was conducted concurrently with Dr. David Conlin (NPS-SRC) and a hydrographic survey team who were taking core samples at both sites. The plan was to set up survey blocks to encompass the *Hunley* (Block 1), the *Housatonic* (Block 2), an anomaly between the two sites (3rd Anomaly), and a fourth target north of the *Housatonic* (4th Anomaly), both of which had been located during the NPS-SCRU survey in 1996 (Figure 7.3) (Murphy et al. 1998). On May 25, 1999, using coordinates provided to us by Dr. Conlin, the MRD placed a buoy on the *Hunley* site and conducted a single side scan pass. The magnetometer verified the location of the submarine. With the sonar range set at 20 meters, two-channel and towing the fish some five feet below the surface the unit revealed an untouched seafloor with no evidence of disturbance around the site.

With a 20-knot wind and 4-foot seas, the buoy was then removed and placed on the *Housatonic* preparatory to the following day's survey and core sampling. On May 26, 1999 a survey block was set up over the location of the "third anomaly", located between the *Hunley* and *Housatonic* sites. The ADAP III continued to experience intermittent shutdowns and unreliable data acquisition. An attempt the following day to complete a survey block over the *Housatonic* met with similar problems. Troubleshooting led to the discovery that the Marine Sonic software was causing erratic functioning of the side scan unit. The survey was aborted prematurely because a rogue wave breached the forward hatch dousing the side scan computer housing in salt water and opening the boat up to flooding when running lanes into the rising waves and wind.

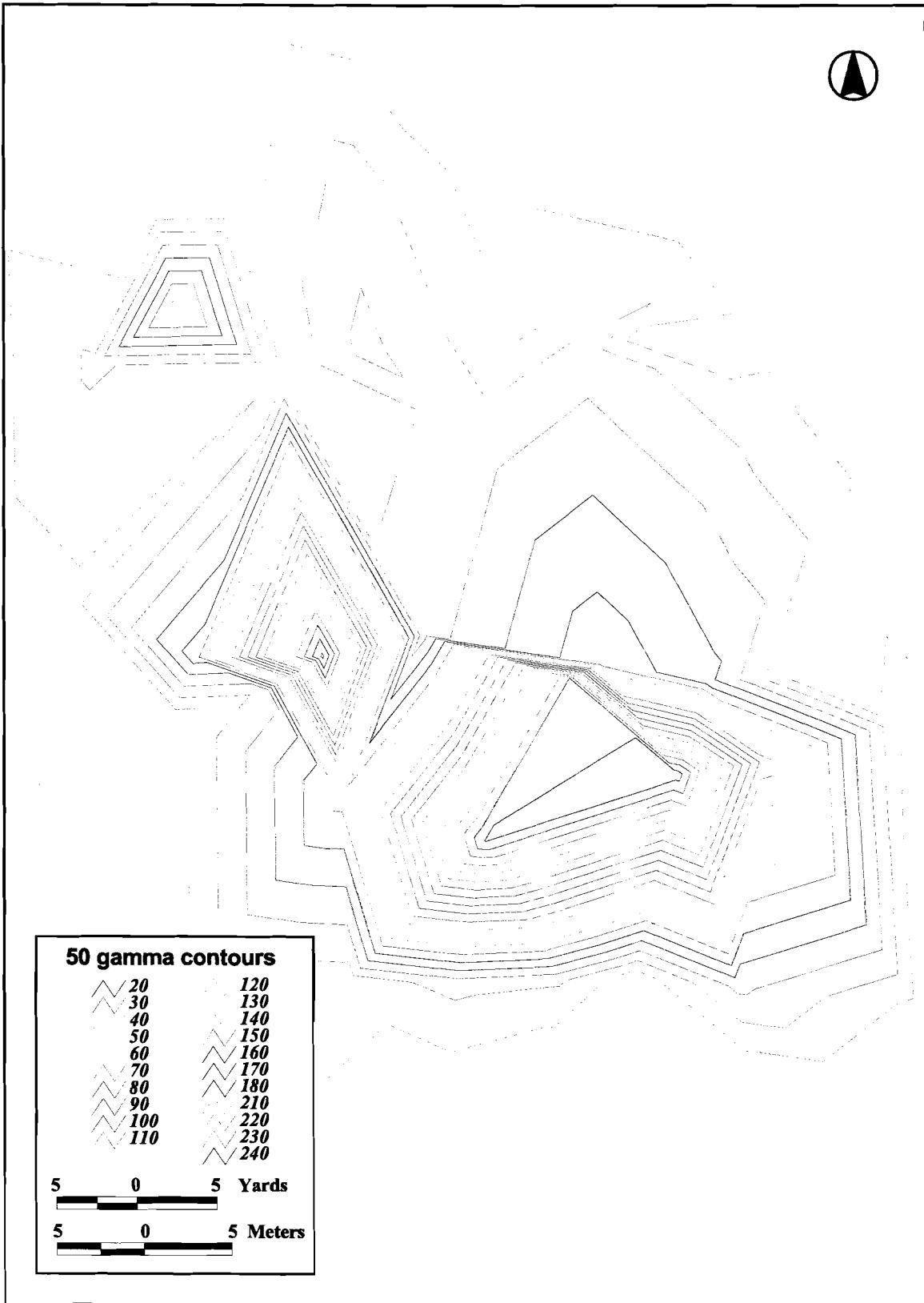


Figure 7.3: Fifty gamma magnetic contours of Housatonic site from 1996 National Park Service-Submerged Cultural Resource survey.

Throughout much of the remainder of 1999 and through 2000 the MRD's ADAP III marine survey system was undergoing repairs and having the system upgraded at Sandia Research Associates, Inc. This paralleled similar problems encountered by Mexico's Subdirección Del Arqueología Subacuática, Instituto Nacional Antropológico E Histórico that possessed the only other ADAP III system built. During this time also, the *Hunley* was excavated and raised, effectively removing one of the stated goals of the grant, to monitor the *Hunley* site. Finally, by the beginning of 2001, the problems with the ADAP III were solved and the system tested.

Project Area and Previous Archaeological Work

The survey area for the Charleston Harbor (See Figure 7.2) encompassed an area approximately 10 kilometers along the coast from Morris Island northwest to Breach Inlet, between Sullivan's Island and Isle of Palms. Perpendicular to the coast, the area extends from the most inshore wreck, the *Patapsco*, located near Ft. Sumter, to the *Housatonic/Hunley* sites some 10 kilometers distant. All the wrecks surveyed are within South Carolina's Territorial Sea. The *Patapsco* is clearly within the harbor while the *Keokuk* and *Weehawken* are within two kilometers of the shore of Morris Island. The *Housatonic* is approximately six kilometers (3.75 miles) off Sullivan's Island. However, the wreck is less than one-half that distance from the seaward end of the south jetty, from which the state's three-mile-limit is measured. Due to this, the wreck of the *Housatonic* (and that of the *Hunley*) is within the state's Territorial Sea.

Historical research of the 46 US Naval vessels lost in South Carolina waters determined there are potentially 40 US Naval shipwrecks in and around Charleston Harbor. Vessels scuttled from both Stone Fleets account for 31 of those wrecks and two wrecks, the lightship *Robert B. Howlett*, *Gunboat No. 157*, *Queen of France*, and the patrol vessel *YP-481* (formerly *Princess Mary*) remain undiscovered. For the remaining five shipwrecks, their locations have been known and recorded since shortly after the War Between the States. These wrecks include, USS *Keokuk*, USS *Weehawken*, USS *Patapsco*, and USS *Housatonic*. Additionally, the remains of the *Stono* (formerly USS *Gunboat Isaac Smith*) lie in the shallows of Sullivan's Island along with three other blockade-runners.

The project area was defined based on the locations of these five known shipwrecks under the purview of the US Navy. South Carolina's state site files indicated that the project area contained the remains all five wrecks, and an 1870 chart of Charleston Harbor showed the location of four of the five shipwrecks. The National Underwater Marine Agency (NUMA) located the *Keokuk* and *Weehawken* while conducting survey operations to attempt to locate the *Hunley* in 1980 and 1981 (NUMA report on file at SCIAA). These coordinates were later corrected using differential GPS and the depth of overburden tested (NUMA 2001). Other surveys conducted during the 1980s and 1990s located the remains of USS *Patapsco* and *Stono* (ex USS *Isaac Smith*). These included work by Gordon Watts in 1995 (Watts 1995) and a sub-bottom survey over the *Stono* by SCIAA's Maritime Research Division in 1996. Additionally, the *Stono*

and wrecks of other blockade-runners at Bowman's Jetty was the subject of commercial salvage in the 1980s by a group out of Florida.

In 1996, the Submerged Resources Center (SRC) of the National Park Service conducted a remote sensing survey of a block that included the *Housatonic* and *Hunley*. Using a first generation Archaeological Data Acquisition (ADAP) survey system designed by Sandia Research Associates, Inc., the SCRU team collected magnetic, acoustic, bathymetric and seabed classification data for the survey block. The resultant Geographic Information System (GIS) database was provided to SCIAA. Given this work had already been accomplished and SCIAA's attempts to resurvey the *Housatonic* had been less than successful in 1999, the resurveying of the site was de-prioritized in relation to the other sites in the project area. The raising of the *Hunley* in 2000 effectively removed that aspect of the stated goals of the grant.

USS *Patapsco* (38CH270)

Remote sensing operations on USS *Patapsco* were conducted on February 21 and 22, 2001. Prior to commencing the survey, MRD had at least three sets of coordinates all showing different locations for *Patapsco* (Figure 7.4). The state site files had the wreck plotted in the shipping channel. Gordon Watts and Ralph Wilbanks coordinates had it located slightly west of the channel on the 27-foot contour. The 1870 chart showed the site to the west of the channel lying on the 30-foot contour. Faced with these different locations and discounting the channel location as spurious, MRD opted to begin the survey at the 1870 location and cover Wilbanks' location during the survey. A 430 by 150-meter block consisting of ten 15-meter lanes was completed without magnetic or acoustic acquisition of the target. Lanes ran approximately parallel to the bathymetric contours of the seabed oriented NW to SE. A second 100 by 400-meter block, oriented parallel to the first block, was set up to the west and north of that block using 45-meter lanes as a means of detecting the site rapidly. The sonar was set to the 50-meter scale to provide complete coverage of the survey tracts. On February 22 the site was detected magnetically and acoustically. The point of steepest magnetic gradient centered 492 meters NNW of the point shown on the 1870 chart.

Once the site was located, an additional lane was set up equidistant between the two lanes bracketing the site, creating a lane spacing of 22.5 meters over the site. With the sonar set on the 20-meter scale and using the 22.5-meter lane spacing, several lanes were re-surveyed resulting in good acoustic images of site components that were above the bottom grade. Seven lanes oriented NE to SW were set up over the site resulting in several more good images and a refinement of the magnetic signature.

Magnetometer

Figure 7.5 depicts the magnetics of the site using a 100-gamma contour encompassing a roughly 24,000 square meter area, although the anomalies having high gamma readings cover less than one-third of that area. The site is composed of a series of

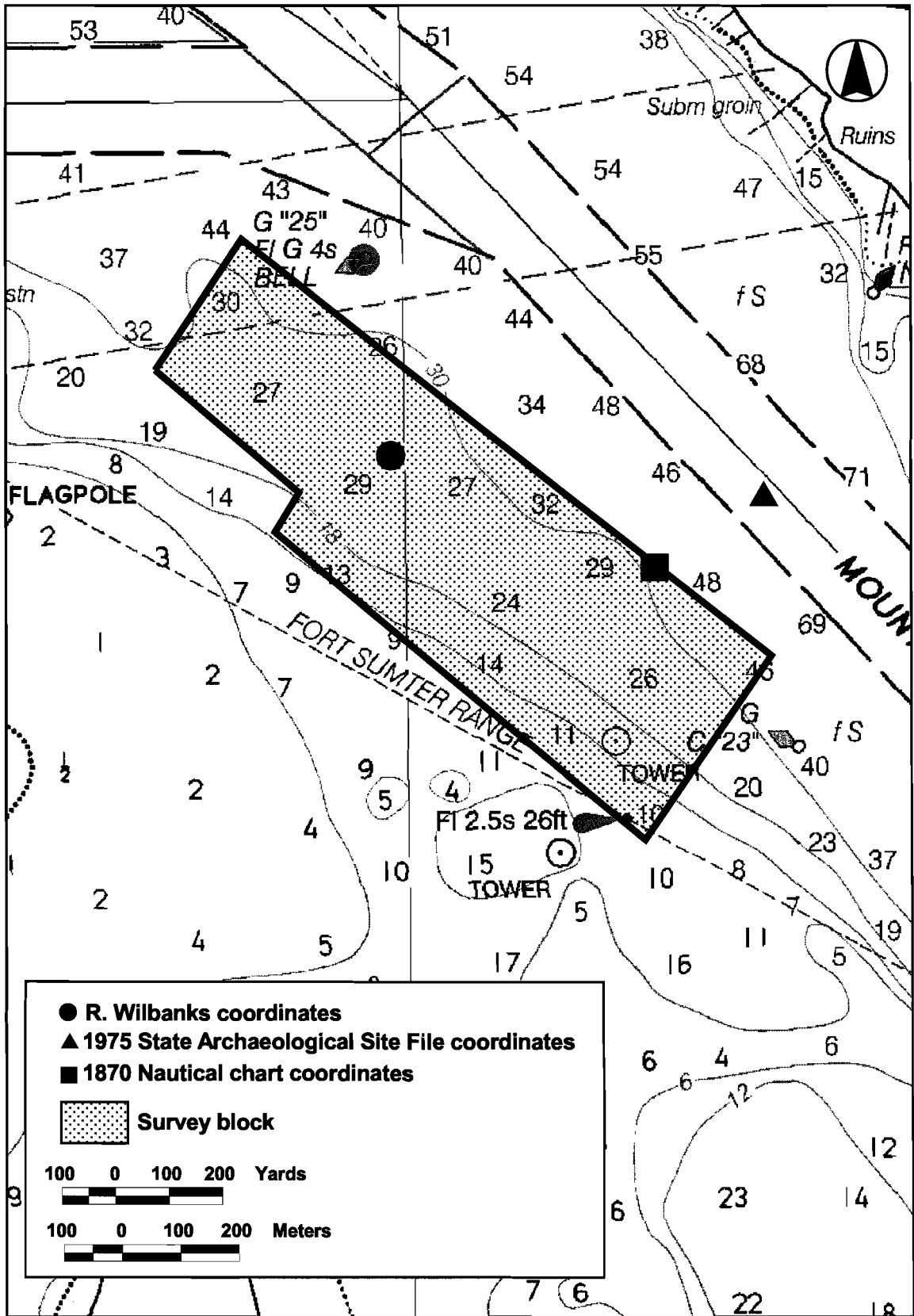


Figure 7.4: USS Patapsco Survey Area (NOAA chart 11521, scale 1:20000, 1993).

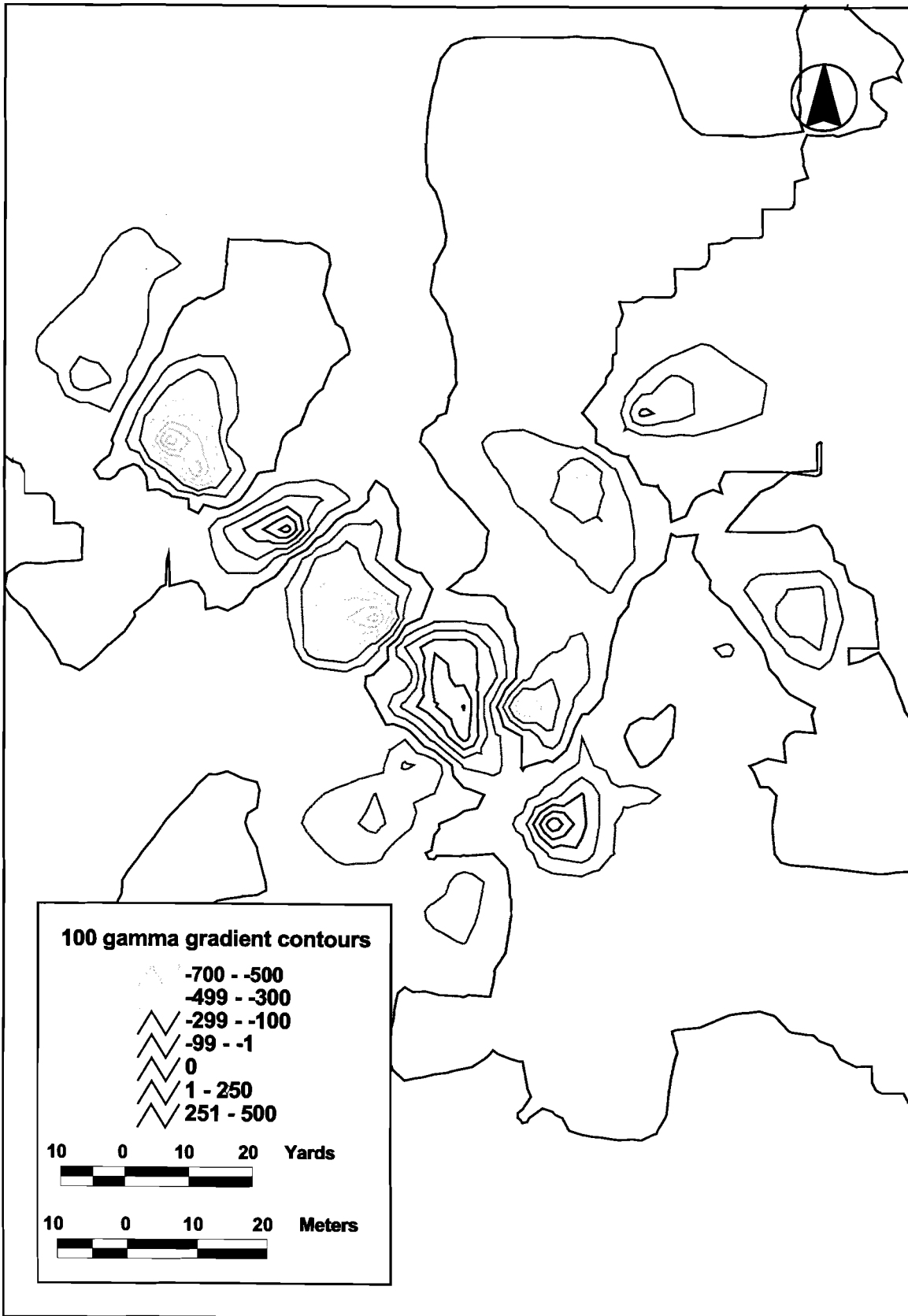


Figure 7.5: USS Patapsco 100 gamma gradient magnetic contours.

dipolar and multi-component magnetic anomalies. The main grouping of anomalies having the greatest gamma readings lie along a NW-SE orientation. The majority of those anomalies have gamma readings in the 500 to 700 range, with a maximum reading of 954 gammas on an anomaly located towards the NW extent of the site. The maximum duration along this axis is 74 seconds representing a distance of approximately 122 meters, or a little over twice the vessel's length of 190 feet (57.8 meters).

The maximum duration along the NE-SW axis is 43 seconds representing a distance of approximately 103 meters. Many of the outlying anomalies have gamma readings in the 200 to 500 range. While the significant magnetic readings are presented above, the influence of the site on the earth's magnetic field (readings greater than 2 gammas) can be detected farther out, in places as far as 60 meters beyond evident anomalies.

Side Scan Sonar

Visible signs of the remains of USS *Patapsco* were evident on six acoustic images. Two of these images (Figure 7.6) were acquired while the sensor was towed along a SE-NW axis passing over or nearly over the remains of the vessel. Other acoustic images were taken while passing over the site on a NE-SW heading. All six images consistently show a linear object in excess of 30 meters, which is slightly curved along its length. The object protrudes from the sediment from between 18 to 45 centimeters and the opposing ends appear to disappear into the sediment. The similarity of coordinates of the target taken from the side scan plotter suggests that each image represents a different view of the same object. Additionally, the images show irregular masses of both linear and non-linear objects associated with the curved, linear object. In Figure 7.6, a series of linear objects can be seen lying parallel to each other, and spaced some one to two meters apart. These objects also lie approximately perpendicular to the run of the longer linear object. Each object is between nine to ten meters in length and stands proud of the bottom by 31 to 43 centimeters. All the objects observed in the sonar images cover an area of approximately 589 square meters (approximately 31 by 19 meters) centered on the magnetic region of steepest gradient on the site.

Discussion

Both the magnetics and the acoustic images suggest the hull of the wreck lies along a NW-SE orientation at the 28-foot bathymetric contour line. While the majority of the magnetic anomalies confirm this orientation, several outlying magnetic features to the NE and SW of the main axis suggest that the site is heavily scattered, due to contemporary salvage and environmental factors. During 1871-1872, Dr. Benjamin Maillefert conducted extensive salvage on the vessel, removing the deck and machinery located beneath, as well as the boiler, turret, pilothouse and sections of armored sponsons. Maillefert noted that salvage on the site, conducted prior to his arrival, had left the wreck in a "distorted condition." The presence of numerous magnetic anomalies associated with the site suggests that much of the hull iron still remains buried beneath

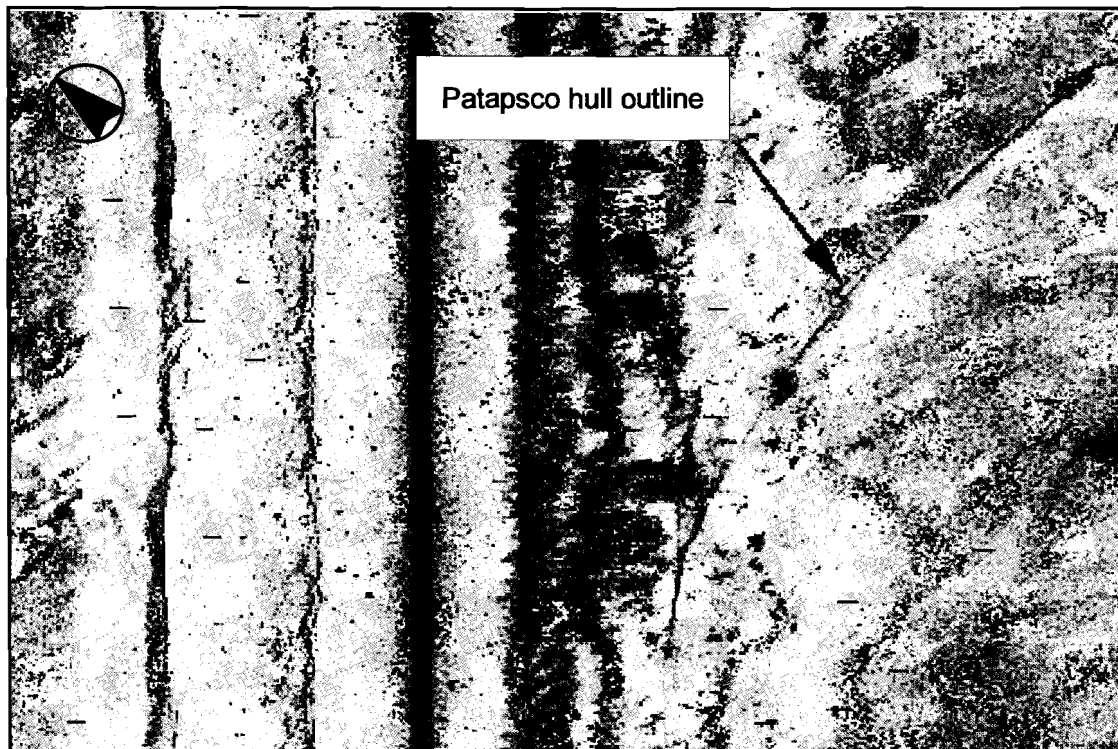
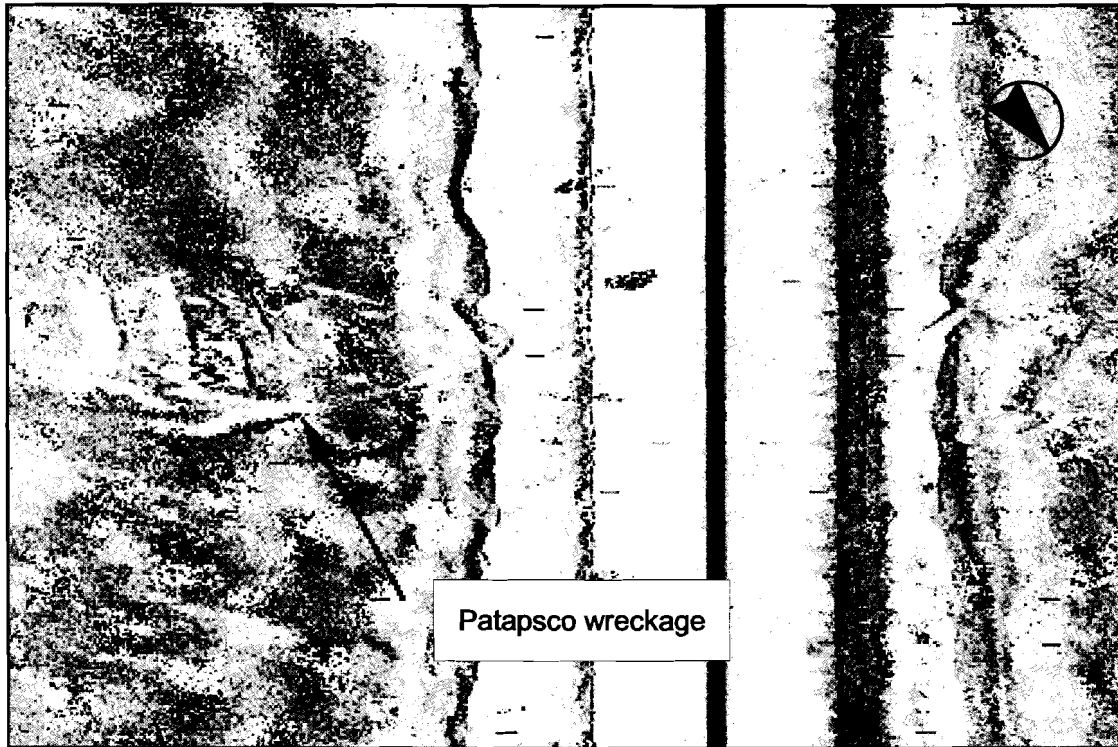


Figure 7.6: *Two sonograms showing sections of the exposed Patapsco hull. Scale is approximately 1.4 centimeters per 1 meter.*

the sediments. Further, the side scan survey confirms that only a relatively small area of the wreck remains exposed above the harbor sediments.

Specific objects visible in the acoustic images lend themselves to interpretation. The curved linear shape, evident in the sonar images, suggests a component of the hull. It is perhaps part of a side of the vessel or a section of armor belt or sponson. The nine-to-ten-meter-long linear objects perpendicular to the curved object could be structural members of the hull, possibly deck beams. The scaled length of each object (approximately 10 meters) is consistent with the 11.6-meter (38-foot) beam of the ship.

USS *Keokuk* (38CH271)

The remains of USS *Keokuk* lie buried in the sediments off Morris Island. The wreck is approximately 1.9 kilometers due east of the abandoned Morris Island Lighthouse and less than 1.5 kilometers NE of the entrance to Lighthouse Creek. The 1870 chart, however, places it some 490 meters SE of that location. This is consistent with the direction and distance error for the *Patapsco*. The wreck lies approximately 450 meters due west of the wreck position plotted by NUMA in 1980-81.

Remote sensing operations on USS *Keokuk* were conducted over two days in 2001 (Figure 7.7). The Division conducted a brief survey on February 23 to encompass the location shown on the 1870 chart and the NUMA coordinates. Eleven survey lanes were run in a NNE-SSW orientation, parallel to the direction of the ebb tide. Operating the magnetometer and side scan sonar simultaneously, the results confirmed that the *Keokuk* did not lie at either of those locations. Two small magnetic anomalies were recorded in that block. Neither, however, coinciding with the 1870 or NUMA locations. The side scan sonar recorded a relatively flat seabed with no evident protrusions from the bottom or evidence of cultural material.

Under clear skies with a SE wind producing two-to-three-foot waves, a second survey was conducted on July 11. This survey was centered over coordinates provided by Ralph Wilbanks earlier that year. After confirming the presence of a large magnetic anomaly with the magnetometer, MRD set up a survey block approximately 210 meters by 180 meters over the site. Using 15-meter lane spacing, 14 survey lanes were run in a NNW-SSE orientation. Two additional lanes were run to compensate for navigation errors along two of the original lanes. Running parallel to the ebb tide, an average speed over ground of between 4.5 and 5.5 knots was maintained. Due to the shallow depth of water over the site, the magnetometer sensor was towed on the surface 15.2 meters (50 feet) behind the GPS antenna. Likewise, the side scan sonar sensor was suspended from a spar approximately two feet below the water's surface. Twelve survey lanes were placed across the block, oriented East-West to refine the magnetic contours. Both the magnetometer and side scan operation were run concurrently with the sonar set at the 20-meter scale providing greater than 100% coverage of the survey tracks.

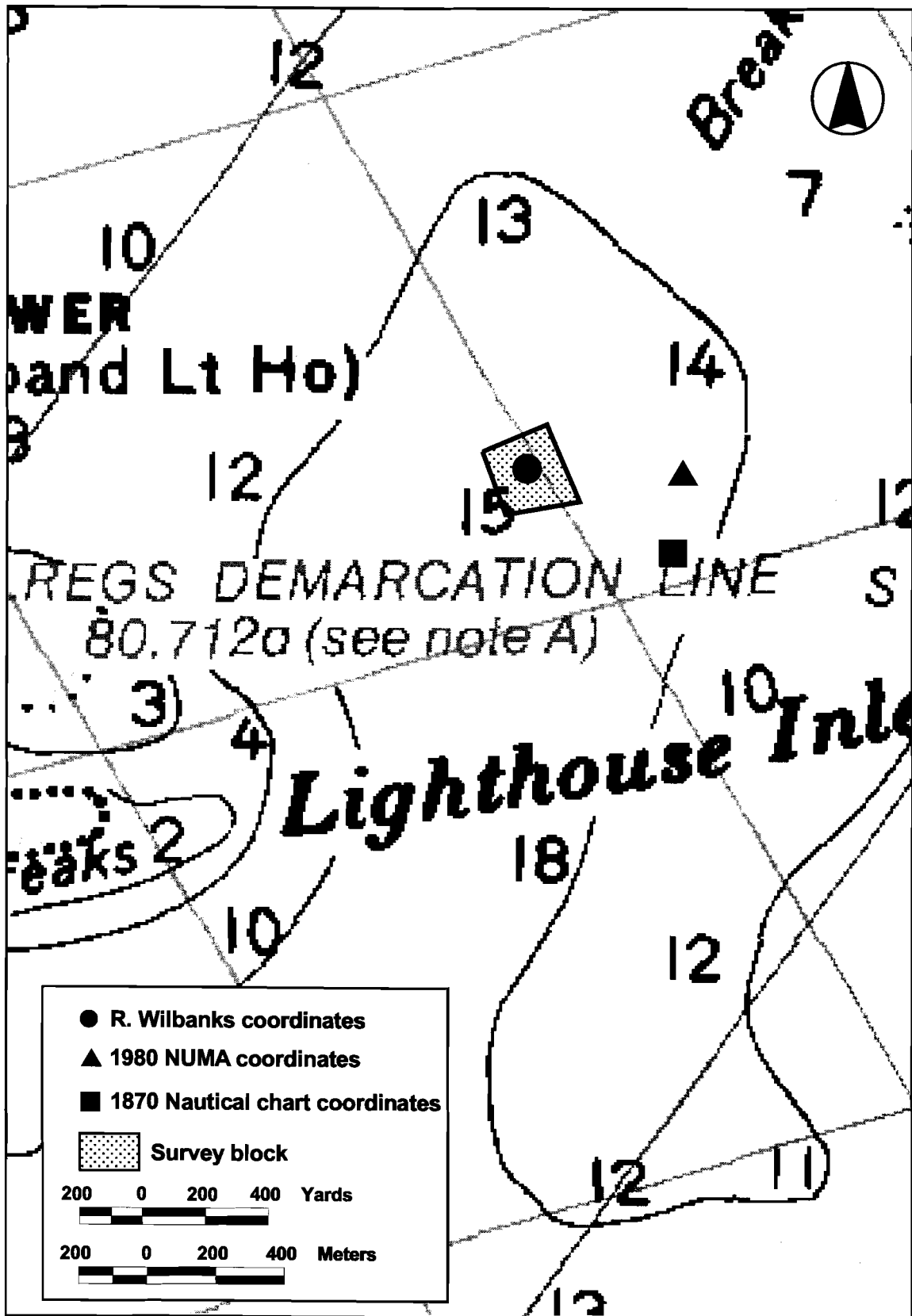


Figure 7.7: USS Keokuk Survey Area (NOAA chart 11523, scale 1:20000, 1993).

Magnetometer

Figure 7.8 depicts the magnetics of the site using a 100-gamma contour. The area of magnetic influence encompasses approximately 35,000 square meters, although the magnetic nodes having the greatest intensity cover an area little more than one-tenth of that area. The site is composed of a series of multi-component and dipolar magnetic anomalies. Nine nodes of high positive and negative magnetic intensity are aligned in three groupings of three anomalies each in a NE-SW axis. Three anomalies with the highest magnetic intensity are aligned along the SE margin of the site. One node of magnetic intensity, somewhat offset from the rest, occurs at the northwest corner of the groupings of anomalies. The main grouping of magnetic nodes has gamma readings in the 800 to 1900 range. The highest reading, 1,970 gammas, occurs at the southeast corner of the area of greatest magnetic deflection. The maximum duration of magnetic influence at 1 gamma along the NNW-SSE axis is 79 seconds representing a distance of approximately 175 meters, while along the E-W axis the duration was 67 seconds representing approximately 168 meters.

Side Scan Sonar

While the side scan sonar operated concurrently with the magnetometer, no visible signs of cultural material, unusual disturbances or perturbations of the bottom sediments were detected.

Bathymetry

Bathymetric data was collected over an 80,000-square-meter area surrounding the site. This was the first time on the project that MRD had been able to gather reliable bathymetric data with the ADAP III due to previous conflicts and interference in the system. The bathymetry clearly indicates that the wreck lies in approximately 4.5 meters (15 feet) of water with a sea floor that slopes from an average of 4.2 meters (14 feet) to the east of the site to an average of 5.0 meters (16.5 feet) inshore

Discussion

Discussion of the site is based on the magnetics, bathymetry, and historical records as they pertain to the post-depositional history of the site. All remains of the *Keokuk* appear to be buried beneath the sediments as no evidence of cultural material protruding from the site could be identified acoustically. In 2001, Ralph Wilbanks tested the site and suggested that there was some six feet of overburden covering the site (NUMA 2001:3). However, correlation of modern bathymetric data recorded during the survey, Mr. Wilbanks' overburden determination, and contemporary descriptions of the depth of water to which the wreck was to be reduced, suggest that the seafloor may have accreted by as much as eight feet at the site.

The linear orientation of the magnetic anomalies having the highest intensity, located along the SE side of the site, suggests that the lower hull is likely fairly intact and

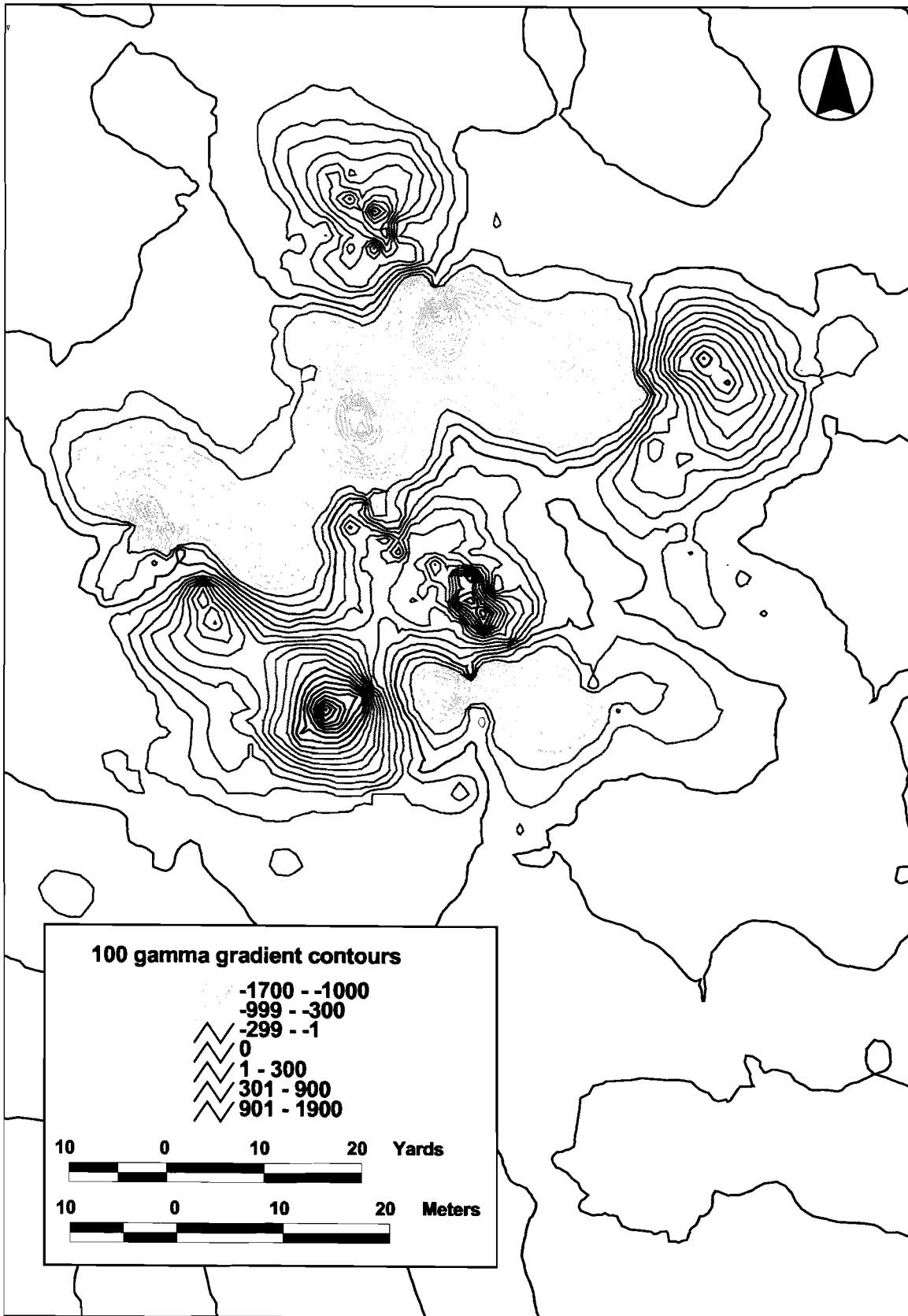


Figure 7.8: USS Keokuk 100 gamma gradient magnetic contours.

is oriented along a NE to SW axis. The distance between the centers of highest gamma reading at the NE and SW ends of the site is 49 meters (162 feet), which corresponds fairly well with the ship's 159.6-foot length. *Keokuk* was an iron-hulled, double turreted ironclad built of one-half-inch iron plates covered with 4-inch iron bars. After being sunk by enemy gunfire, Confederate crews systematically recovered the two big 11-inch Dahlgrens from the sunken hull, removing both turrets and salvaging numerous other items from the hull. In 1873, Dr. Benjamin Maillefert was awarded a contract to remove the wreck down to 15 feet of water. Evidently, this was accomplished by 1874 (USACE 1874a). Various sizable anomalies scattered across the site to the NW likely represent evidence of those salvage activities, as well as natural decomposition and dispersal of the upper hull components by natural forces.

USS *Weehawken* (38CH272)

The remains of USS *Weehawken* lie two point eight kilometers NNE of the *Keokuk*. The *Weehawken* foundered after taking on water while at anchor eight months after the *Keokuk*'s demise. The center of magnetic disturbance lies approximately 200 meters East of the location given on the 1870 chart and 440 meters west of NUMA's coordinates.

The MRD conducted a remote sensing survey of the site on August 6, 2001 (Figure 7.9). Realizing from our experience on the *Patapsco* and *Keokuk* that the 1870 coordinates would be erroneous, MRD centered the survey block over Wilbanks' coordinates (NUMA 2001), after first verifying the presence of the wreck with a magnetometer pass over the coordinates. With clear skies and 2-3-foot seas, a 434-meter by 270-meter block was set up with the long axis in a NNW-SSE orientation to take advantage of the current, which ebbed and flowed in those directions. Using 15-meter spacing, 19 lanes running along the long axis were surveyed using concurrent magnetometer/side scan sonar operation. The same sensor configuration was used on the other sites. Fifteen lanes were set up crossing the site in an ENE-WSW orientation to refine the magnetic contours.

Magnetometer

Figure 7.10 depicts the magnetics of the site using a 100-gamma contour. The area of magnetic influence covers approximately 29,000 square meters, although the nodes having the greatest gamma readings cover less than one-quarter of that area. Six nodes of high magnetic intensity are aligned in two parallel rows along a NW-SE axis covering a distance of approximately 65 meters NW-SE and approximately 60 meters NE-SW. The nodes range from approximately 500 to 1000 gammas, while the highest reading, -1,867, occurs along the east side of the site. The main cluster of magnetic nodes is surrounded by a number of smaller anomalies in the 100 to 300-gamma ranges that are scattered around the fringes of the site. The maximum duration of magnetic influence at 1 gamma along both NW-SE and NE-SW axis is 76 seconds representing an approximate distance of 170 meters.

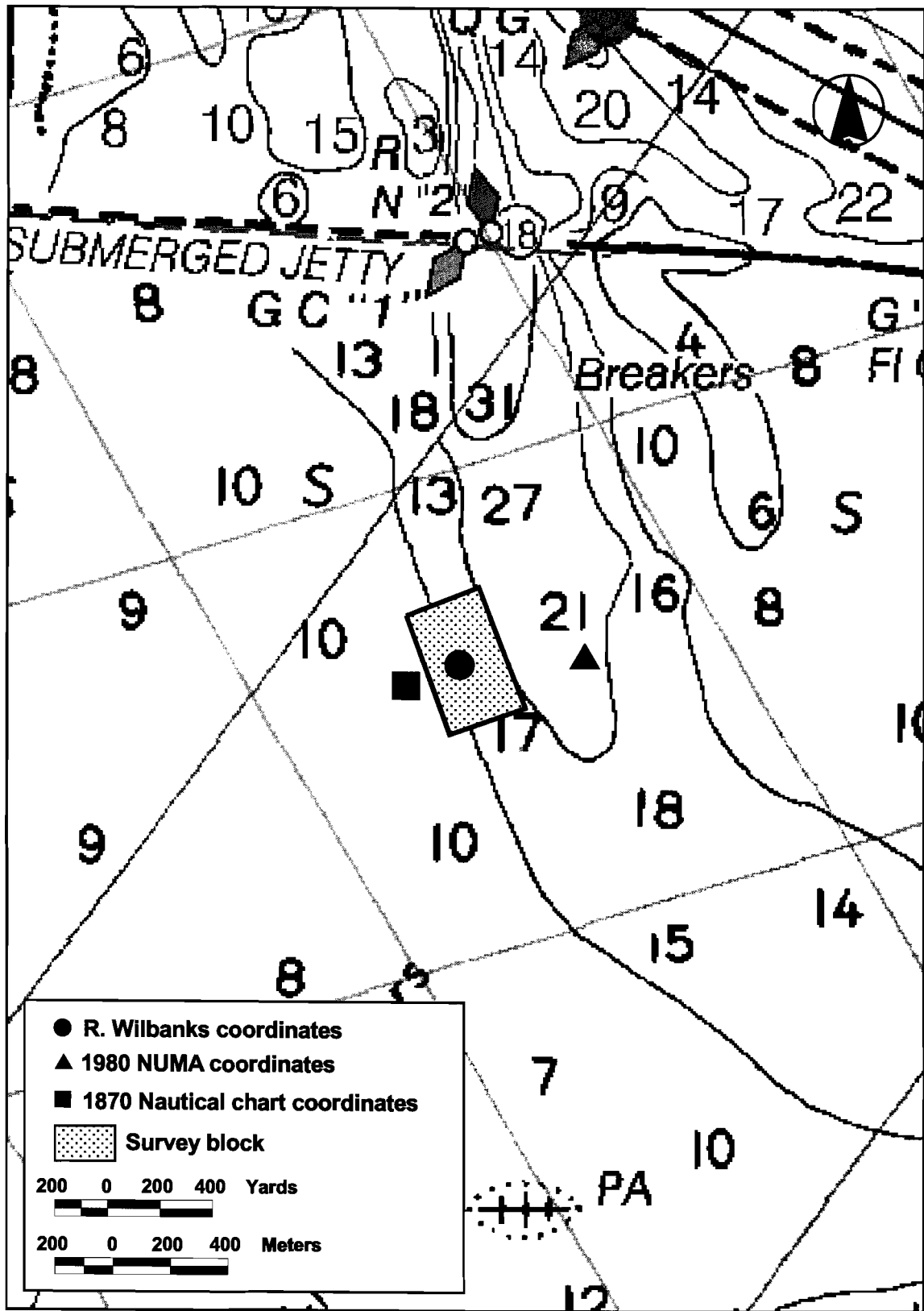


Figure 7.9: USS Weehawken Survey Area (NOAA chart 11523, scale 1:20000, 1993).

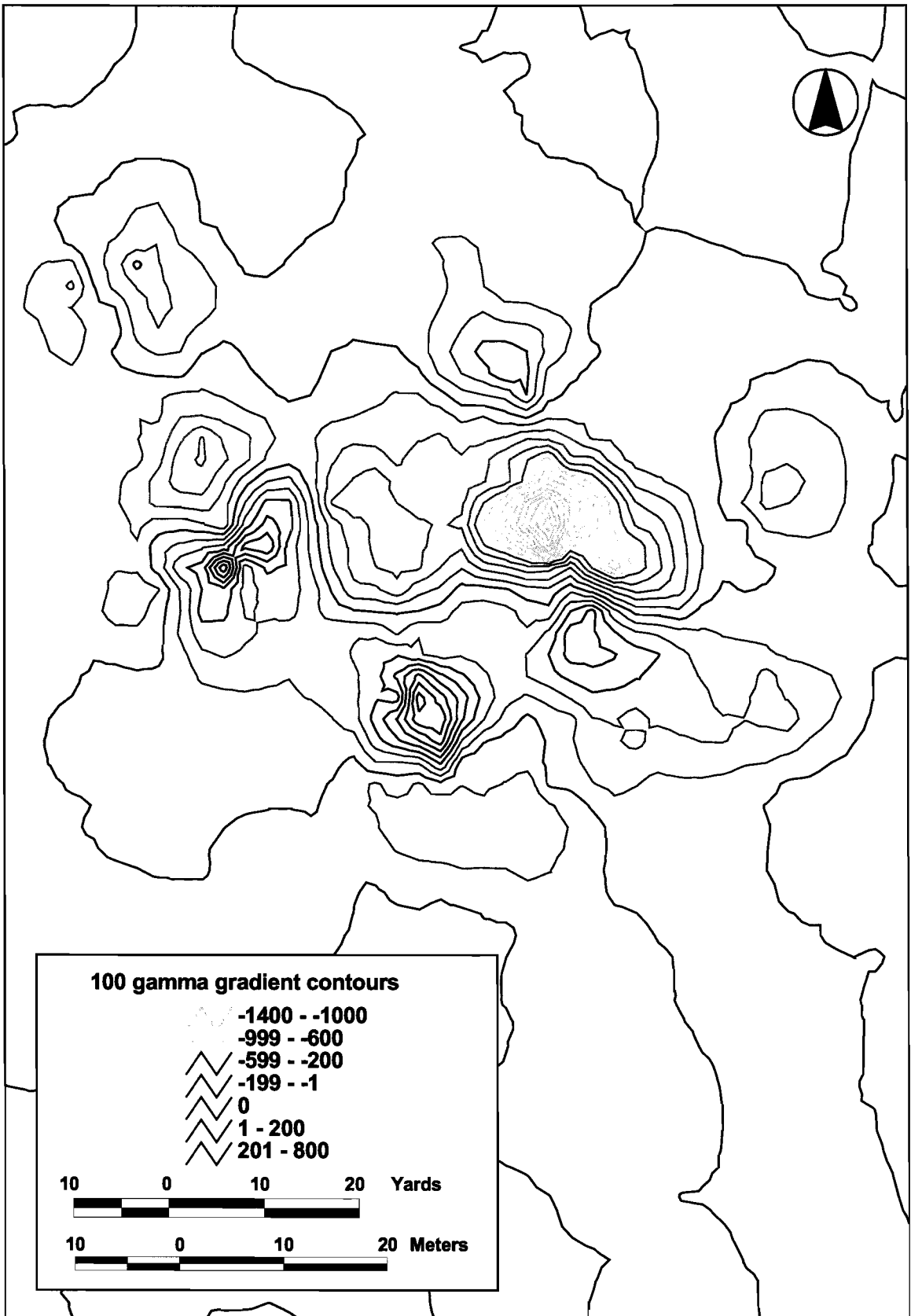


Figure 7.10: USS Weehawken 100 gamma gradient magnetic contours.

Side Scan Sonar

The acoustic record of the survey block gave no indications of cultural material that may be associated with USS *Weehawken* and presented a relatively smooth featureless bottom.

Bathymetry

Bathymetric data were collected over a 163,000-square-meter area surrounding the site. This data describes the site lying in sediments that gently slope from approximately 3.9 meters (13 feet) inshore of the wreck to an average of 4.8 meters (16 feet) offshore before dropping rapidly to over 6.0 meters (20 feet) in the channel some 180 meters east of the site. The center of magnetic disturbance occurs in approximately 4.3 meters (14 feet) of water.

Discussion

The absence of any acoustic images that may relate to the wreck confirms that the *Weehawken* is buried beneath the sediments. Based on bathymetric data recorded during the survey, the wreck lies in approximately 14 feet of water; while the 2001 NUMA survey indicates an additional 12 feet of sediment lie over the site (NUMA 2001:4). From a contemporary letter written after the war, the vessel appears to have sunk across the channel in 30 feet of water. Given the discrepancy in contemporary and modern water depths over the site it appears that a significant amount of accretion has occurred over the site in the intervening years.

In 1873, the sunken remains of the *Weehawken* were partially salvaged by Dr. Benjamin Maillefert. Dr. Maillefert removed the decking and upper hull down to a depth of 20 feet at low water, recovering the engines, both Dahlgren guns, portions of the turret and pilothouse. He also removed a 40-foot section of the 844-ton monitor's stern (USACE 1874a). The location and clustering of the anomalies suggests that the site was dispersed, probably not only during the salvage process but through later intervention by environmental forces. The orientation of the high magnetic intensity anomalies suggests that a significant portion of the lower hull may be intact and that the hull lies in a WNW-ESE orientation. However, the distance between magnetic peaks located at opposite ends of the site tend to confirm that at least 40 feet of the original 200-foot hull is missing.

Port Royal Sound

In 2001, 2002, and 2003, MRD conducted remote sensing survey operations at several areas of past naval activity in Port Royal Sound, primarily relating to the Civil War occupation by Federal forces. Six survey areas—Skull Creek, Station Creek, Bay Point Island, Gaskin Bank, Whale Branch River and Hilton Head Island—were investigated to determine the presence of archaeologically or historically significant cultural objects associated with past naval activity in the sound (Figure 7.11). The Hilton

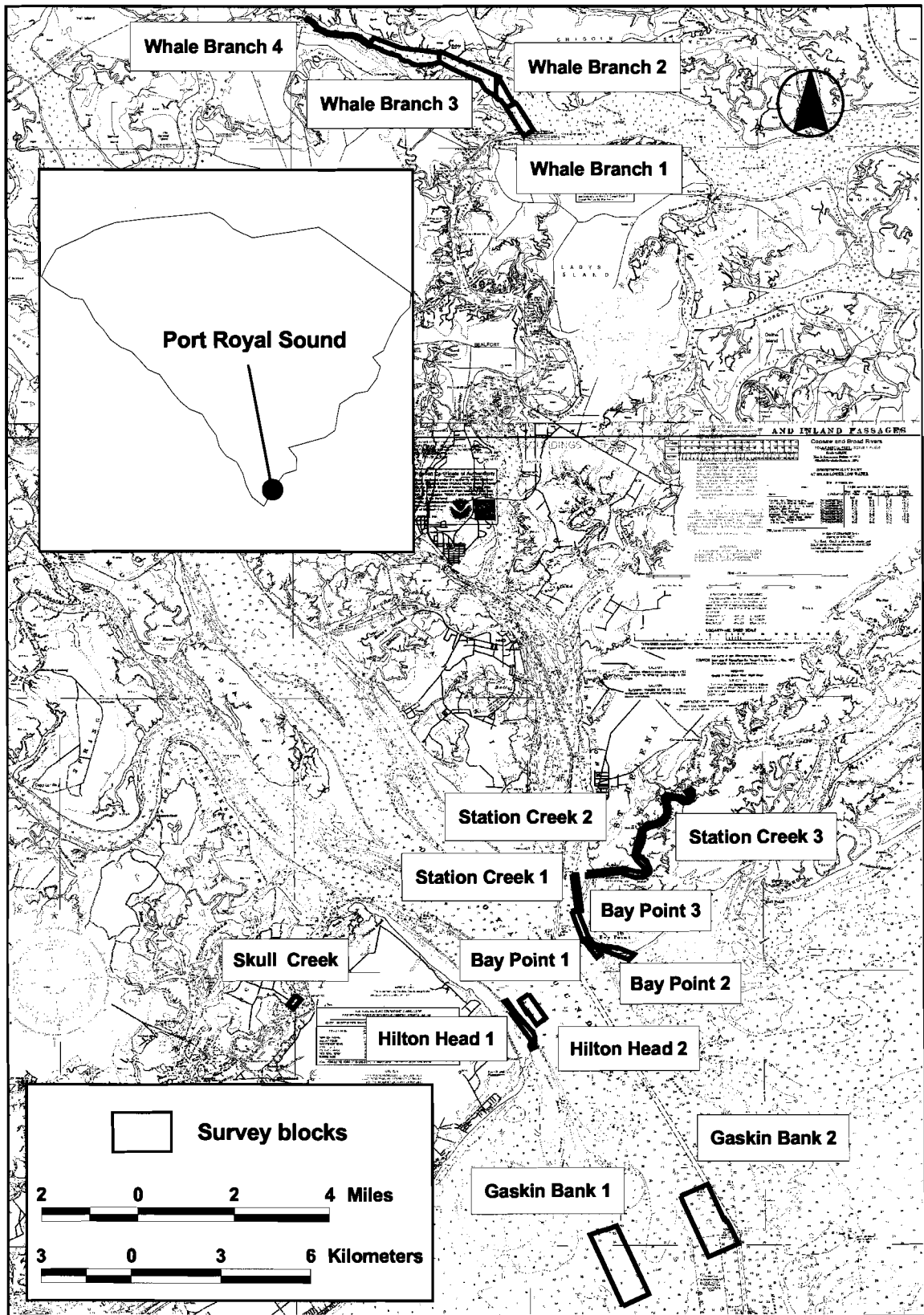


Figure 7.11: Port Royal Sound survey areas.

Head Island survey area, along the northeastern shoreline, consisted of two survey blocks designed to locate evidence of the T-dock complex used by Federal forces to re-supply the Army troops and the South Atlantic Blockading Squadron. The Bay Point Island survey area, opposite Hilton Head Island, was the site of a naval coal depot with a large T-dock and defensive structures. Both the Hilton Head Island and Bay Point Island survey areas had an earlier Confederate presence as well. At the Station Creek survey area, there was a naval repair facility featuring buildings and floating workshops. The Skull Creek survey area was chosen due to the presence of the Skull Creek Wreck (38BU723), which may be associated with attempts by Confederate forces to blockade Skull Creek by sinking the Martins Industry Lightship. Alternately, the wreck could also be that of a Union vessel that was intentionally sunk. The Whale Branch River survey area, totaling four blocks, was implemented to find the remains of an Army gunboat, USS *George Washington*, sunk during the Civil War. The Gaskin Bank survey area, consisting of two blocks, was conducted to locate the remains of the *Marcia*, a merchantmen intended for use on the Second Stone Fleet, that sank while crossing the Port Royal Sound bar system.

The ADAP-III system was used to survey the designated areas, primarily relying on the magnetometer as the main archaeological prospecting tool. However, on occasion, the team used the side scan sonar ensemble to gather additional data in selected survey areas, namely Skull Creek and Station Creek. Survey blocks were denoted by geographic location and number, for example, Hilton Head 1, designated the near shore survey block for components of the T-dock complex. Magnetic or acoustic anomalies were identified by abbreviating the survey block name and given a sequential number, for example, HH1-1. In the case of acoustic anomalies, a lowercase "s" before the number, e.g., SC2-s1, was used to differentiate a sonar anomaly from a magnetic anomaly.

The survey strategy was to rapidly detect magnetic anomalies with a high boat speed and wide spaced lanes and to later come back at another time to further refine the anomalies with more magnetometry and side scan sonar. A total area of 7.8 square kilometers and approximately 447 linear kilometers was surveyed in fourteen survey blocks. Survey speed ranged from six to seven knots, and a magnetometer sample rate of one second, resulted in gathering magnetic data approximately every three to five meters. When towing with the sonar, lane speed was reduced to four to five knots to attain better acoustic images, with magnetic data obtained approximately every two to three meters. Unless stated otherwise in the following discussion of individual survey blocks, lanes were spaced 20 meters apart. At all times the magnetometer sensor was floated as a precaution against snagging the sensor on an underwater obstruction or the bottom. A total of 761 anomalies were detected in the survey areas: 758 magnetic anomalies, ranging from one gamma to 1,400 gammas, and three acoustic anomalies. Water depths ranged from 0.6 meters (two feet) to 15.2 meters (50 feet) and anomaly depths are approximate as the tidal range in Port Royal Sound is 1.8 to 2.1 meters depending whether within the confines of the sound or in the ocean. MRD also undertook a limited visual investigation of the Skull Creek Wreck (38BU723), and ground-truthed several magnetic and acoustic anomalies.

The results of the survey, along with a description of the historical or archaeological potential of each area, are discussed by survey area and block number. The discussion is limited to significant archaeological remains found and/or magnetic or acoustic anomalies bearing the potential to be historically or archaeologically significant. The magnetic anomalies are characterized by their amplitude, or the strength of the disturbance; signature, that is whether dipolar, monopolar, or multi-component; duration, or how long in seconds the anomaly was detected at its greatest width in a lane; number of lanes affected by the magnetic disturbance; quantification of the area of disturbance based on the magnetic contours; and finally, water depth in meters of the anomaly. A brief suggestion of the cause of the magnetic anomaly is also posited, which typically was identified as a ferro-magnetic cultural object. A subjective classification of the magnetic anomaly's size (or mass), based primarily on amplitude, although the other above factors also helped to define an anomaly, was generated to aid in qualifying the source of the anomaly. The classification values were Small (1-10 gammas), Small to Medium (10-20 gammas), Medium (20-50 gammas), Medium to Large (50-100 gammas), and Large (100-1400 gammas). Acoustic anomalies were discussed based on the sonograms and in conjunction of any corresponding magnetic anomalies. At this point, the exact sources and causes of the majority of the magnetic anomalies are unknown and await visual inspection by underwater archaeologists to determine their historical or archaeological importance, and their relationship to the naval presence in Port Royal Sound. Ground-truthing of several magnetic and acoustic targets succeeded in locating a shipwreck, a small truck body, and modern debris, which are discussed in the relevant survey block.

Hilton Head Island Survey Area

Two survey blocks along the Port Royal Sound shoreline of Hilton Head Island were chosen for survey due to the presence of the Civil War T-dock facilities used by the Federal forces occupying Port Royal Sound. The T-dock stretched approximately 330 meters into the sound and included a rail line to transport supplies to shore. Previously, the site was fortified by the Confederates to oppose entrance into the sound by the Union. Later, the same area was used during the Spanish-American War to supply Fort Walker. Interviews with local shrimpers resulted in documenting a number of unidentified snags in the general vicinity. The intended results from this survey area were to obtain magnetic data of the shrimper snags and to locate discarded or accidentally deposited supplies and anchors affiliated with the operation of the dock and adjacent anchorage during the Civil War. The first survey block was located along the immediate near shore waters of the island. The second survey block was located further offshore and intended to locate reported shrimper snags (Figure 7.12).

The location of the T-dock was determined by georeferencing an 1873 nautical chart to modern UTM coordinates. Coordinate points were obtained by locating historic road intersections that correlated to modern ones. Placed in ArcView, features on the georectified chart corresponded to the modern landscape with little distortion. The T-dock position on the historic chart matched a "Piles" symbol in the modern National Oceanic and Atmospheric Administration (NOAA) nautical chart 11516–Port Royal

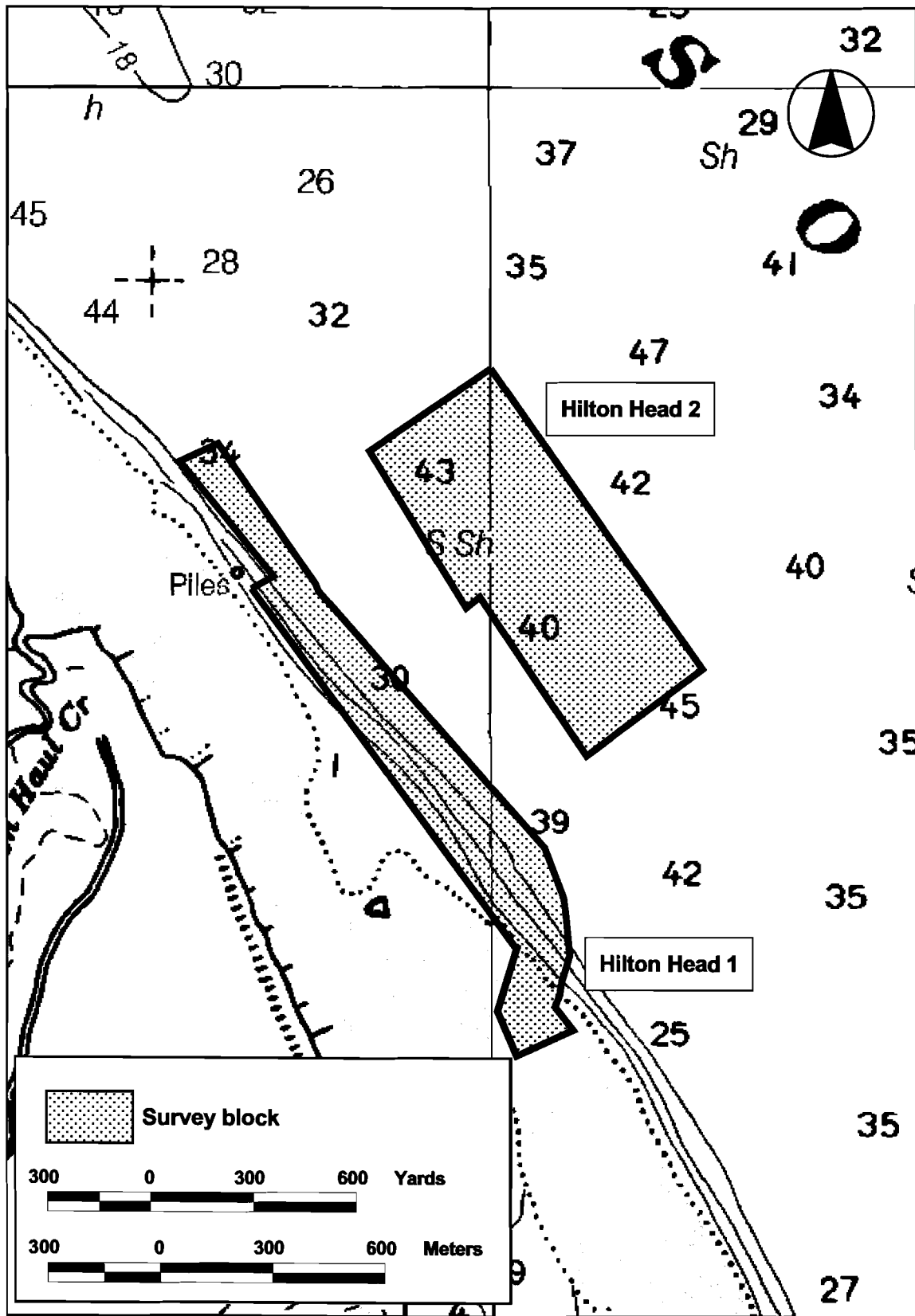


Figure 7.12: Hilton Head Island Survey Area (NOAA chart 11516, scale 1:40000, 1997).

Sound and Inland Passages. A digital tracing of the T-dock from the historic chart was overlaid a Digital Orthographic Quarter Quadrangle of Hilton Head Island which revealed several environmental changes from the historic Civil War shoreline, albeit with some consideration of the error introduced through georectification of an historic chart. The most notable observation was that the modern shoreline has eroded several hundred feet from the 1860s shoreline. This erosion was verified during the pedestrian survey phase of the Port Royal Sound Survey in 1997 when archaeologists observed several cultural deposits of animal bones, ceramic shards, and glass on the sand and mud flats during low tide. The adjacent tidal creek, Fish Haul Creek, has also changed from its Civil War-era meandering course northwards to present times where it empties into Port Royal Sound much closer to the remains of the dock. What has not changed, however, is the bathymetric contour where the pier head met the interface of shallow water to deep water. The historic chart and placement of the pier coincided accurately to modern depth contours, which in turn guided the research strategy to survey along this historic/modern interface.

Hilton Head 1 Survey Block

On March 21, 2001, MRD surveyed a block measuring 1,848 meters in length and at its maximum width, 191 meters, covering an area approximately 271,798 square meters (Figures 7.13 and 7.14). The southern end of the survey block was scalloped due to the intrusion of a large sand island and by maintaining an initial transect along the 1.3-meter depth contour. Water depths in the survey block ranged from 1.3 meters along the shoreline to 10.4 meters further offshore. Fifty-two magnetic anomalies were detected in the survey block. The majority of the magnetic anomalies, 44, were under 10 gammas, dipolar in nature, and suggestive of small, single-source, ferro-magnetic cultural materials (HH1-1, 2, 4, 5, 7-17, 19-33, 35, 37, 39-42, 44, 45, 48-52). The rest of the magnetic anomalies ranged from 10 to 58 gammas and are discussed below:

T-Dock

There were eleven magnetic anomalies in the general vicinity of the T-dock remains. Two medium-sized magnetic anomalies (HH1-43 and 46) ran parallel to the historical position of the dock, and may be related to structural elements, or perhaps the rail line, of the construct. Two anomalies (HH1-47 and 50) are located within the confines of the proposed location of the dock. Three small magnetic anomalies (HHI-42, 44, 45) are located south of the dock and another six (HH1-47, 48, 49, 50, 51, 52) were north of the dock. These small magnetic anomalies may represent little objects associated with the construction of the dock such as fasteners, or bits and pieces of debris from the moored ships:

HHI-43 was a 32.9 gamma multi-component magnetic anomaly that lasted for 30 seconds. The anomaly disturbed two lanes and a 1,689 square meter area. Water depth at the anomaly was 5.3 meters. The magnetics suggest the presence of several small to medium-sized, ferro-magnetic cultural objects are the cause of this anomaly.

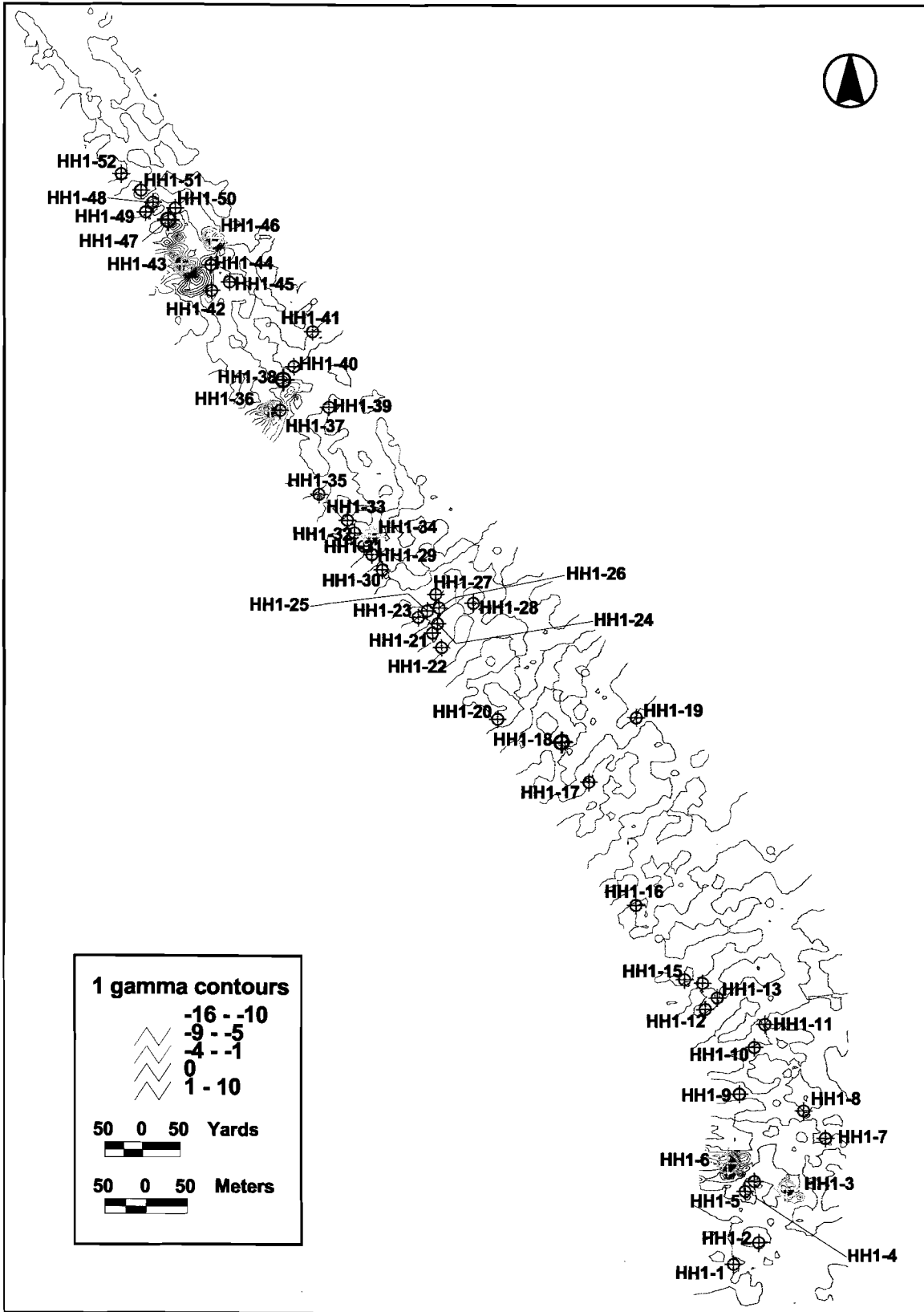


Figure 7.13: One gamma magnetic contours of Hilton Head 1 survey block and identified anomalies.

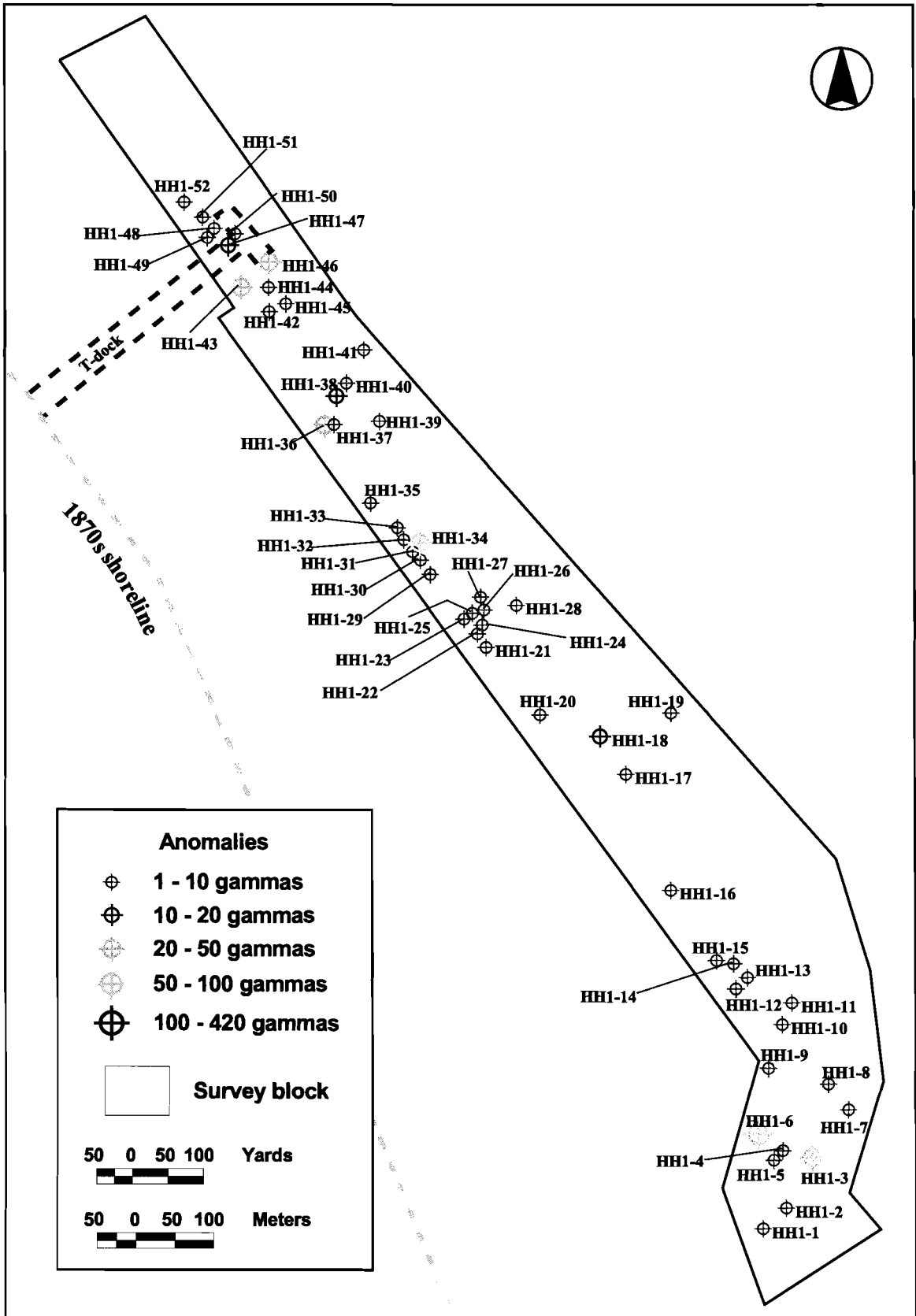


Figure 7.14: Hilton Head 1 survey block anomalies. With geo-rectified position of T-dock.

HH1-46 was a 28.3 gamma multi-component magnetic anomaly that lasted for 16 seconds. The anomaly disturbed two lanes and an 884 square meter area. Water depth at the anomaly was 7.6 meters. The magnetics suggest several small to medium-sized ferro-magnetic cultural objects are the cause of the anomaly.

HH1-47 was a 12.7 gamma multi-component magnetic anomaly that lasted for 14 seconds. The anomaly disturbed two lanes and a 523 square meter area. Water depth at the anomaly was 6.6 meters. The magnetics suggest several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

HH1-3 was a 23.5 gamma multi-component magnetic anomaly that lasted for 12 seconds. The anomaly disturbed two lanes and a 651 square meter area. Water depth at the anomaly was 2.6 meters. The magnetics suggest several small to medium-sized ferro-magnetic cultural objects are the cause of the anomaly.

HH1-18 was a 15.5 gamma dipolar magnetic anomaly that lasted for 13 seconds. The anomaly disturbed two lanes and covered an area of 678 square meters. Water depth at the anomaly was 3.7 meters. The magnetics suggest a small to medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

HH1-34 was a 31.7 gamma dipolar anomaly that lasted for eight seconds. The anomaly disturbed one lane and a 343 square meter area. Water depth at the anomaly was 3.1 meters. The magnetics suggest a small to medium-sized, ferro-magnetic cultural object as the cause of the anomaly. In the adjacent lane there were a series of several small magnetic anomalies (HH1-29 through 33), ranging between 1.8 and 6.6 gammas that form a cluster and may be related to HH1-34.

Hilton Head 2 Survey Block

MRD surveyed this block on April 11, 2002 (Figures 7.15 and 7.16). The survey block measured 986 meters by 415 meters and covered a 201,735 square meter area. Water depth in the block ranged from 11.6 meters to 17.7 meters. Two magnetic anomalies were detected in this survey area. The anomalies located in this survey block do not seem to correspond to any snags in the area reported by shrimpers, although the transformation from Loran-C to UTM coordinates may have introduced some positional error. The distance between HH2-2 and the nearest reported snag was 125 meters. Other correlations between a reported snag and a survey magnetic anomaly in other parts of the sound were much better at around 25 meters or so.

HH2-1 was a 6.4 gamma dipolar magnetic anomaly that lasted four seconds. The anomaly disturbed one lane and a 136 square meter area. Water depth at the anomaly was 14 meters. The magnetics suggest a small, single-source, ferro-magnetic cultural object as the cause of the anomaly.

HH2-2 was a 14.1 gamma dipolar magnetic anomaly that lasted 25 seconds. The anomaly disturbed two lanes and a 1,430 square meter area. Water depth at the anomaly

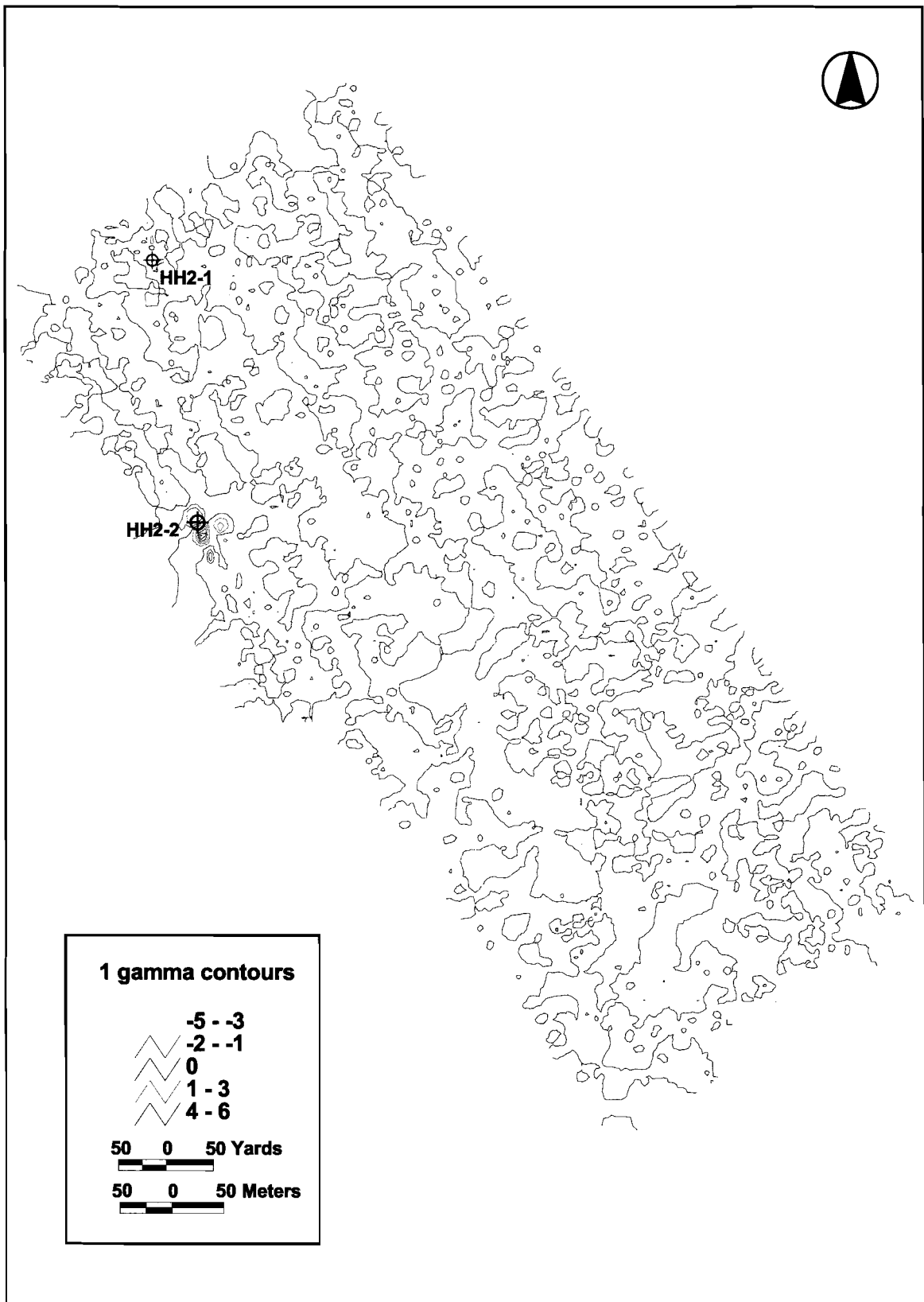


Figure 7.15: One gamma magnetic contours of Hilton Head 2 survey block and identified anomalies.

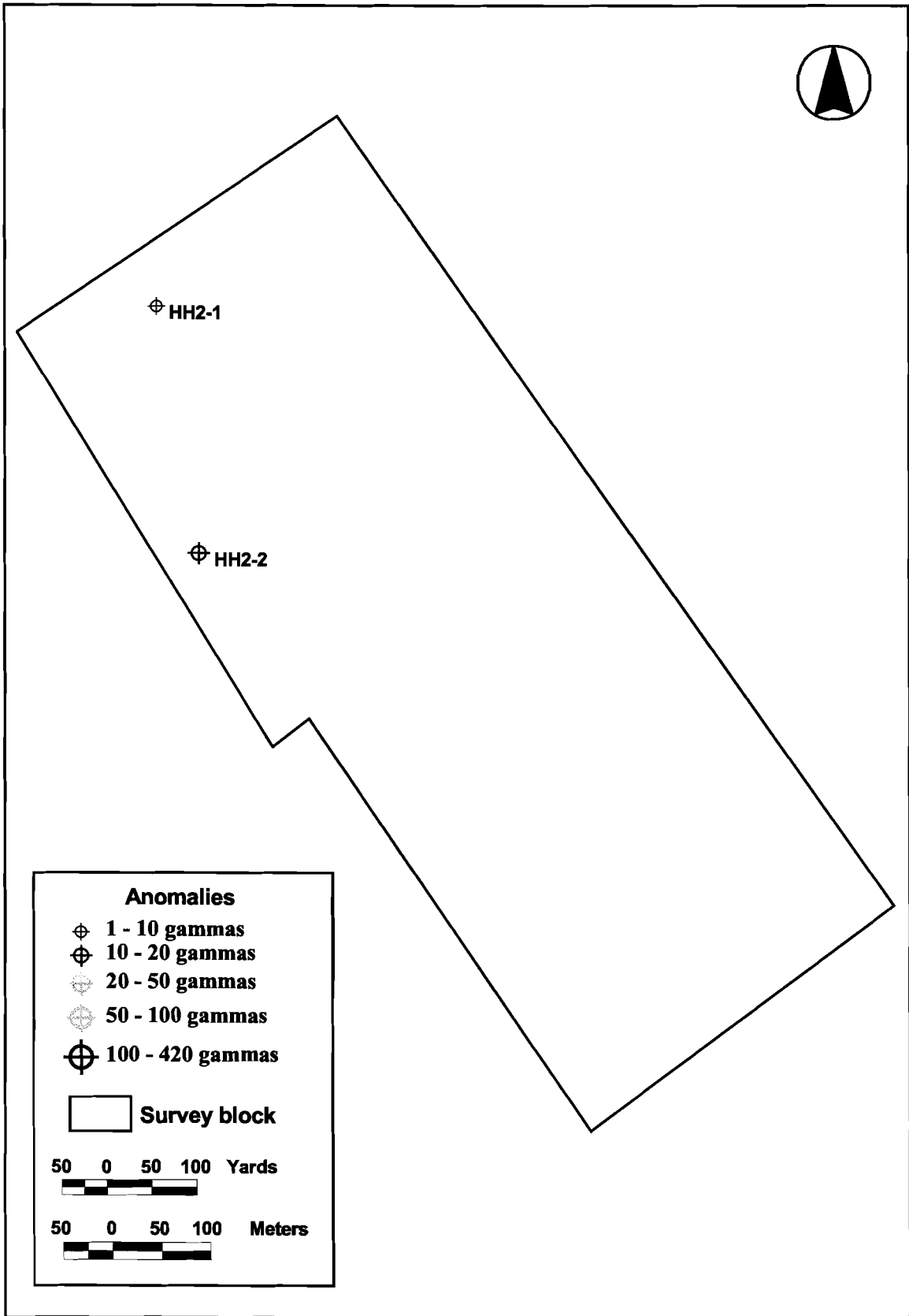


Figure 7.16: Hilton Head 2 survey block anomalies.

was 13.5 meters. The magnetics suggest a small to medium-sized, single-source, ferromagnetic cultural object as the cause of the anomaly.

Bay Point Survey Area

Prior to the arrival of the Union Navy's Port Royal Expedition, Confederate forces occupied Bay Point and constructed a defensive earthwork, Fort Beauregard, to thwart entrance into the sound. Under Flag Officer Samuel F. DuPont, the Union naval expedition forced their way through the sound entrance with a heavy naval bombardment of Forts Beauregard and Walker on November 7, 1861. Following the expulsion of Confederate forces from Bay Point, Union forces utilized the area for defensive purposes and as a coaling station. A T-dock stretched 167 meters out from shore to deeper water to transfer coal and other supplies from ship to shore. Like the T-dock across the sound at Hilton Head, the Bay Point dock was outfitted with a rail line to transport coal to several caches onshore. Intended results from this survey area was to locate evidence of usage of the dock, such as the iron rails, construction fasteners, and incidental discards from the ships, and the shells and shots from the naval bombardment.

Georeferencing the 1873 nautical chart provided an approximate position for the Bay Point T-dock. An 1862 map devoted to depicting the Bay Point coaling station, unfortunately, did not undergo a smooth georectification; but did provide a general idea of the terminus of the dock rail line, as well as the locations of earthen fortifications. Analysis of the changing shoreline revealed that the landside of the dock was now covered by water during high tide and that severe erosion has occurred and is an ongoing process along Bay Point especially along the southeastern shoreline. The depth contour of the dock's terminus remains roughly similar today as during the Civil War.

The Bay Point survey area was divided into three separate survey blocks (Figure 7.17). Survey block 1 was a short block that covered the georeferenced dock area and southeast along deeper water. Survey block 2 concentrated on the southeastern shoreline of Bay Point and had some overlap of survey block 1. The stepped nature along the shoreline portion of the survey block was a result of shallow water and the curvature of the shoreline. Additionally, the overlay of the survey block and the modern NOAA nautical chart 11516 shows the transects on dry land. Last surveyed around 1976, the chart does not account for the severe and ongoing erosion of this portion of Bay Point. Survey block 3 covered the northern area of Bay Point to the mouth of Station Creek.

Bay Point 1 Survey Block

MRD surveyed this block on April 5, 2001 (Figures 7.18 and 7.19). The survey block measured 725 meters by 204 meters and covered a 65,621 square meter area. Water depth ranged from 1.9 meters to 13.5 meters. There were 29 magnetic anomalies detected in this survey block. Of these, 24 were between one and 10 gammas (BP1-1, 2, 3, 5-7, 9-18, 20-26, 28). The other 5 magnetic anomalies ranged from 15 to 58 gammas. There were several magnetic anomalies in proximity to the georectified position of the T-dock.

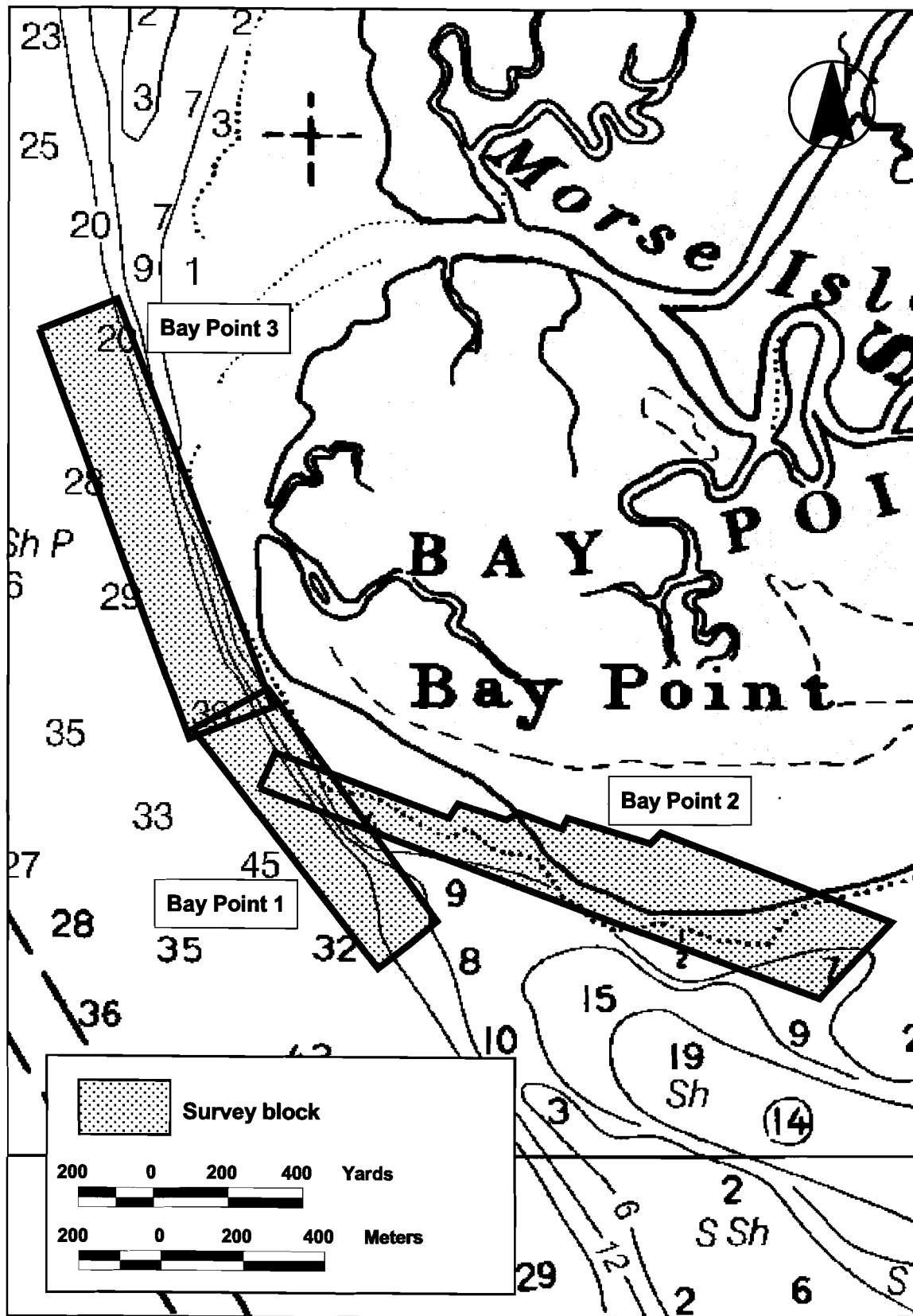


Figure 7.17: Bay Point Survey Area (NOAA chart 11516, scale 1:40000, 1997).

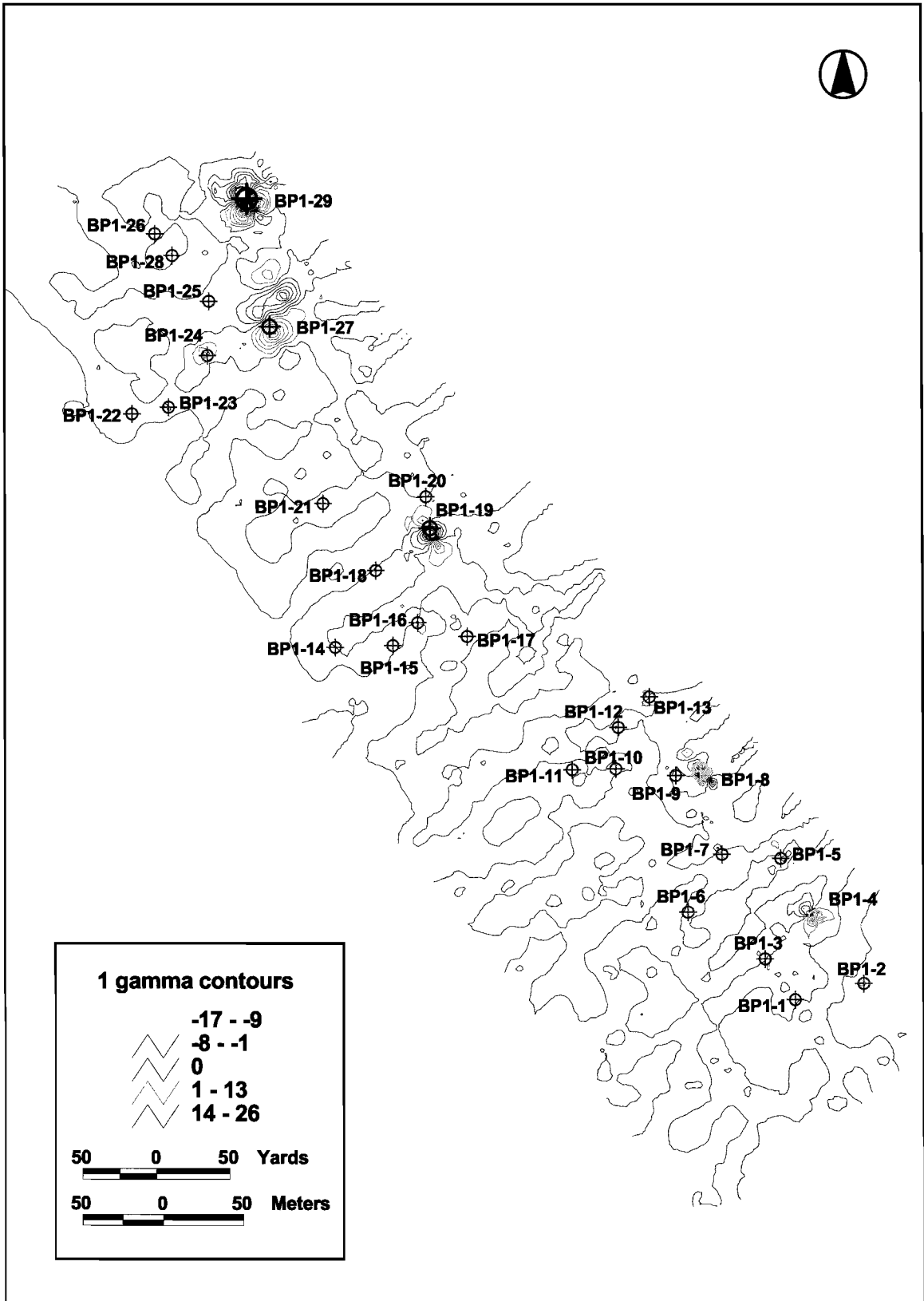


Figure 7.18: One gamma magnetic contours of Bay Point 1 survey block and identified anomalies.

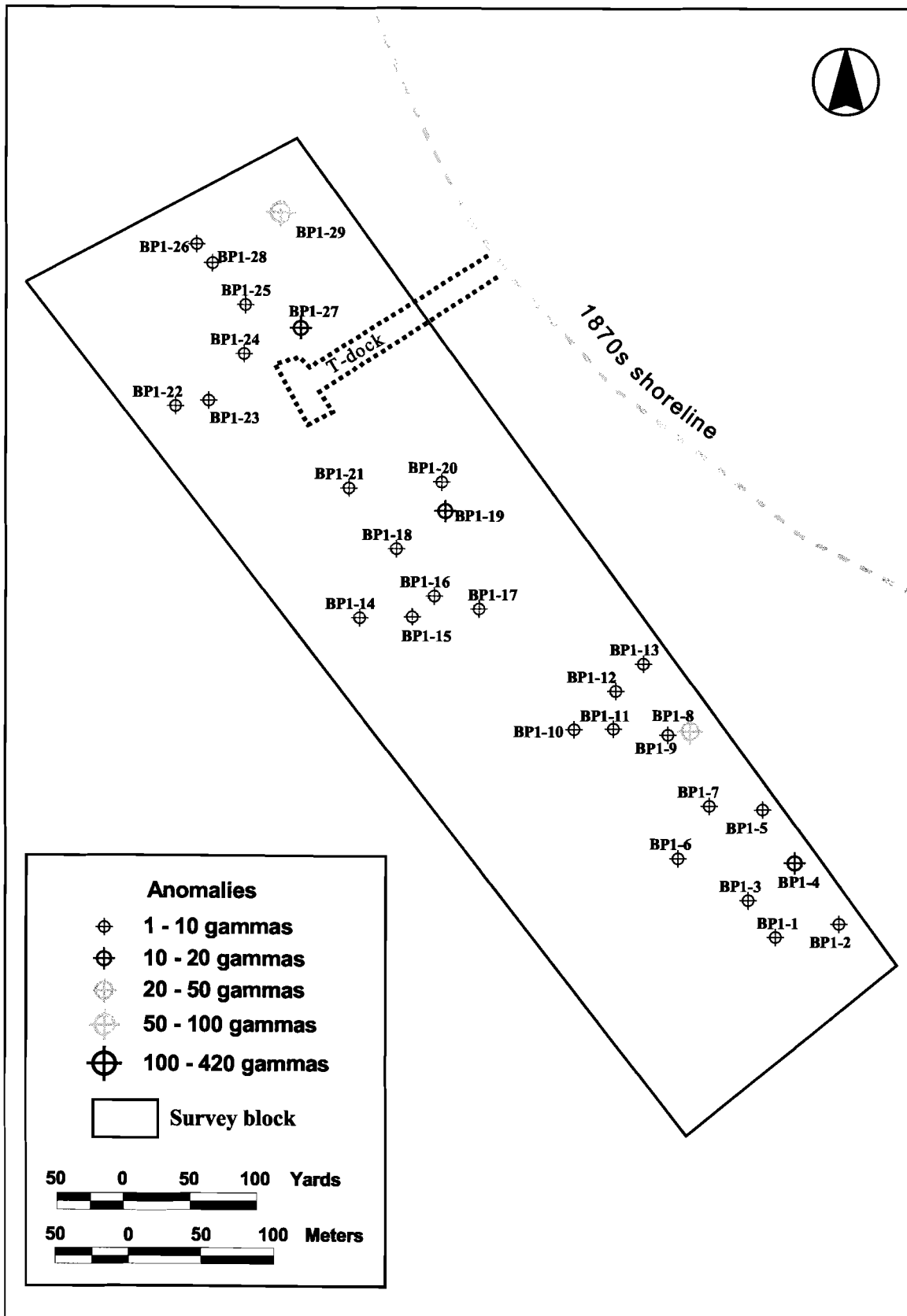


Figure 7.19: Bay Point 1 survey block anomalies. With geo-rectified position of T-dock.

T-dock

Five magnetic anomalies were detected in the georeferenced area of the dock. Four small anomalies (BP1-22, 23, 24, 25) ranging in amplitude from 1.2 to 3.5 gammas were in the general vicinity of the supposed dock location and each represents a small, single-source, ferro-magnetic cultural object as the cause of the anomaly. Water depth at these four anomalies ranged from 9 to 11 meters.

BP1-27 was a 15.2 gamma dipolar magnetic anomaly that lasted for 19 seconds North of the positioned T-dock. The anomaly disturbed three lanes and a 3,029 square meter area. Water depth at the anomaly was 3.8 meters. The magnetics suggest a small to medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

BP1-4 was a 16.7 gamma dipolar magnetic anomaly that lasted for 10 seconds. The anomaly disturbed two lanes and a 1,336 square meter area. Water depth at the anomaly was 4.1 meters. The magnetics suggest a small to medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

BP1-8 was a 20.2 gamma multi-component magnetic anomaly that lasted for 10 seconds. The anomaly disturbed two lanes and a 758 square meter area. Water depth at the anomaly was 2.8 meters. The magnetics suggest several small to medium-sized, ferro-magnetic cultural objects as the cause of the anomaly. An adjacent magnetic anomaly, BP1-9, with an amplitude of 2.2 gammas, may also be associated with this anomaly.

BP1-19 was a 19.1 gamma dipolar magnetic anomaly that lasted for 18 seconds. The anomaly disturbed two lanes and a 1,396 square meter area. Water depth at the anomaly was 3.5 meters. The magnetics suggest a small to medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

BP1-29 was a 58-gamma dipolar magnetic anomaly that lasted for 18 seconds. The anomaly disturbed three lanes and a 2,387 square meter area. Water depth at the anomaly was 4.5 meters. The magnetics suggest a medium to large-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

Bay Point 2 Survey Block

MRD surveyed this block on March 23, 2001 (Figures 7.20 and 7.21). The survey block covered a 241,801 square meter area and had maximum dimensions of 1,483 meters in length and a width of 263 meters. Water depths in the survey block ranged from 0.9 meters to 11.5 meters. Approximately 74 magnetic anomalies were detected in the block. Of these, 61 magnetic anomalies ranged from 1 to 10 gammas (BP2-1, 2-6, 8, 11-30, 32-39, 41, 43-50, 52, 54-56, 58-60, 62, 64, 67-74), and the remaining 13 anomalies ranged from 10 to 130 gammas. Many of these magnetic hits, ranging from 1 gamma to approximately 20 gammas or so, may relate to the shot and shell expended by Union forces in forcing the sound entrance in 1862.

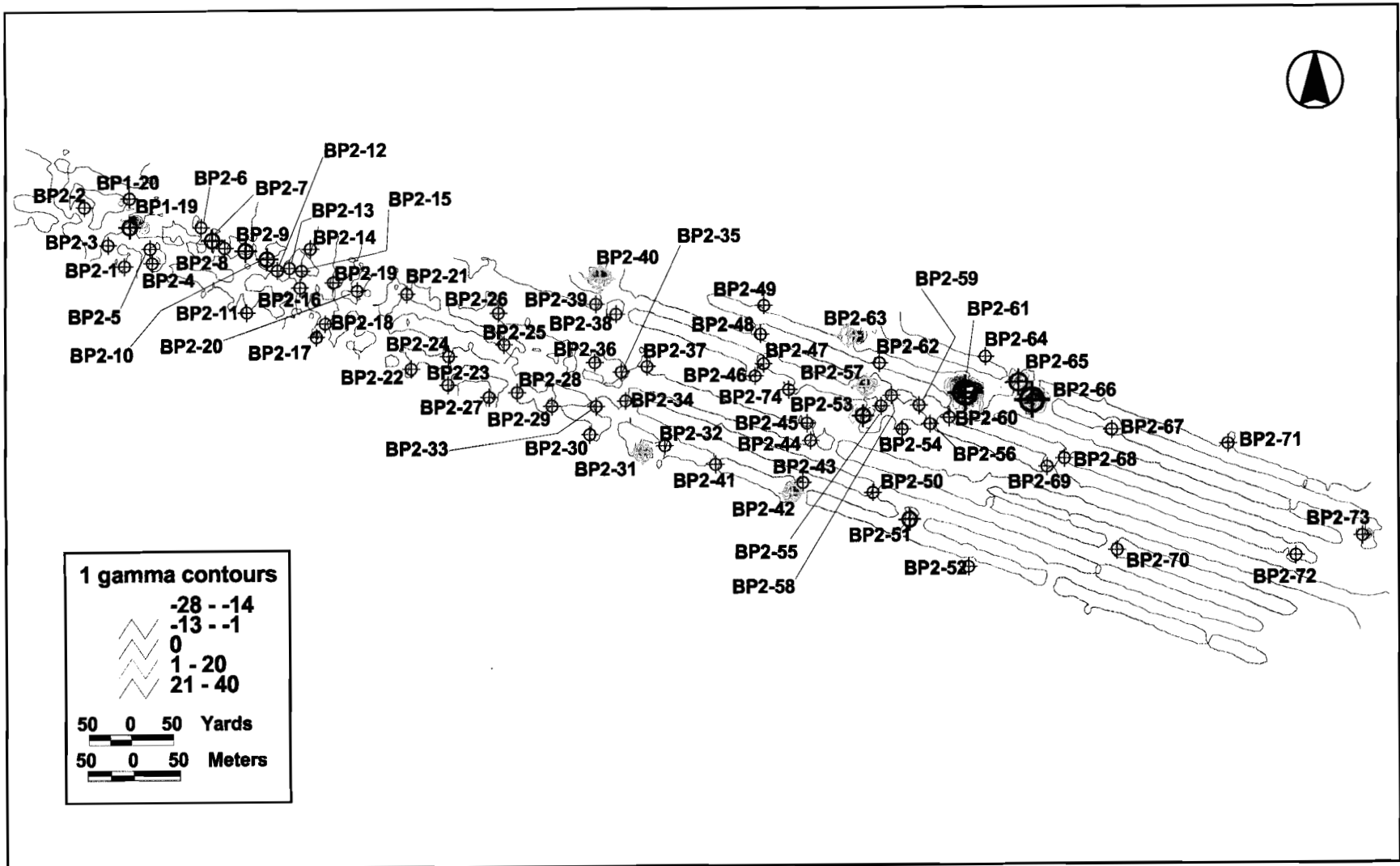


Figure 7.20: One gamma magnetic contours of Bay Point 2 survey block with identified anomalies.

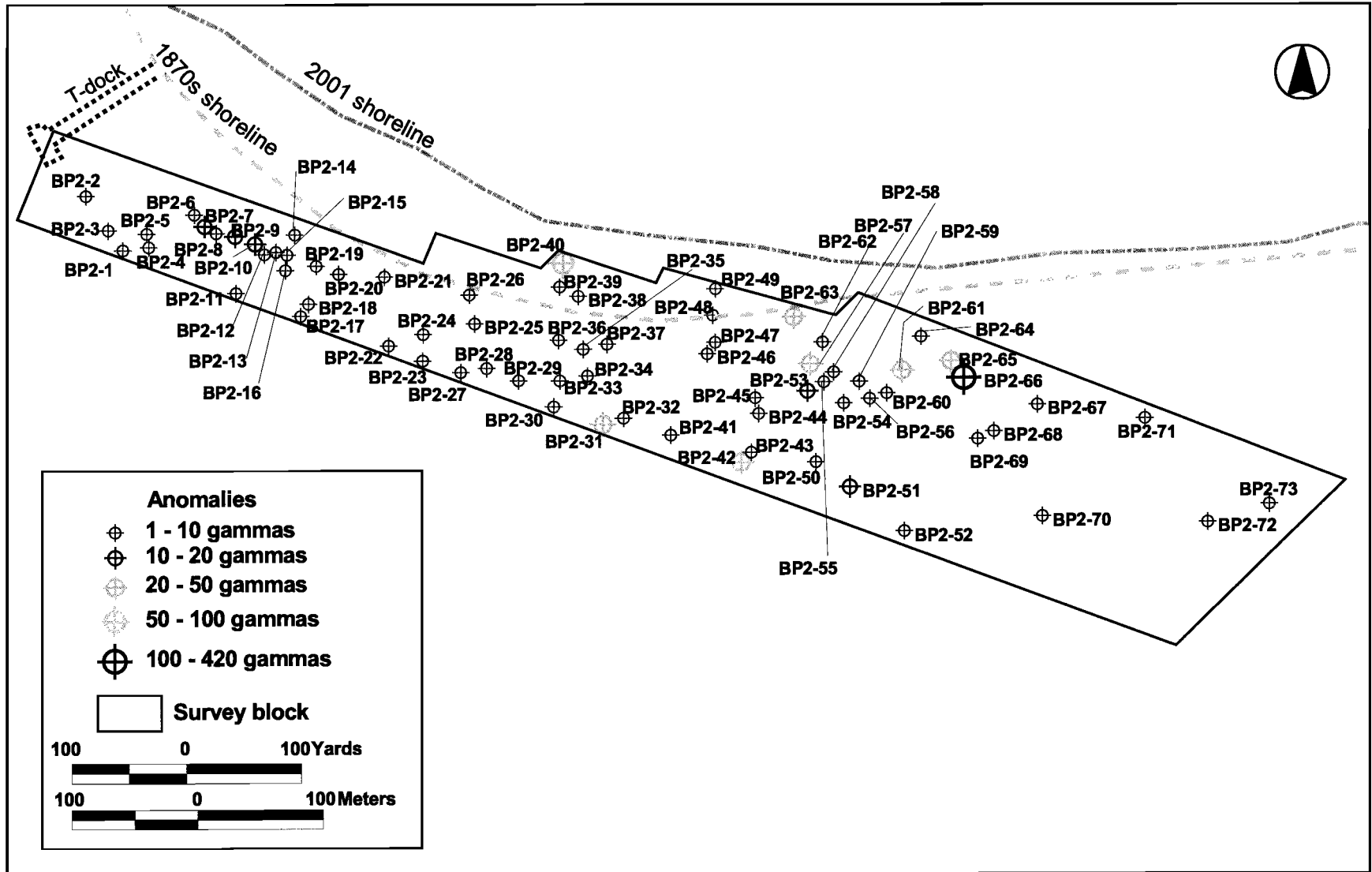


Figure 7.21: Bay Point 2 survey block anomalies. With geo-rectified position of T-dock.

BP2-7 was an 18.3 gamma dipolar magnetic anomaly that lasted for seven seconds. The anomaly disturbed two lanes and a 175 square meter area. Water depth at the anomaly was 0.9 meters. The magnetics and shallow water depth suggest a small to medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

BP2-9 was a 10.3 gamma multi-component anomaly that lasted for six seconds. The anomaly disturbed two lanes and a 178 square meter area. Water depth at the anomaly was 1.1 meters. The magnetics and shallow water depth suggest several small, ferro-magnetic cultural objects are the cause of the anomaly.

BP2-10 was a 15.2 gamma dipolar magnetic anomaly that lasted between six and seven seconds. The anomaly disturbed two lanes and a 230 square meter area. Water depth at the anomaly was 1.2 meters. The magnetics and shallow water suggest a small to medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

BP2-31 was a 33.6 gamma dipolar anomaly that lasted for nine seconds. The anomaly disturbed one lane and a 456 square meter area. Water depth at the anomaly was 1.6 meters. The magnetics and shallow water suggest several medium-sized, ferro-magnetic cultural objects as the cause of the anomaly. A nearby 5.5 gamma anomaly, BP2-32, might be related to this anomaly.

BP2-42 was a 25.9 gamma dipolar magnetic anomaly that lasted for 11 seconds. The anomaly disturbed two lanes and a 1,030 square meter area. Water depth at the anomaly was 1.5 meters. The magnetics and shallow water suggest a medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly. An adjacent 2.2 gamma anomaly, BP2-43, might be related to this anomaly.

BP2-51 was an 11.9 gamma dipolar magnetic anomaly that lasted for eight seconds. The anomaly disturbed one lane and a 386 square meter area. Water depth at the anomaly was 1.6 meters. The magnetics and water depth suggest a small to medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

BP2-53 was an 18.1 gamma dipolar magnetic anomaly that lasted for 10 seconds. The anomaly disturbed one lane and a 929 square meter area. Water depth at the anomaly was 2.4 meters. The magnetics suggest a small to medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly. A nearby 6.1 gamma anomaly, BP2-55, might be associated with this anomaly.

BP2-57 was a 31.3 gamma dipolar magnetic anomaly that lasted for eight seconds. The anomaly disturbed one lane and a 457 square meter area. Water depth at the anomaly was 2.2 meters. The magnetics suggest a medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

BP2-61 was a 43.2 gamma multi-component magnetic anomaly that lasted for 23 seconds. The anomaly disturbed three lanes and a 2,323 square meter area. Water depth

at the anomaly was 2.2 meters. The magnetics suggest several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

BP2-63 was a 35.7 gamma dipolar magnetic anomaly that lasted for eight seconds. The anomaly disturbed two lanes and a 573 square meter area. Water depth at the anomaly was 1.6 meters. The magnetics and shallow-depth suggest a medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

BP2-65 was a 30.4 gamma dipolar magnetic anomaly that lasted for 12 seconds. The anomaly disturbed two lanes and a 692 square meter area. Water depth at the anomaly was 1.8 meters. The magnetics and shallow water suggest a medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly. This anomaly might be associated with BP2-66.

BP2-66 was a 130.2 gamma multi-component magnetic anomaly. The anomaly disturbed three lanes and a 990 square meter area. Water depth at the anomaly was 2.2 meters. The magnetics suggest several small to large, ferro-magnetic cultural objects are the cause of the anomaly. Anomaly BP2-65 might also be a part of this anomaly.

Ground-truthing

BP2-61 was ground-truthed on May 28, 2003, and tentatively identified as the car body of a Ford Model-A, possibly a truck, although further inquiries are needed to determine the exact make and model. The articulated remains consisted of an engine block, drive shaft, cargo area, and four fenders with wheels. The vehicle measured 4.5 meters long and the square cargo area measured approximately 1.5 meters square. Water depth at the site was approximately 2 meters. The vehicle body rested in a scour on a coarse sand bottom.

BP2-66 was ground-truthed on May 28, 2003, and found to consist of the lower structural support of a car with the lower seat belt attachment present. The object was buried in coarse sand about 0.3 m and dredged to identify the anomaly. The fragment measured approximately 2 meters long by 30 centimeters wide. Additionally an intrusive wooden plank with an iron fastener was found lodged against the metal object. Water depth was approximately 2 meters. During the circle sweep to locate the primary magnetic beacon, the metal detector registered on several smaller buried metallic objects in vicinity of the main piece.

Bay Point 3 Survey Block

MRD surveyed this block on March 22, 2001 (Figures 7.22 and 7.23). The survey block covered 117,790 square meters measuring 1,066 meters by 219 meters. Water depths in the block ranged from 2.9 meters to 14.6 meters. There were 22 anomalies detected in the survey block. The majority of the magnetic anomalies were between one and 10 gammas (BP3-1, 2-10, 12, 13, 15, 16, 18-22). The other three ranged between 11 and 61 gammas.

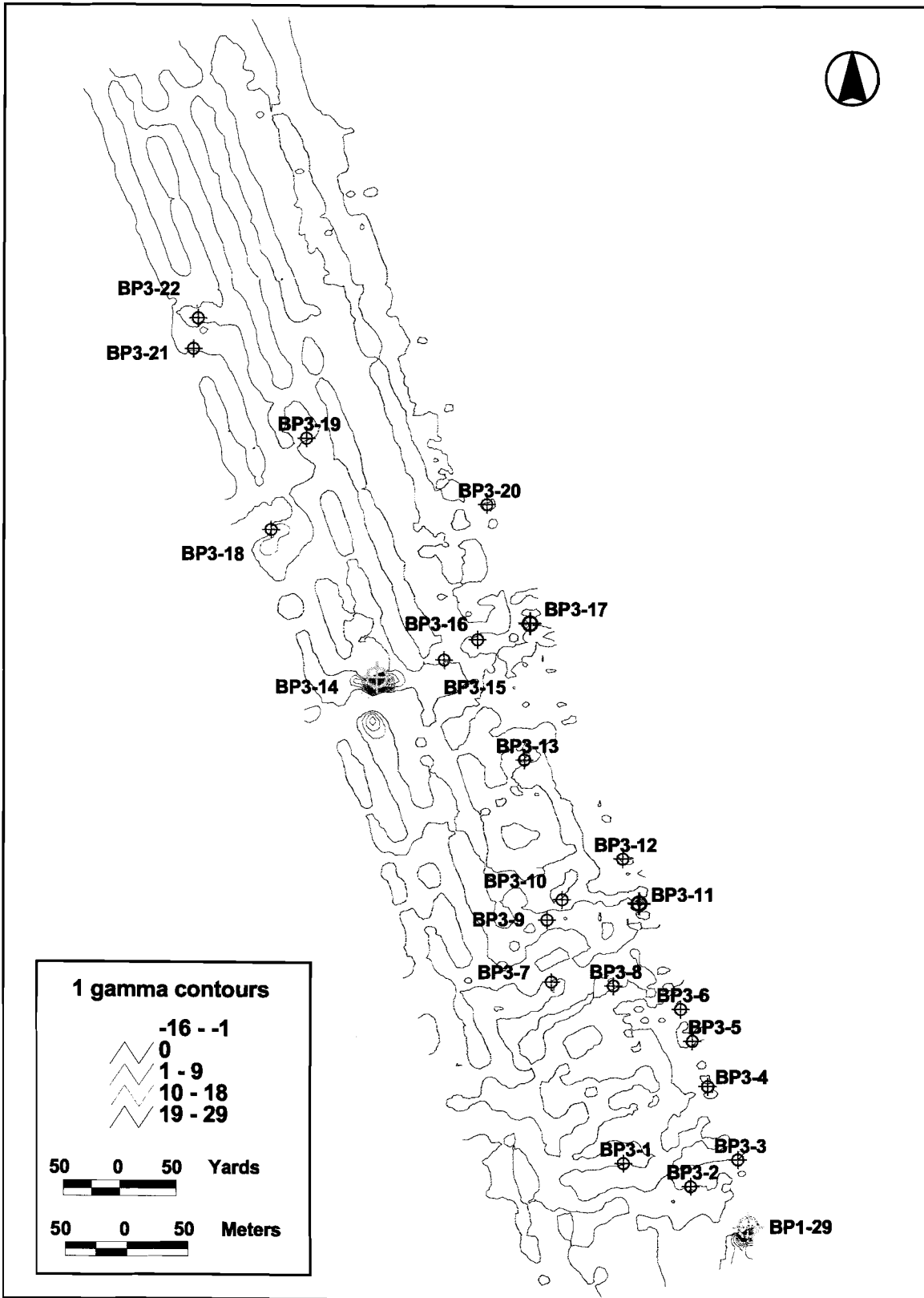


Figure 7.22: One gamma magnetic contours of Bay Point 3 survey block with identified anomalies.

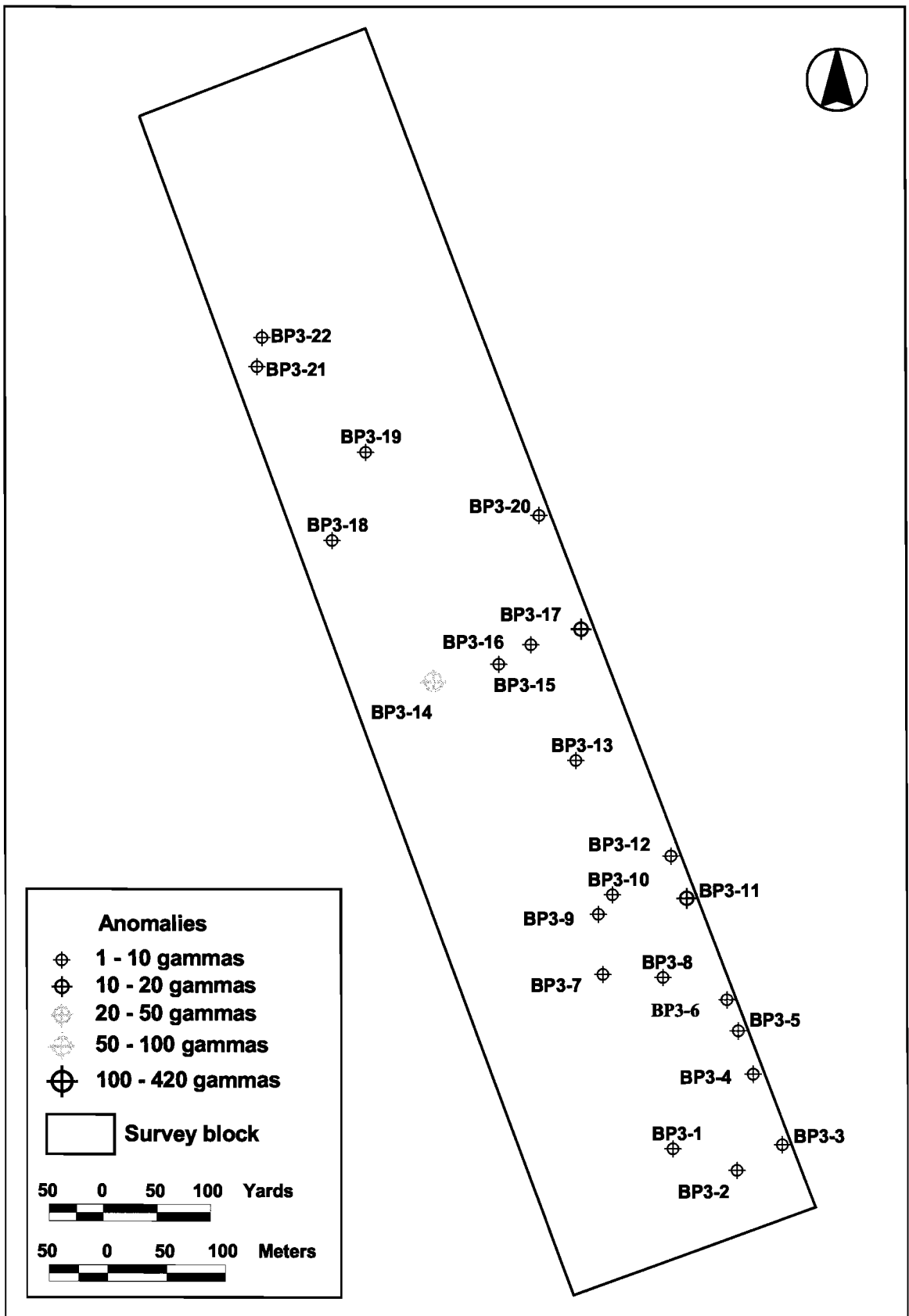


Figure 7.23: Bay Point 3 survey block anomalies.

BP3-11 was a 16.8 gamma multi-component magnetic anomaly that lasted for seven seconds. The anomaly disturbed one lane and 262 square meters. Water depth at the anomaly was 3.9 meters. The magnetics suggest several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

BP3-14 was a 61.2 gamma multi-component magnetic anomaly that lasted for 26 seconds. The anomaly disturbed five lanes and a 5,340 square meter area. Water depth at the anomaly was 9.8 meters. The magnetics suggest several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

BP3-17 was an 11.6 gamma multi-component magnetic anomaly that lasted for eight seconds. The anomaly disturbed one lane and a 416 square meter area. Water depth at the anomaly was 6.2 meters. The magnetics suggest several small to medium-sized, single-source, ferro-magnetic cultural objects are the cause of the anomaly.

Station Creek Survey Area

After the fall of Port Royal, SC in November of 1861, Flag-officer DuPont, wanting to establish a floating repair facility in Station Creek, wrote to Assistant Secretary of the Navy Gustavus Vasa Fox saying:

I have just remembered that during the Crimean and China wars by England and France vessels fitted up as machine shops were used with remarkable advantage, and gunboats and large steamers were always undergoing repairs. The French floating machine shop I was on board of in Hongkong, and she was fitted precisely as a shop on shore would have been, with shafting and gearing, etc.(ORN, ser. 1, vol. 12:341).

Secretary of the Navy Gideon Welles wrote to Flag-officer Dupont:

Two houses, similar to the shops at Fortress Monroe, are building, and when ready will go with the machinists for the purpose of affording minor repairs to the engines at two points on the coast under your command. Several tugs are at Baltimore undergoing repairs. Attempts were made to tow them from Hampton Roads, but they were driven back by gale. The Department feels confident of getting them to Port Royal by towing them empty (ORN, ser.1, vol.12:348).

After the second Stone Fleet arrived, Flag officer Dupont kept two of the whalers for use as the repair facility in Station Creek (Canney 1998:53). These were the 340-ton bark *Edward* and the 366-ton ship *India*. When the buildings arrived Dupont had them assembled on top of the two whalers, which had been attached broadsides, using the *India*

as the blacksmith's shop and the *Edward* as a machine shop, with brass, iron and copper foundries (Figure 7.24). These vessels also contained carpenter shops, barracks, mess rooms and storerooms. William B. Cogswell, a master mechanic, supervised the work and master mechanic W.S. Kimball supervised the entire operation (Browning 2002:78). Station Creek, an estuary opening into Port Royal harbor, was not broad enough to allow a ship at anchor to swing with the tide. However, when anchored by bow and stern, the width of the creek allowed lighters from the machine shop and coal schooners to come along side. At high tide ships could pass by to anchor upstream or pass out to the harbor. It was also used as a carenage where vessels could be beached for bottom and rudder repairs (Hayes 1987:39; Browning 2002:297).

While ships were under repair, the crews were allowed to go on leave and, if the ship needed extensive repairs, the crews were transferred to other ships (Browning 2002:80). Within the first few months, Dupont had the capability of undertaking minor repairs to woodwork and engines at Port Royal, but major repairs still had to be undertaken at Northern shipyards. In mid January of 1863, the ironclads started to arrive at Port Royal. These vessels had special repair needs. In response to these needs, Gideon Welles sent General Inspector Stammers and seven machinists to Port Royal to oversee the repairs. In April 1863, Stammers asked Secretary Welles to appoint Patrick Hughes assistant inspector of ironclads and have him put in charge of their repairs. Hughes and forty men arrived in Port Royal on June 25, 1863 and immediately started work on three monitors (Roberts 2002:103).

The *Edward* and the *India* were used for almost two years until the size of the squadron grew too large for them to handle the scope of work needed. In the fall of 1863, W.B. Cogswell started to move the foundry ashore near the hulks, which were about to be abandoned. A small shell midden, just off the creek, was used to set up the foundry with a wharf jutting out into the creek. The spring tides of August 1864 almost stopped repairs altogether. The *India* was lifted off the piles that were holding her in place. The current floated the vessel down the creek and beached her on the opposite side. When she was towed back they discovered that she could not be put back in place inside the pilings and was taking on water at an alarming rate. *India* was stranded and eventually broken up after all usable machinery had been salvaged. The *Edward* also had to be beached near the wharf, where she was also stripped of her machinery and left to the elements (Browning 2002:297).

During the Civil War, several hummocks, or islets, along the northeastern creek bank were used by Union forces as a naval repair station. An 1862 nautical chart shows a dock on the north side of the creek on the hummock closest to the water. The 1873 nautical chart shows two docks at the location, reflecting a build-up of the facilities as the war dragged on to 1865. Georectification of the 1873 nautical chart helped to position the two docks on the modern charts. On modern charts, the docks overlay into the marsh, perhaps a result of accretion in this area of the creek or as a result of positional error from georeferencing the 1873 nautical chart.

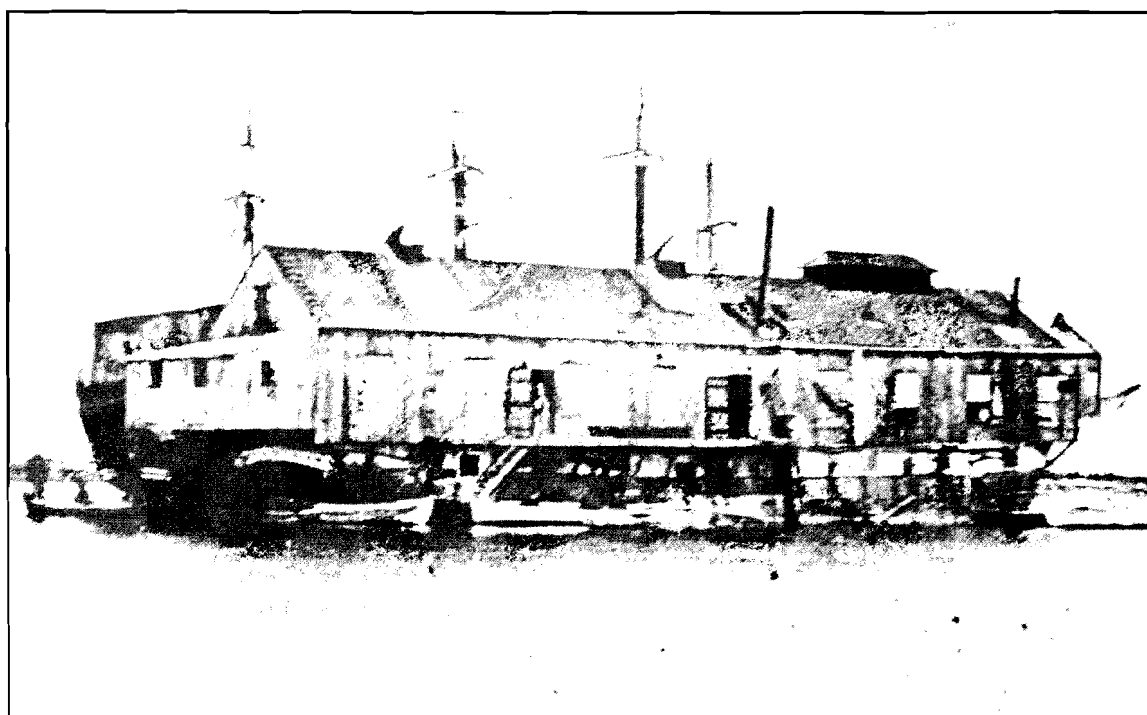


Figure 7.24: Contemporary photograph of the Edward and India in Station Creek (Canney 1998).

An examination of the small islets in 1997 during the Port Royal Sound Survey did not produce evidence of any vessels or dock pilings, but did reveal the remains of a causeway leading from the southern-most island adjacent the creek to the northern island. During the 2003 field season, Dr. Chester DePratter joined the team for a day to examine the islet nearest the creek and the marsh between it and the creek. His reconnaissance confirmed the presence of numerous artifacts dating to the Civil War period, including copious amounts of iron slag. A large depression in the center of the islet may be the remains of a foundry. Additionally, a line of pilings between the islet and Station Creek clearly indicated the location of one of the docks.

Three remote sensing survey blocks were located at the mouth of Station Creek, adjacent the repair facility island in the creek and further upstream of the facility (Figure 7.25). Intended results included, detecting the whaling vessels, incidental discards in the water, and abandoned materials associated with the repair facility. A survey block to connect the survey blocks 1 and 2 together did not materialize due to scheduling conflicts. During the 2003 field season, Division staff extended the survey of the creek for 3.5 km upstream and ground-truthed several of the magnetic and acoustic anomalies in the creek.

Station Creek 1 Survey Block

MRD surveyed this block on March 20, 2001 (Figures 7.26 and 7.27). The block covered 97,817 square meters and measured 1,236 meters by 161 meters. Water depths in the block ranged from 1.4 meters to 6.8 meters. Approximately 66 magnetic anomalies were detected. Of these, 52 anomalies ranged between 1 and 10 gammas (SC1-1, 2-4, 6-11, 13-15, 18-21, 23-28, 30, 31, 36-38, 40-46, 48-51, 53, 54, 57-65), and the remaining 14 were between 11 and 362 gammas.

SC1-5 was a 14 gamma multi-component magnetic anomaly that lasted for 10 seconds. The anomaly disturbed one lane and a 654 square meter area. Water depth at the anomaly was 2.4 meters. The magnetics suggest several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

SC1-12 was a 23.5 gamma multi-component magnetic anomaly that lasted for 12 seconds. The anomaly disturbed two lanes and a 1,271 square meter area. Water depth at the anomaly was 5.5 meters. The magnetics suggest several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

SC1-16 was a 13.1 gamma dipolar magnetic anomaly that lasted for six seconds. The anomaly disturbed one lane and a 442 square meter area. Water depth at the anomaly was 3.5 meters. The magnetics suggest a medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

SC1-17 was a 13.2 gamma multi-component magnetic anomaly that lasted for eight seconds. The anomaly disturbed one lane and a 539 square meter area. Water depth at

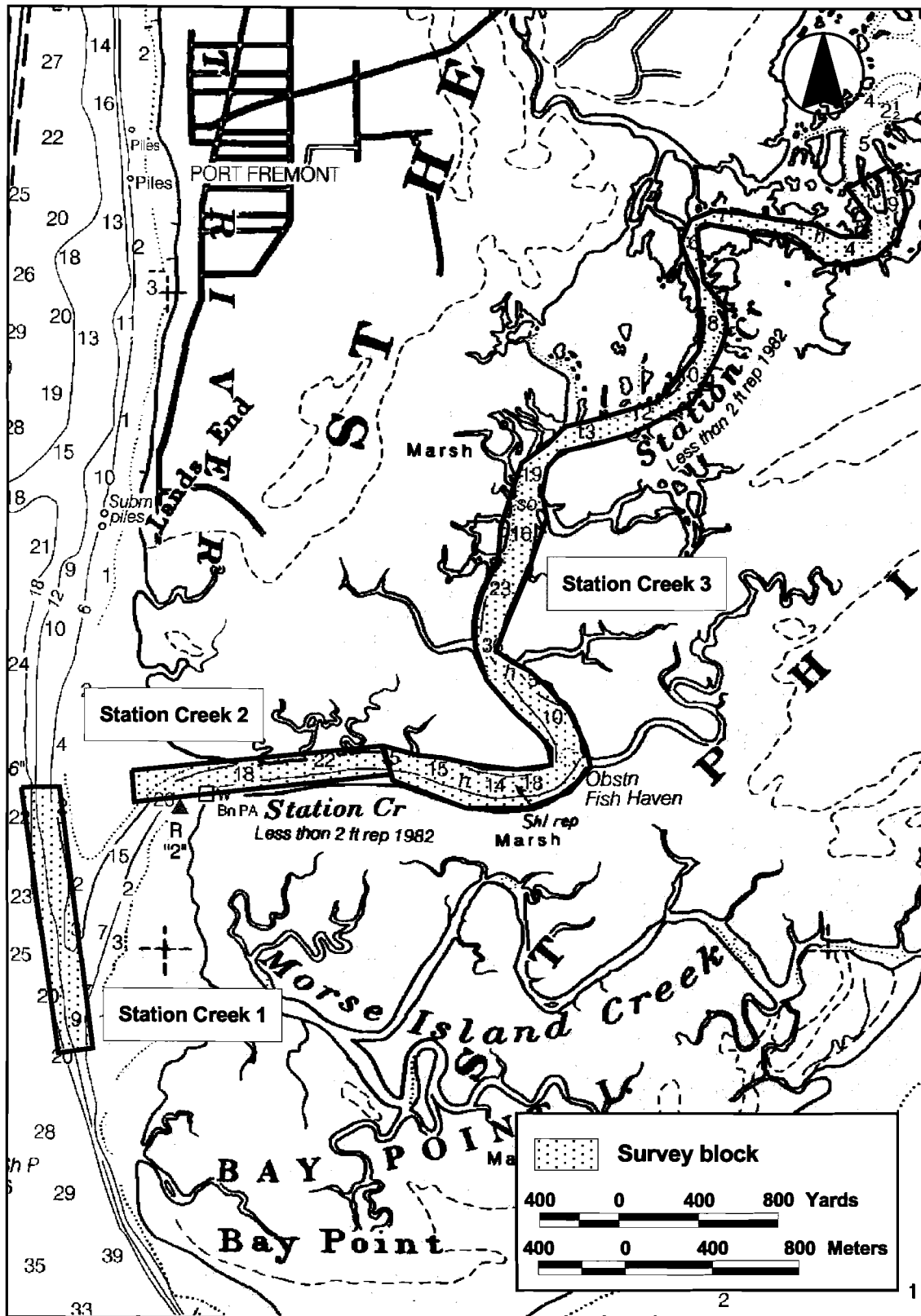


Figure 7.25: Station Creek Survey Area (NOAA chart 11516, scale 1:40000, 1997).

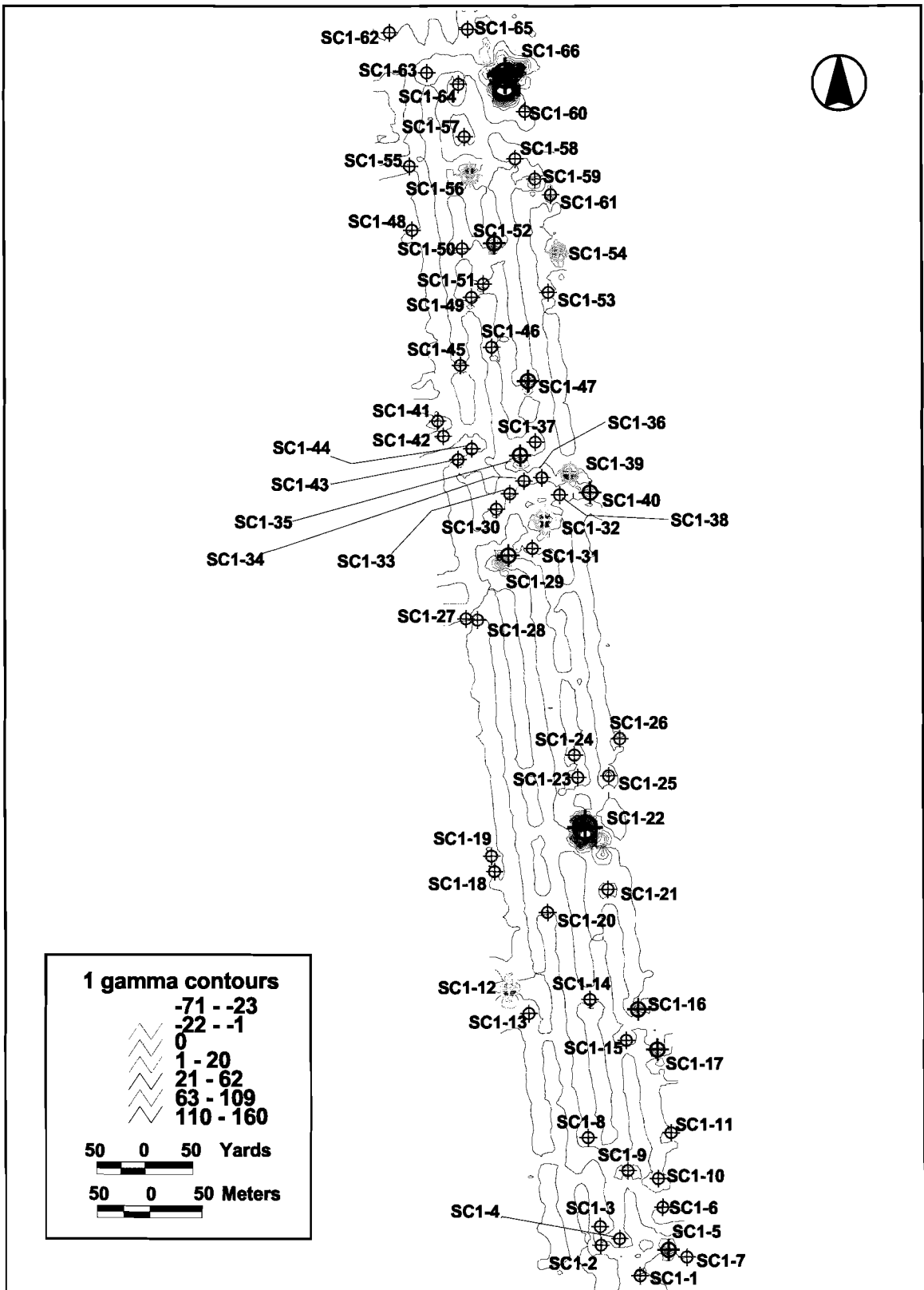


Figure 7.26: One gamma magnetic contours of Station Creek 1 survey block and identified anomalies.

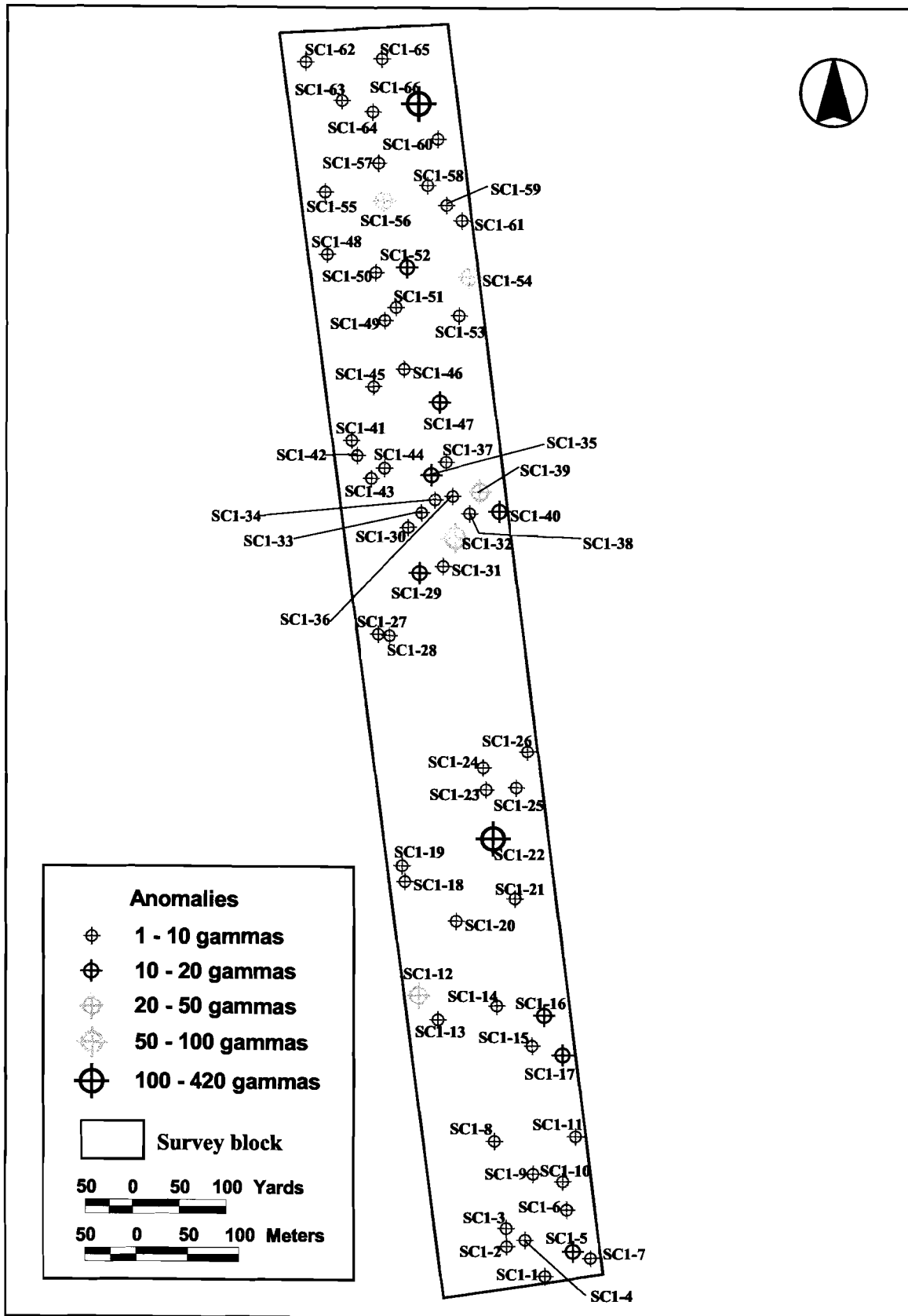


Figure 7.27: Station Creek 1 survey block anomalies.

the anomaly was 3.1 meters. The magnetics suggest several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

SCI-22 was a 258.6 gamma dipolar magnetic anomaly that lasted for 17 seconds. The anomaly disturbed three lanes and a 2,600 square meter area. Water depth at the anomaly was 3.3 meters. The magnetics suggest a large, single-source, ferro-magnetic cultural object as the cause of the anomaly. However, a magnetic disturbance along its eastern periphery suggests that the object, perhaps, has some length to it, or possibly another object is located close-by.

SCI-29 was a 17.9 gamma multi-component magnetic anomaly that lasted for 13 seconds. The anomaly disturbed three lanes and a 1,488 square meter. Water depth at the anomaly was 3.6 meters. The magnetics suggest several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

SCI-35 was a 16 gamma multi-component magnetic anomaly that lasted for seven seconds. The anomaly disturbed one lane and a 345 square meter area. Water depth at the anomaly was three meters. The magnetics suggest several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

SCI-40 was a 13.5 gamma multi-component magnetic anomaly that lasted for nine seconds. The anomaly disturbed one lane and a 153 square meter area. Water depth at the anomaly was 3.4 meters. The magnetics suggest several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

SCI-39 was a 28.9 gamma multi-component magnetic anomaly that lasted for eight seconds. The anomaly disturbed two lanes and a 478 square meter area. Water depth at the anomaly was 2.2 meters. The magnetics suggest several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

SCI-47 was a 13.2 gamma multi-component magnetic anomaly that lasted for eight seconds. The anomaly disturbed one lane and 652 square meters. Water depth at the anomaly was 2.6 meters. The magnetics suggest several small to medium-sized; ferro-magnetic cultural objects are the cause of the anomaly.

SCI-52 was an 11-gamma dipolar magnetic anomaly that lasted for seven seconds. The anomaly disturbed one lane and a 377 square meter area. Water depth at the anomaly was 3.1 meters. The magnetics suggest a small to medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

SCI-54 was a 20.7 gamma multi-component magnetic anomaly that lasted for 17 seconds. The anomaly disturbed one lane and a 717 square meter area. Water depth at the anomaly was 1.7 meters. The magnetics suggest several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

SC1-56 was a 25.9 gamma dipolar magnetic anomaly that lasted for nine seconds. The anomaly disturbed one lane and a 555 square meter area. Water depth at the anomaly was 3.4 meters. The magnetics suggest a medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

SC1-66 was a 362.1 gamma multi-component magnetic anomaly that lasted for 18 seconds. The anomaly disturbed four lanes and a 3,574 square meter area. Water depth at the anomaly was 2.3 meters. The magnetics suggest that several medium to large-sized, ferro-magnetic cultural objects are the cause of the anomaly.

Ground-Truthing

SC1-22 was ground-truthed on September 24, 2003 and found to consist of a large metallic object of modern vintage. Limited excavation revealed an object resembling a gas station fluorescent lightpost from the 1950s and 1960s. The "light bulb area" measured 1.5 meters (5 feet) in length and had a tapered width forward of around 10 centimeters (4 inches) to aft 20 centimeters of (8 inches). At the aft end a 20-centimeter (8-inch)-diameter pole was affixed to the "light bulb area". This pole seemed to have a curvature as detected during probing of the object. An exact length of the pole was not determined but is least over 1.5 meters (5 feet). The object was buried under approximately 60 centimeters (1 to 2 feet) of a fine, sandy matrix. Depth at low tide was around 2.4 meters (8 feet).

SC1-66 was ground-truthed on September 25, 2003 and found to consist of two wooden planks on edge forming an angle, along with a possible intrusive log wedged against the structure. The planks ranged in thickness of 7 to 10 centimeters (3 to 4 inches), with a width of 15 to 30 centimeters (6 and 12 inches). The iron components detected by the magnetometer were not encountered during a limited excavation at the area of probe contact. The planks were buried under 1.2 meters (4 feet) of a fine, sandy matrix. Tentative analysis of the wood suggests the planks are pine. Additional investigation is needed to determine the source of the magnetic anomaly, but the presence of wood and iron, in a complex magnetic signature, suggest the potential of the site as a shipwreck.

Station Creek 2 Survey Block

MRD surveyed this block on March 29, 2001 using both the magnetometer and the side scan sonar (Figures 7.28 and 7.29). Lane spacing was set at 15 meters, and the boat operated at approximately four knots. The block covered a 90,785 square meter area and measured 1,199 meters by 147 meters. Water depth in the block ranged from 1.5 meters to 9.6 meters. There were 38 anomalies detected, 35 magnetic anomalies and three sonar anomalies. Of these 35 magnetic anomalies, 21 were between one and 10 gammas (SC2-1, 5-12, 14-16, 19, 20, 23, 26, 30-34), and the remaining 14 ranged from 15 to 410 gammas. The sonar anomalies were three interconnected rock mounds along the interface of the creek and marsh, which had corresponding magnetic anomalies. The rock mounds were in such close proximity to each other that they were given a single designation, SC2-s1. There were many medium to large-sized magnetic anomalies in the

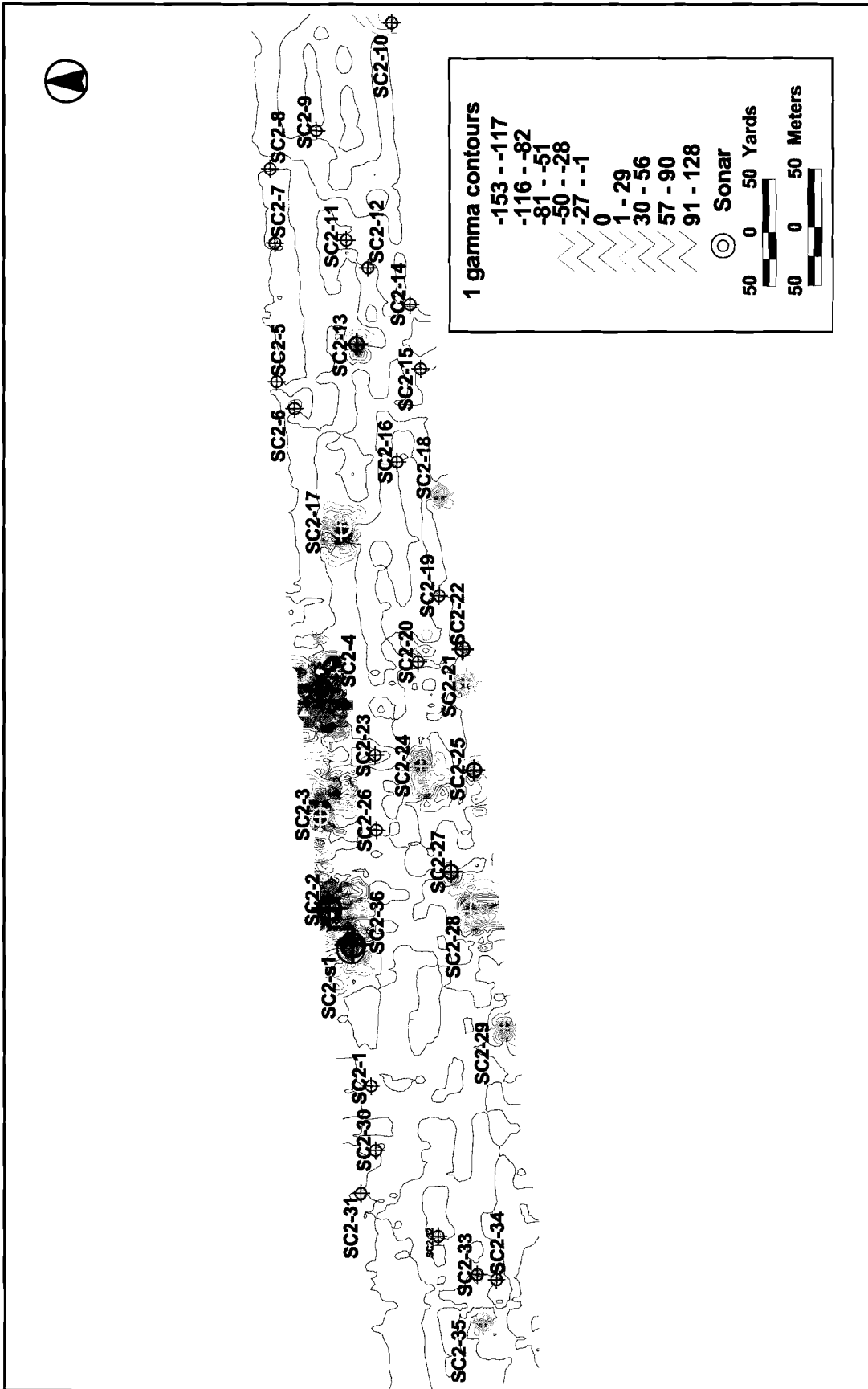


Figure 7.28: One gamma magnetic contours of Station Creek 2 survey block with identified anomalies.

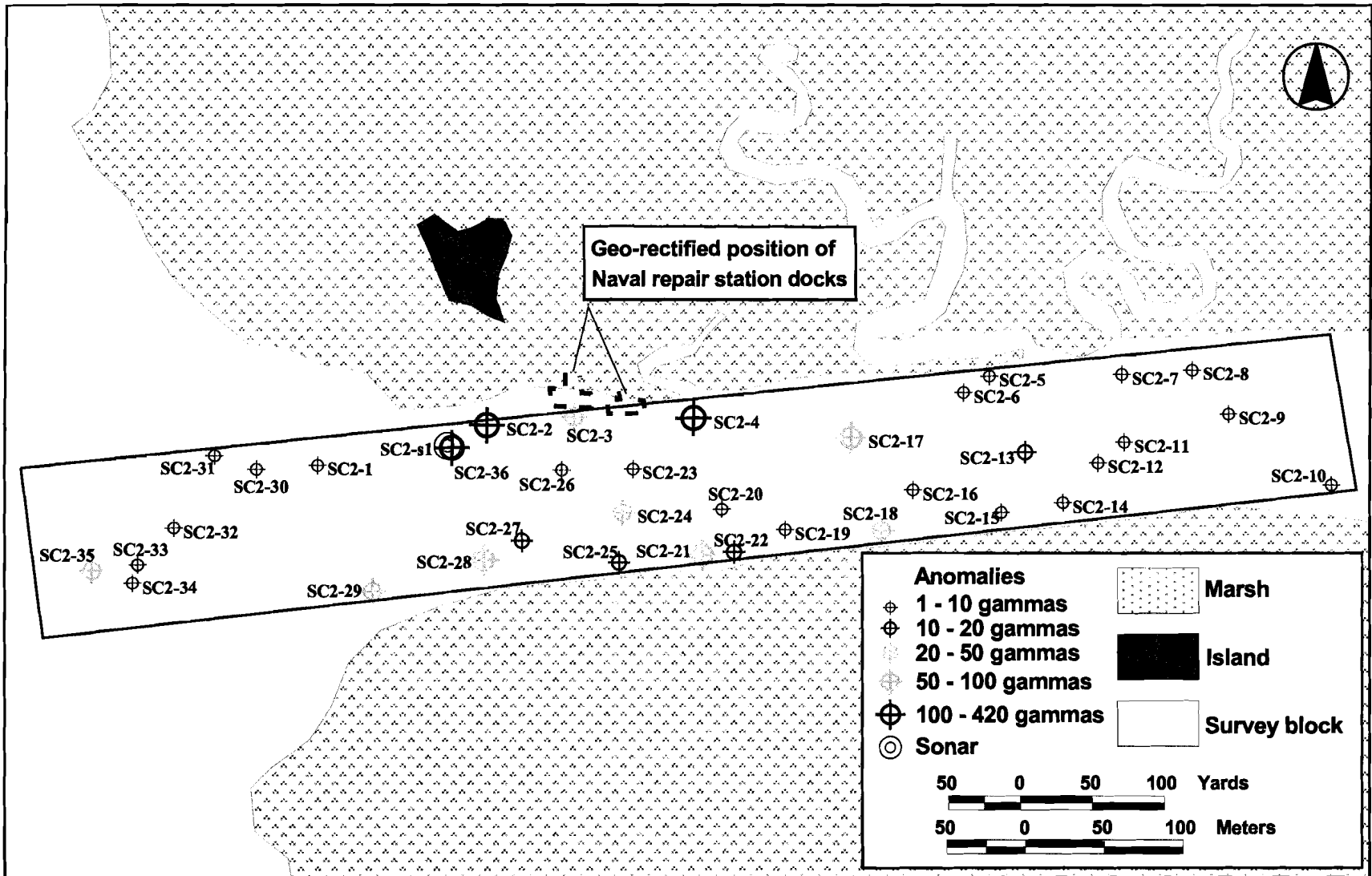


Figure 7.29: Station Creek 2 survey block anomalies.

creek, which most likely reflect the Civil War use of the creek as a workstation. The largest magnetic anomalies were detected along the marshland where the docks were located on the north shore of Station Creek.

Rock Mounds

SC2-s1 was an acoustic anomaly that appeared to be a series of three rock mounds (Figure 7.30). The mounds cover an approximate length of 35 meters. Their widths vary from between two and four meters. Perhaps the rock mounds are associated with the whaling hulks, which were most likely stripped of anything of value or use and then scuttled, or alternately, the rocks were used in the construction of the inter-island causeway.

SC2-36 was a 121.9 gamma multi-component magnetic anomaly that lasted for 10 seconds was also associated with the rock mounds. Water depth at the magnetic and sonar anomalies was 4.7 meters. The magnetic anomaly disturbed two lanes and covered an 811 square meter area. The magnetics suggest the presence of several medium to large-sized, ferro-magnetic cultural objects that are associated with the rock mounds. The rock mounds and the magnetic anomaly are also part of the cluster of magnetic anomalies connected to SC2-2.

SC2-2 was a 410.7 gamma multi-component magnetic anomaly that lasted for 35 seconds. The anomaly disturbed two lanes and 4,827 square meter area. Water depth at the anomaly was 4.8 meters. The magnetics suggest the presence of several medium to large-sized, ferro-magnetic cultural objects. This anomaly is the largest of the cluster of anomalies along the marsh, which includes the rock mounds. There were no acoustic targets associated with this anomaly.

SC2-3 was a 29.8 gamma multi-component magnetic anomaly that lasted for 14 seconds. The anomaly disturbed two lanes and a 2,627 square meter area. Water depth at the anomaly was 4.1 meters. The magnetics suggest the presence of several small to medium-sized, ferro-magnetic cultural objects are the cause of anomaly. This anomaly was the largest anomaly in a cluster of anomalies. The anomaly is also directly adjacent to the georectified position of the westernmost dock.

SC2-4 was a 358.1 gamma multi-component magnetic anomaly that lasted for 31 seconds. The anomaly disturbed two lanes and a 4,805 square meter area. Water depth at the anomaly was 7.1 meters. The magnetics suggest the presence of several medium to large-sized, ferro-magnetic cultural objects are the cause of the anomaly. This anomaly is the largest magnetic node in a cluster of other lesser anomalies.

SC2-13 was an 18.1 gamma dipolar magnetic anomaly that lasted for 15 seconds. The anomaly disturbed three lanes and a 1,757 square meter area. Water depth at the anomaly was 7.8 meters. The magnetics suggest a small to medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

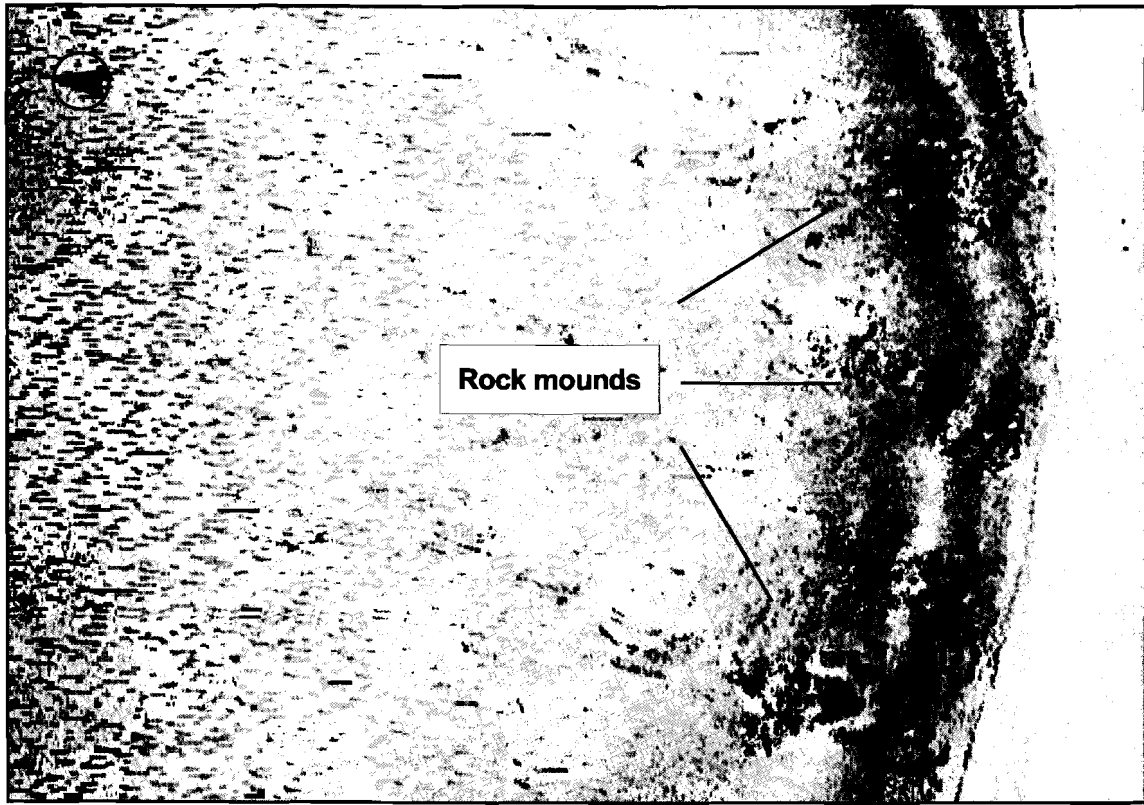


Figure 7.30: *Sonograms of rock mounds in Station Creek. Top, rock mounds, scale is approximately 5mm=1m; Bottom, one gamma magnetic contours overlaid sonogram.*

SC2-18 was a 38.8 gamma dipolar magnetic anomaly that lasted for nine seconds. The anomaly disturbed one lane and a 358 square meter area. Water depth at the anomaly was 4.5 meters. The magnetics suggest a medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

SC2-21 was a 60.2 gamma dipolar magnetic anomaly that lasted for eight seconds. The anomaly disturbed one lane and a 212 square meter area. Water depth at the anomaly was 4.8 meters. The magnetics suggest a medium to large-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

SC2-22 was a 16.9 gamma dipolar magnetic anomaly that lasted for four seconds. The anomaly disturbed one lane and an 80 square meter area. Water depth at the anomaly was 4.6 meters. The magnetics suggest a small to medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

SC2-24 was a 29.1 gamma multi-component magnetic anomaly that lasted for 16 seconds. The anomaly disturbed three lanes and a 2,540 square meter area. Water depth at the anomaly was 6.6 meters. The magnetics suggest the presence of several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

SC2-25 was a 15.7 gamma dipolar magnetic anomaly that lasted for eight seconds. The anomaly disturbed one lane and a 316 square meter area. Water depth at the anomaly was 2.6 meters. The magnetics suggest a small to medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly. A few meters further to the west on the same lane was a smaller anomaly that may be associated with this anomaly.

SC2-27 was a 13.4 gamma multi-component magnetic anomaly that lasted for 10 seconds. The anomaly disturbed one lane and a 250 square meter area. Water depth at the anomaly was 6.2 meters. The magnetics suggest the presence of several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

SC2-28 was a 73.9 gamma multi-component magnetic anomaly that lasted for 29 seconds. The anomaly disturbed two lanes and a 1,719 square meter area. Water depth at the anomaly was 4.4 meters. The magnetics suggest the presence of several medium to large-sized, ferro-magnetic cultural objects are the cause of the anomaly.

SC2-29 was a 28.5 gamma multi-component magnetic anomaly that lasted for 10 seconds. The anomaly disturbed one lane and a 255 square meter area. Water depth at the anomaly was 3.4 meters. The magnetics suggest the presence of several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

SC2-35 was a 44.1 gamma multi-component magnetic anomaly that lasted for six seconds. The anomaly disturbed one lane and a 166 square meter area. Water depth at the anomaly was 5.8 meters. The magnetics suggest the presence of several small to medium-sized, ferro-magnetic cultural objects are the cause of the anomaly.

Ground-truthing

SC2-2 was ground-truthed on May 29, 2003, and found to consist of two large metal rectangular objects, heavily concreted, perhaps iron stock for foundry work. A pine piling was also located during the circle search of the area, and perhaps is related to the navy docks, or alternately pilings used to secure the position of the floating machine shops. Numerous other smaller metallic targets were detected by the metal detector. Hand fanning revealed the two large iron objects laying in a cruciform shape. The larger of the two weighed approximately 45 kilograms (100 pounds) and measured about 1.5 meters in length, with a maximum width of 0.2 meters, and tapered to a slightly lesser width at the other end. The other smaller piece weighed approximately 34 kilograms (75 pounds) and about 0.6 meters in length and 0.15 meters wide. The objects were resting in a muddy and sandy matrix in about 2 meters of water, at low tide.

SC2-4 was ground-truthed on May 26, 2003, and found to consist of a deposit of modern ferro-magnetic debris. Objects included remnants of a boat trailer, steel wire, and other indeterminate metal constructs, both exposed on the bottom and buried in the sediment. The scatter site was approximately 15 meters in length and five to seven meters in width. Water depth ranged from under a meter to two meters and rested on a sand/mud matrix with oyster shells.

SC2-36 and SC2-s1 assessment and eventual identification of the rock mound (SC2-s1) and associated magnetic anomalies, of which SC2-36 is the largest, began with the magnetometer and side-scan survey conducted during the 2001 field season. Historical research affirmed that that area of the creek had been used as a Union ship repair depot during the Civil War, and one or two whaling ships were abandoned there. That left a distinct possibility that the rock mound may actually be a ballast mound from one of the abandoned whaling ships. On May 26, 2003, Division staff set buoys at the magnetic anomaly SC2-36 and at the upstream and downstream termini of the rock mound SC2-s1. One dive was made for the purpose of measuring and sampling the rock pile, as well as searching for evidence of a ship. During that dive, staff measured the rock mound as 28.3 m in length, which conformed quite well to the 28.0-m scaled length taken from the sonar records. Scaled widths for the mound indicated that the rocks extend from 9.0 to 12.0 m across the site. Division staff also retrieved some flint cobbles from the mound, an iron ship nail with a fragment of wood attached, and a piece of iron stock with a brick and a bottle concreted to either end of it (Figure 7.31). Both the brick and bottle date to the Civil War era. Staff also reported large quantities of iron strewn around the site.

A return visit to the site on May 29 provided the evidence necessary to pronounce SC2-s1 a shipwreck. The site was designated 38BU2080 in the South Carolina State Site Files, and named the Station Creek Wreck. Staff encountered and recovered a copper drift pin, wooden pulley sheave, and a fragment of a stoneware vessel, as well as locating and exposing a 75-cm long section of hull made up of the eroded ends of frames, hull planking and ceiling. The exposed timbers were recorded during that dive and samples taken of the wood, copper sheathing covering the exterior surface of the hull planks, and a wooden treenail (See Appendix H).

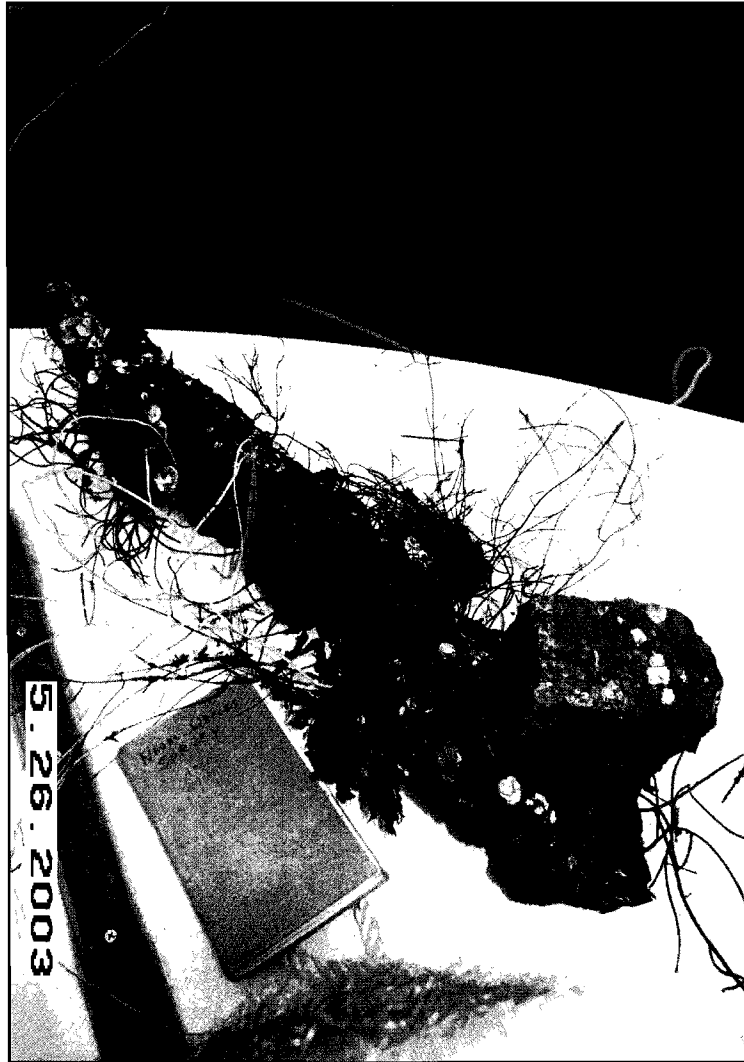


Figure 7.31: Concreted iron bar with a brick and two bottles attached found on Station Creek Wreck (38BU2080).

The exposed timbers are located on the south side of the ballast mound, approximately five meters from the downstream end of the rocks (Figure 7.32). The structure lies approximately one meter above the creek bed with rocks both below and above it. The rocks are angular, with many of them having diameters of 75 cm or less. However, several rocks near the structure exceeded 100 cm in diameter. Three frames were accessed after moving several large ballast rocks. The pine frames (See Appendix I) protrude horizontally from the ballast, and perpendicular to the mound's longitudinal axis, for a distance of approximately 75 cm and terminate in heavily eroded ends. Each frame has molded and sided dimensions of 23.0 cm, with a space between each timber of one centimeter, providing a room-and-space measurement of 24.0 cm.

Hull planks are attached to the outboard surface of the frames. Only one plank could be accessed due to the surrounding ballast rocks. The pine plank is 1.6 cm thick and at least 16.0 cm in width. The plank is attached to each frame with a 3.4-cm-diameter wooden treenail. Copper sheathing covers its outboard surface, fastened to the wood with 0.29- to 0.35-cm square copper nails. Much of the visible plank exhibits severe shipworm (*teredo navalis*) damage. Atop the frames, the ceiling was visible beneath the ballast. The pine ceiling is 7.5 cm thick, and like the hull planks, is riddled with shipworm tubes.

The timbers recorded are located near the downstream end of the ballast mound, indicating that they are near one end of the vessel. As the hull narrows at its extremes one would expect to see an upward sweep to the frames, even close in to the centerline of the vessel. The recorded frames are horizontal, suggesting that the hull is heeled towards the creek channel, or that the weight of the ballast has distorted the stout timbers. Circumstantial evidence from the drift pin may point to a clue as to which end the timbers are located. The 136.4-cm (4 ft, 6 in)-copper fastener was found on the creek bed approximately two meters from the articulated timbers. It is likely that a fastener of that length would have been used in the deadwood construction of the stern.

The presence of a shipwreck at that specific location in Station Creek tends to confirm historical accounts of a vessel being abandoned there, and suggests that 38BU2080 is the 340-ton bark, *Edward*. The scantling and timber dimensions would not be inconsistent with a nineteenth century sailing vessel of that tonnage. Furthermore, the large quantity of ballast associated with the wreck, perhaps as much as 560 cubic meters, would not be surprising. The *Edward* was bought for the Second Stone Fleet with the intent of sinking it in the approach to Charleston Harbor. Additionally, the bark was no longer expected to sail, but rather, along with the *India*, to provide a stable, stationary platform for the naval repair facility.

Further work is planned at the 38BU2080 once another source of funding has been identified and secured. Such work will include selectively test excavating the wreck to map its structure, and characterizing the site to its immediate environmental and cultural setting. This will also include mapping the site into the overall complex of the once extensive naval repair facility on land. Additionally, we intend to record precise timber measurements and scantlings at selected hull locations and compare those figures

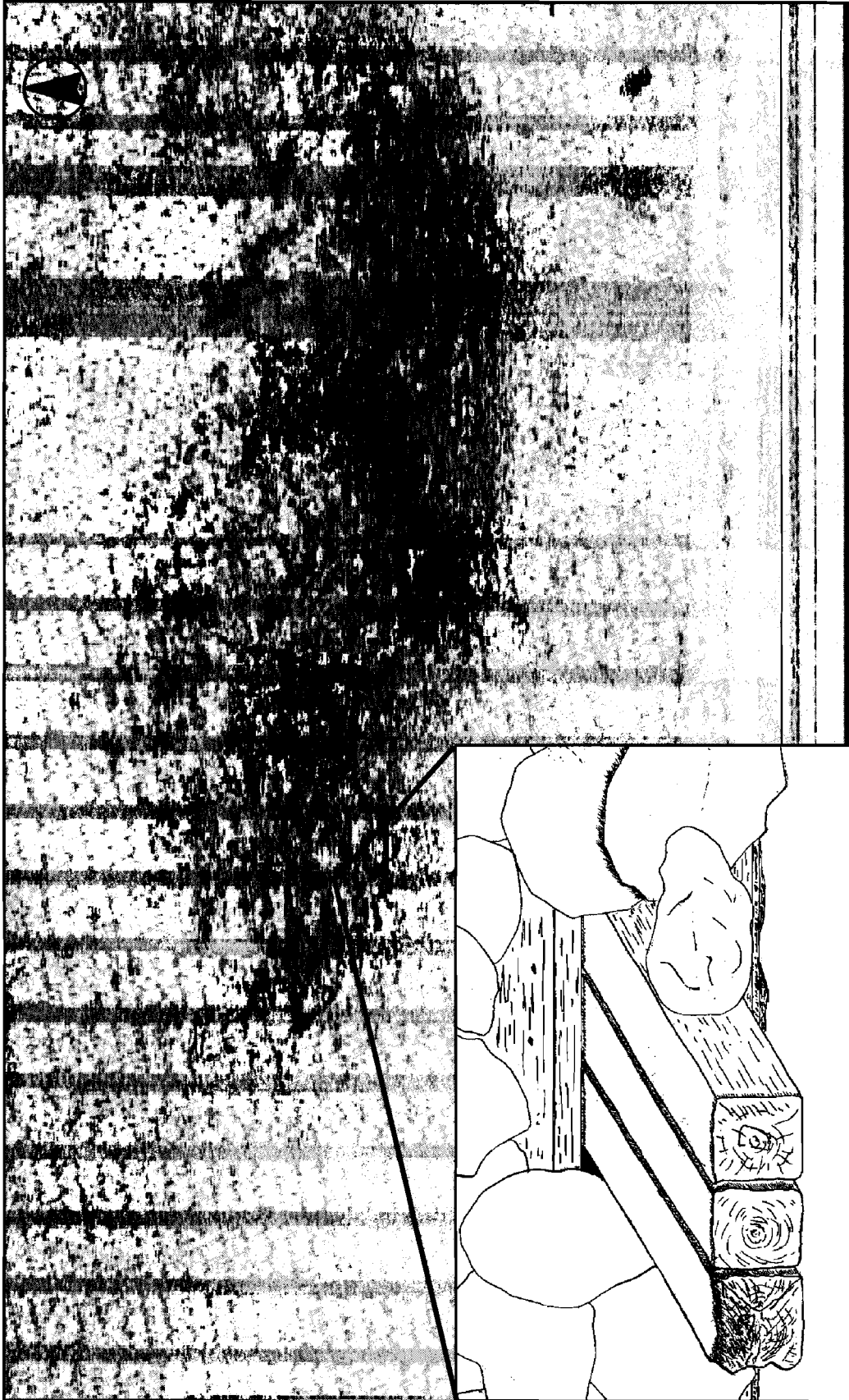


Figure 7.32: Side-scan sonar image of Station Creek Wreck (38BU2080) ballast mound. Insert of timbers exposed during ground-truthing. Ballast mound ca. 28.0 m long. Timbers drawing not to scale.

to those of construction and insurance records of the *Edward*, if those records can be located through additional research.

Lastly, it should be noted that 38BU2080 is the first shipwreck site in South Carolina to be located solely through the efforts of the Maritime Research Division's remote sensing operations.

Station Creek 3 Survey Block

On March 10, 2003, MRD surveyed a section of Station Creek measuring 3,618 meters in length. Three lanes were completed: one on either side of the creek and a third down the middle of the creek (Figures 7.33 and 7.34). Water depths in the survey block ranged from 1 to 15 meters. Forty-three magnetic anomalies were detected in the survey block. Of these magnetic anomalies, 25 were under 10 gammas, dipolar in nature, and suggestive of small, single-source, ferro-magnetic cultural materials (SC3-2-6, 8-12, 16-19, 21, 26, 27, 29, 31, 33, 36-38, 40, 43). Several anomalies having the potential to be historically significant were detected in the creek and are discussed below:

SC3-7 was a 28.3 gamma multi-component anomaly that lasted for five seconds. The anomaly disturbed one lane and a 484 square meter area. Water depth at the anomaly was one meter. The magnetics suggest the presence of several small to medium-sized, ferro-magnetic cultural objects as the cause of the anomaly.

SC3-15 was a 25.1 gamma dipolar anomaly that lasted for five seconds. The anomaly disturbed one lane and a 414 square meter area. Water depth at the anomaly was five meters. The magnetics suggest the presence of a single medium-sized, ferro-magnetic cultural object as the cause of the anomaly.

SC3-23 was a 22.6 gamma multi-component anomaly that lasted for six seconds. The anomaly disturbed one lane and a 293 square meter area. Water depth at the anomaly was four meter. The magnetics suggest the presence of several small to medium-sized, ferro-magnetic cultural objects as the cause of the anomaly.

SC3-24 was a 21.8 gamma multi-component anomaly that lasted for five seconds. The anomaly disturbed one lane and a 273 square meter area. Water depth at the anomaly was one meter. The magnetics suggest the presence of several small to medium-sized, ferro-magnetic cultural objects as the cause of the anomaly.

SC3-28 was a 101 gamma multi-component anomaly that lasted for six seconds. The anomaly disturbed one lane and a 880 square meter area. Water depth at the anomaly was 1.5 meters. The magnetics suggest the presence of several medium to large-sized, ferro-magnetic cultural objects as the cause of the anomaly.

SC3-32 was a 27.7 gamma dipolar anomaly that lasted for four seconds. The anomaly disturbed one lane and a 120 square meter area. Water depth at the anomaly was 5.5

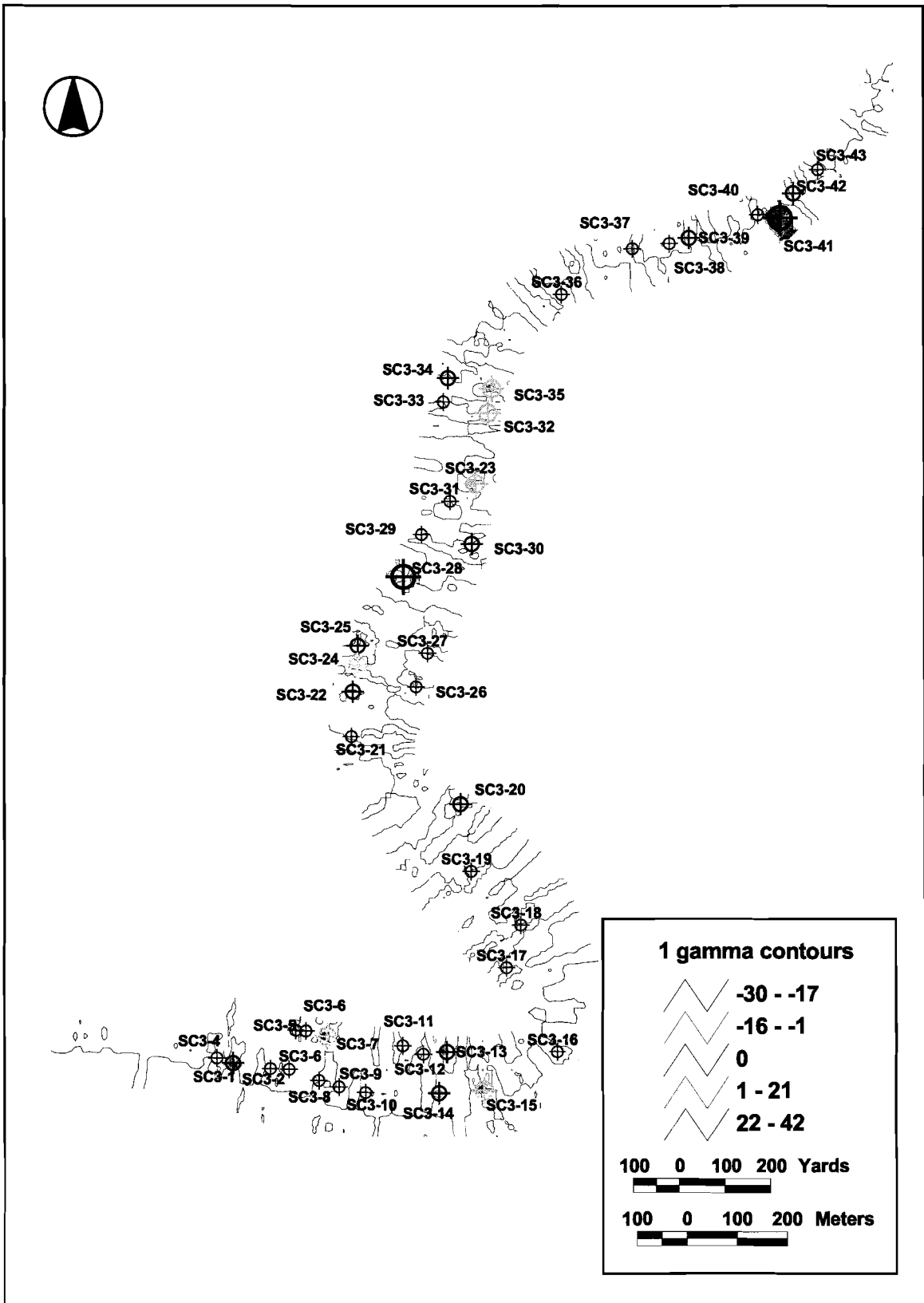


Figure 7.33: One gamma magnetic contours of Station Creek 3 survey block and identified anomalies.

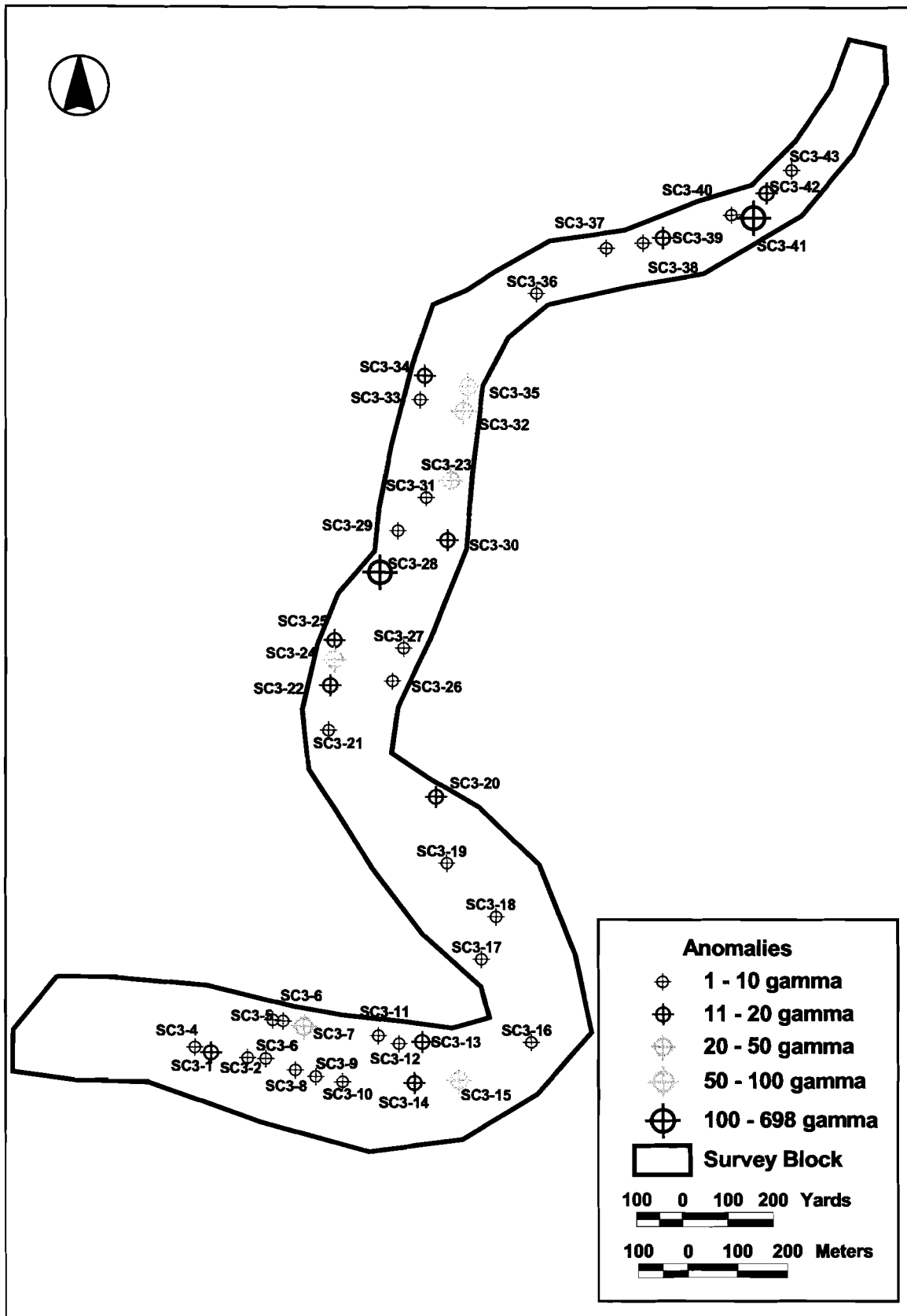


Figure 7.34: Station Creek 3 survey block anomalies.

meters. The magnetics suggest the presence of a medium-sized, ferro-magnetic cultural object as the cause of the anomaly.

SC3-35 was a 36.2 gamma dipolar anomaly that lasted for four seconds. The anomaly disturbed one lane and a 440 square meter area. Water depth at the anomaly was 5.5 meters. The magnetics suggest the presence of a medium-sized, ferro-magnetic cultural object as the cause of the anomaly.

SC3-41 was a 697.2 gamma multi-component anomaly that lasted for 13 seconds. The anomaly disturbed 2 lanes and a 2,021 square meter area. Water depth at the anomaly was two meters. The magnetics suggest the presence of several large-sized, ferro-magnetic cultural objects as the cause of the anomaly.

Ground-truthing

SC3-41 was ground-truthed on May 28, 2003, and identified as a scatter of modern metal objects, including a metal pipe. The pipe was approximately 5.5 meters long and 18 centimeters in diameter. Water depth at the anomaly was between one and two meters. The pipe and other debris rested on an oyster mound covered in mud.

Skull Creek Survey Area

The Skull Creek Wreck (38BU723) was discovered in March 1985 by SCIAA archaeologists while surveying a segment of Skull Creek from the Highway 278 bridge to Port Royal Sound. The survey was in response to the proposed development of a marina and the subsequent increase of boat traffic transiting the Intercoastal Waterway that might disturb unknown archaeological sites in this segment of the creek. Using a Klein 521 dual channel side scan sonar and towed array, SCIAA archaeologists and U.S. Army Corps of Engineers, Savannah District, remote sensing operators detected two anomalies: one sunken modern sailboat and a ballast mound. SCIAA archaeologists returned to the ballast mound in September of that year to perform a reconnaissance dive to ascertain whether the rocks were associated with a shipwreck or perhaps just a dumpsite. They determined that the ballast mound was indeed a component of a shipwreck site. The SCIAA archaeologists noted ballast consisted of quarried granite rocks, observed a number of copper and iron fasteners strewn about the periphery of the site, and located a creosoted post lying adjacent to the mound. Eighteen items, mostly copper fasteners, an iron nail, and a wood fragment with bronze tacks, were surface collected from the site (See Appendix G). These artifacts are now in curation at SCIAA. They posited a date ranging from the middle-eighteenth century to early-nineteenth century of unknown cultural affiliation for the shipwreck. The site was recorded into the state archaeological sites files and was not re-visited by SCIAA personnel until 2001 (State Archaeological Sites Files, Skull Creek Wreck (38BU723) file, SCIAA).

During the course of the Department of Defense Legacy Resource Management Program grant and the Port Royal Sound Survey, a decision was made to gather more sonar information about the Skull Creek Wreck and to record magnetometer data of the

wreck and surrounding area (Figure 7.35). Research since the 1985 discovery suggested several possibilities regarding the identity of the shipwreck. First, the wreck may be associated with the remains of the Martins Industry Shoal Lightship, which was burned by the Confederates in advance of the Union Port Royal Expedition in spring 1862. Second, perhaps the remains are a Confederate vessel intended to obstruct the creek and inland passageway to the Savannah River. Third, the remains could be a whale ship that was intended to blockade Charleston Harbor, but was too unfit to sail any further.

On March 28, 2001, SCIAA surveyed a survey block measuring 418 meters long by 240 meters wide covering an area totaling 46,607 square meters (Figures 7.36 and 7.37). The survey block was hemmed in the west by Pinckney Island and to the east by a small island in the creek. Boat speed ranged from four to five knots and lanes were spaced 15 meters apart. Water depth in the search area ranged from 1.1 meters along the shore to 9.9 meters in the channel. Subsequent analysis of the magnetometer and sonar data determined that 28 magnetic anomalies ranging from one gamma to 65 gammas were detected, along with two sonar targets, the Skull Creek ballast mound (SKC-s1) and another unidentified target (SKC-s2).

The ballast mound was a prominent feature on an otherwise featureless bottom (Figure 7.38). Careful scrutiny of the sonar data revealed no acoustic anomaly associated with the contoured magnetometer anomalies, except one potential corresponding acoustic and magnetic anomaly, respectively SKC-s2 and SKC-11. Several magnetic anomalies surrounded the ballast pile (SKC-11, SKC-12, SKC-13). Any smaller ferro-magnetic cultural materials, such as iron fasteners and other ship components, as well as any detectable magnetite concentrations in the granite ballast, were drowned out by these larger anomalies. A number of other anomalies were detected throughout the survey block.

SCIAA personnel and volunteers dove the shipwreck on September 13, 2001. Archaeologists found the ballast to consist of large quarried granite. They encountered a number of iron and copper fasteners and other components. They, also, detected others that were buried in the mud with a metal detector. Lying parallel along the eastern periphery of the mound was the creosoted post. A swift current and poor visibility allowed only a cursory inspection of the site, which yielded only a modicum of additional information about the wreck site. SCIAA archaeologists visited the site again in May 2003, and concentrated on recording the ballast mound and to note any exposed architectural features (Figure 7.39). Additional research may help to ascertain the identity of the shipwreck, and one avenue of research is to study the Martins Industry Lightship plans at the National Archives II in Maryland to help verify or refute the wreck's identity as that ship.

A total of 30 magnetic and acoustic anomalies were detected in the Skull Creek survey block. Of these 30 anomalies, 28 were magnetic and two were acoustic anomalies. The two acoustic anomalies corresponded to the magnetics associated with the shipwreck and an unknown object lying 45 meters southwest of the ballast mound.

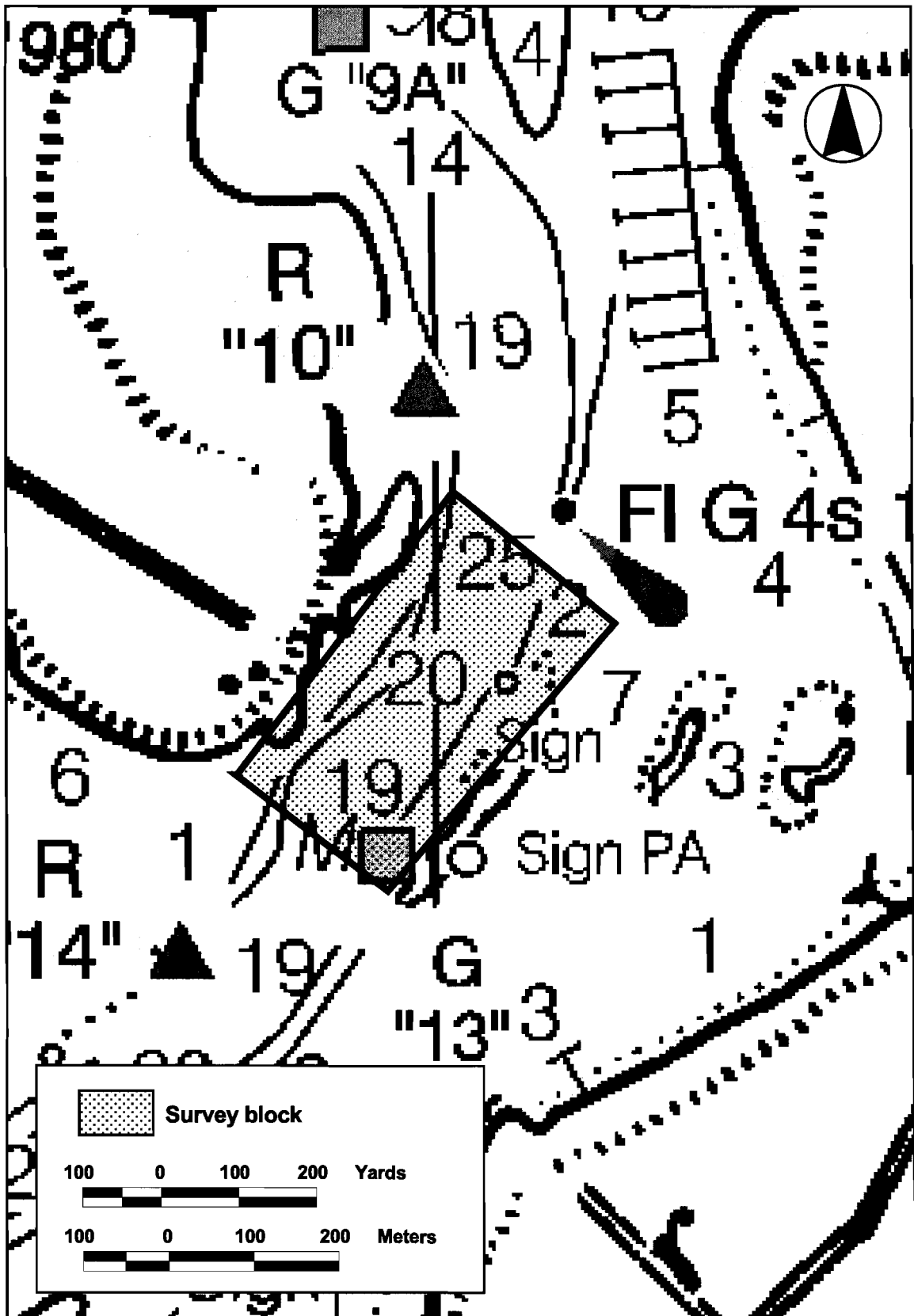


Figure 7.35: Skull Creek Survey Area (NOAA chart 11516, scale 1:40000, 1997).

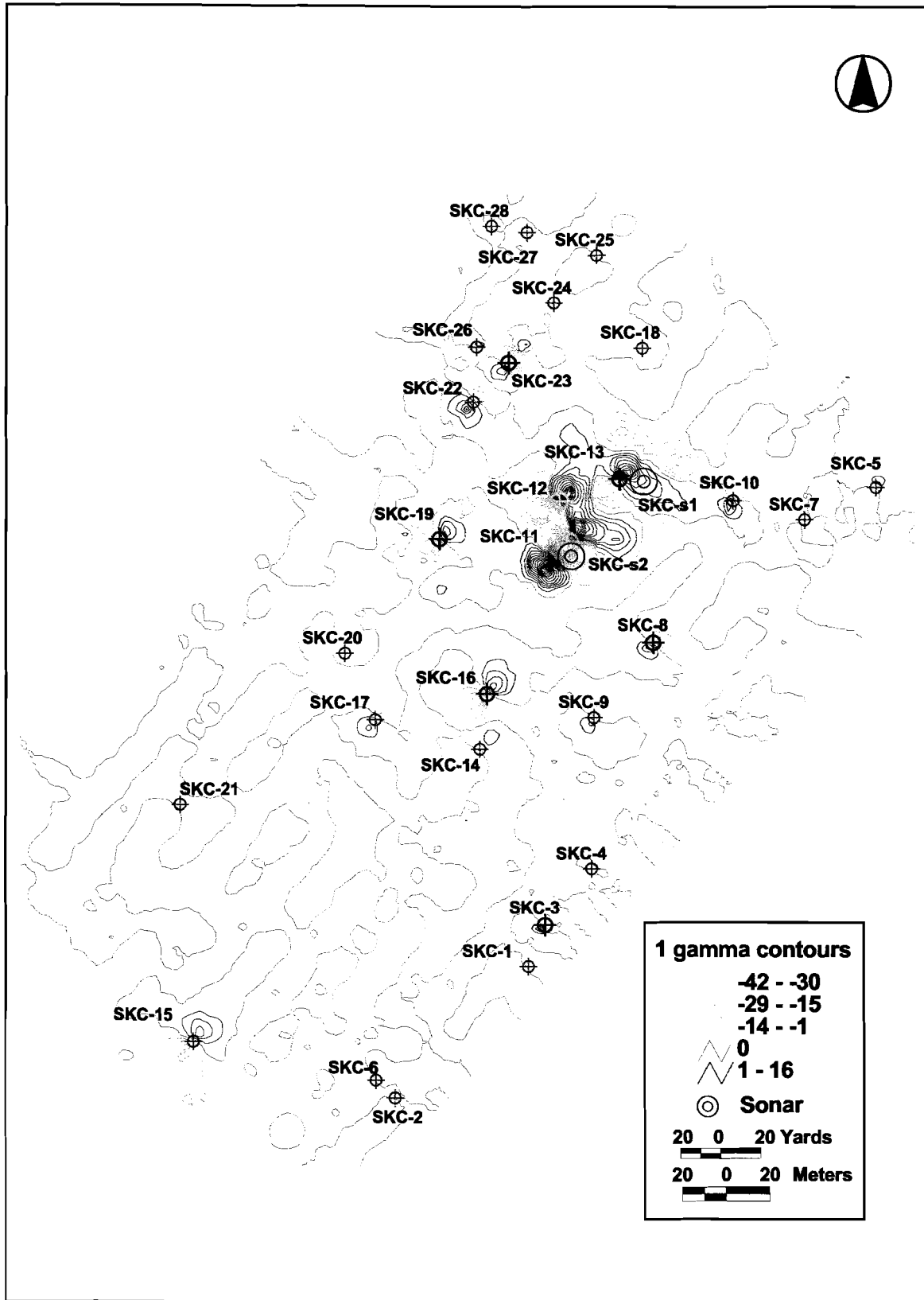


Figure 7.36: One gamma magnetic contours of Skull Creek survey block with identified anomalies.

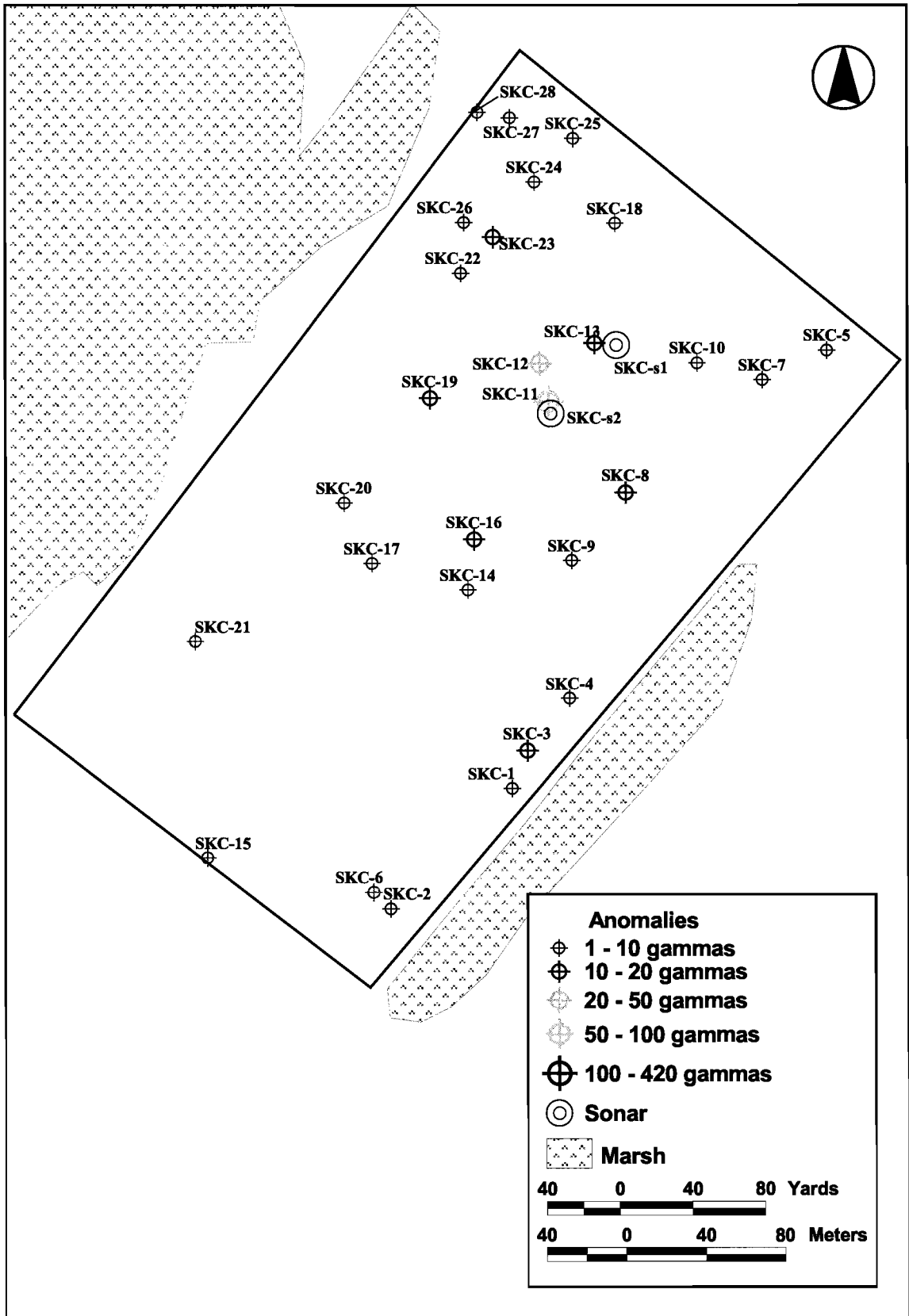


Figure 7.37: Skull Creek survey block anomalies.

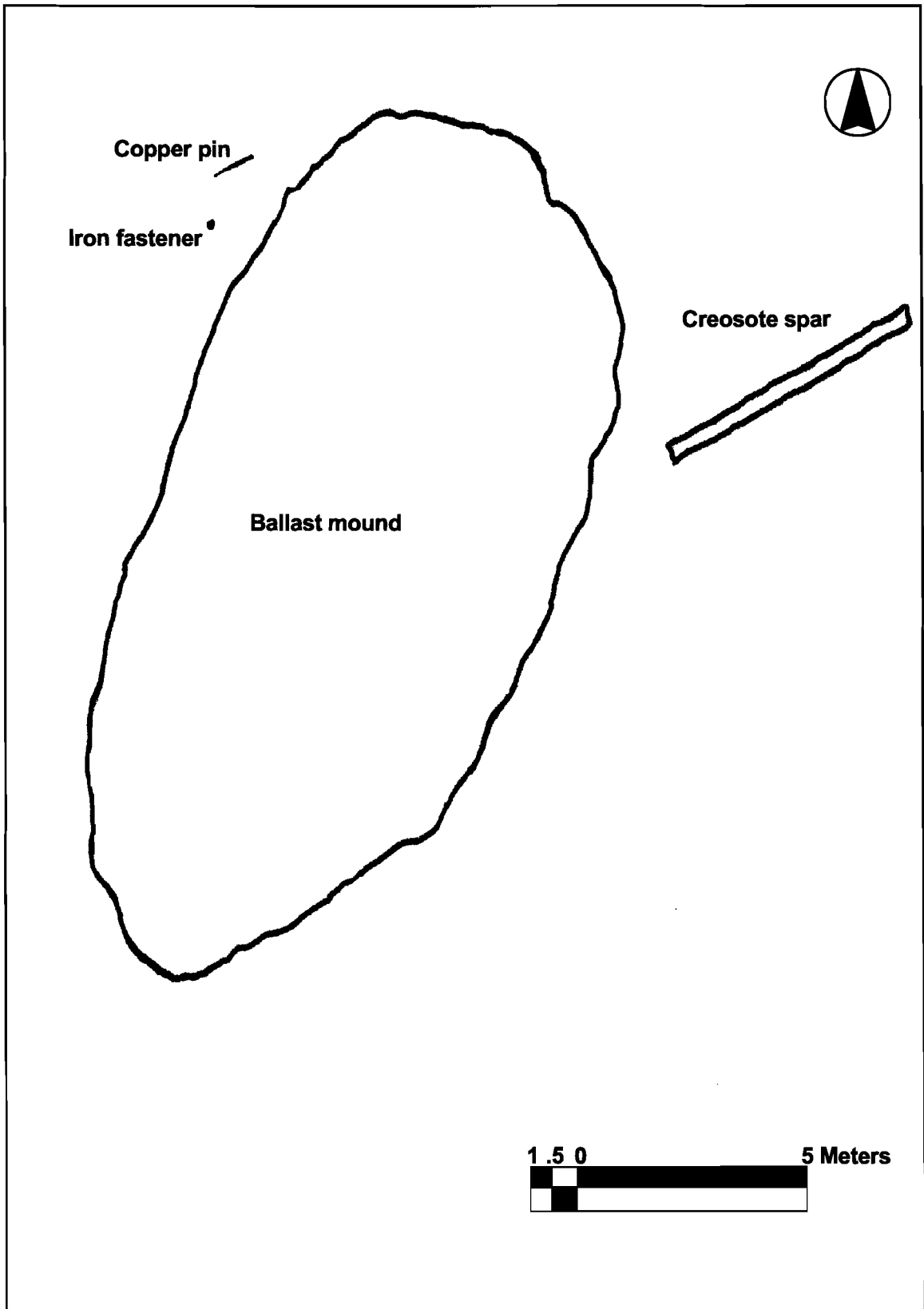


Figure 7.39: Sketch drawing of Skull Creek Wreck ballast mound and associated artifacts.

The majority of the magnetic anomalies, 20, were under 10 gammas, dipolar in nature, suggesting small, single-source ferro-magnetic cultural materials (SKC-1, 2, 4, 5-7, 9, 10, 14, 15 17, 18, 20-22, 24-28). Anomaly SKC-8 was a 12.3 gamma, dipolar magnetic anomaly associated with a No Wake sign. The rest of the magnetic anomalies ranged from 10 to 65 gammas and are discussed below along with any associated acoustic anomaly.

Skull Creek Shipwreck (38BU723) several magnetic and acoustic anomalies were associated with the ballast pile or in close proximity to the site:

SKC-s1 was the ballast mound itself. The survey sonogram revealed the northern portion of the ballast mound, but did not show the post, which was obscured from the shadow as a result of the height of the mound. Prior to diving the site in 2001, MRD deployed the side scan sonar to locate the mound and while running directly over the mound located the post lying on the bottom.

SKC-11 was approximately 44 meters southwest from the center of the ballast mound and was a 65.1 gamma multi-component magnetic anomaly in 8.9 meters of water. The anomaly lasted for 21 seconds, disturbed five lanes, and covered a 5,561 square meter area. An acoustic anomaly, *SKC-s2*, located within the magnetic disturbance area appears as two straight lines in a "\^" configuration (Figure 7.40). One leg measured approximately 1.9 meters and the other 3.8 meters. This may be the source of the magnetic anomaly as its signature suggests the presence of multiple pieces of ferro-magnetic cultural objects. Due to its proximity to the ballast mound it may be related to the shipwreck.

SKC-12 was approximately 35 meters to the southwest of the ballast mound and a 26.6 gamma dipolar magnetic anomaly with duration of 12 seconds. The anomaly affected three lanes and an approximate area of 644 square meters, and was in 9.1 meters of water. The likely source of this anomaly is a medium-sized, single-source, ferro-magnetic cultural object that due to its proximity may be an element of the shipwreck. There was no acoustic anomaly associated with the magnetic disturbance.

SKC-13 was the closest magnetic anomaly to the ballast mound, approximately 10 meters from the center of the ballast located on the western perimeter. *SKC-13* was a 16.3 gamma dipolar magnetic anomaly with duration of nine seconds. The magnetic disturbance affected one lane and approximately 361 square meters of area. The anomaly was located in 9.3 meters of water. There was no apparent acoustic anomaly associated with the magnetic anomaly. The magnetics and location suggest that the anomaly is a small to medium-sized, single-source, ferro-magnetic cultural object that most likely is associated with the wreck.

SKC-3 was a 10.1 gamma, three-second duration, dipolar magnetic anomaly. The anomaly, located in 2.3 meters of water, disturbed one lane and a 56 square meter area. The small amplitude suggests a small, single-source, ferro-magnetic cultural object as the cause of the disturbance. There was no associated acoustic anomaly.

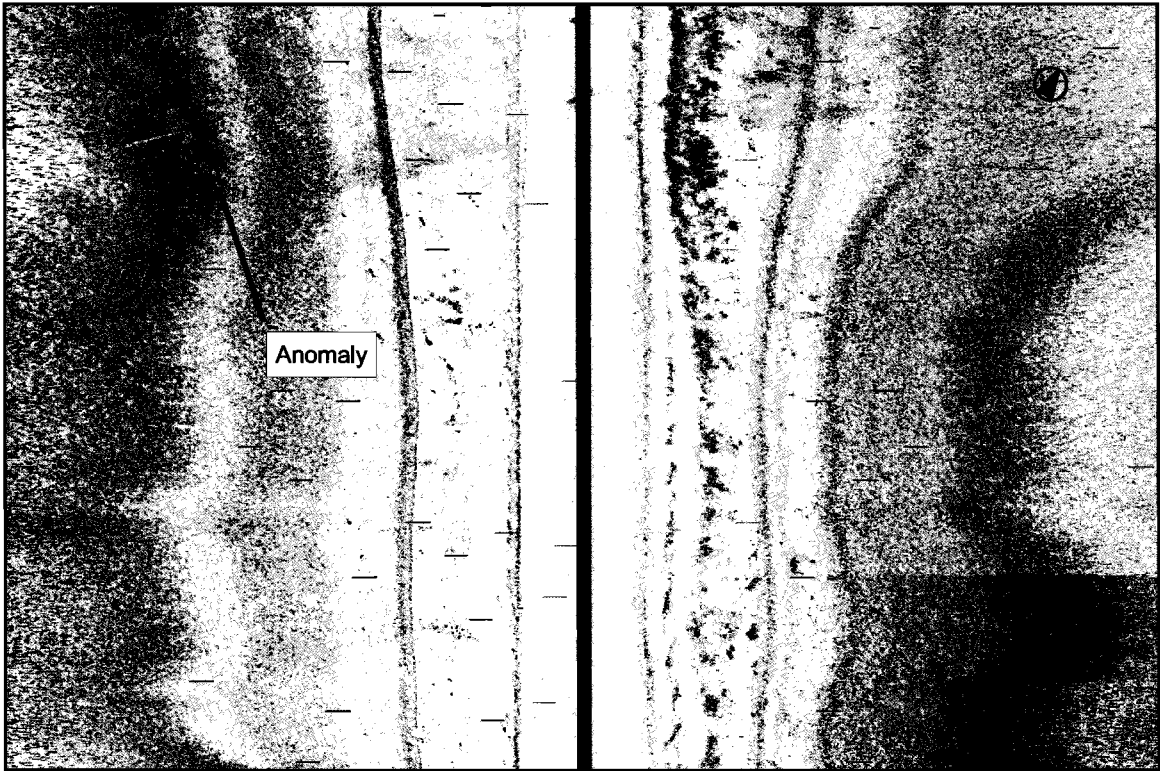


Figure 7.40: Sonogram of anomaly SKC-s2. Scale is approximately 5 mm=1 m.

SKC-16 was a 12.1 gamma, dipolar magnetic anomaly that lasted for nine seconds. The anomaly disturbed a 422 square meter area and one lane. It was located in 8.4 meters of water. The magnetics suggest a small, single-source, ferro-magnetic cultural object as the cause of the anomaly. There was no associated acoustic anomaly.

SKC-19 was an 11.3 gamma, multi-component magnetic anomaly that lasted for nine seconds. The anomaly disturbed three lanes and a 580 square meter area. It was located in 6.7 meters of water. The magnetics suggest that two or more disparate, small, single-source, ferro-magnetic cultural objects compose this magnetic anomaly. There was no acoustic anomaly associated with the magnetic anomaly.

SKC-23 was a 15.1 gamma, multi-component magnetic anomaly that lasted for nine seconds. The magnetic anomaly disturbed one lane and a 270 square meter area. It was located in 5.7 meters of water. The magnetics suggest a small, single-source, ferro-magnetic cultural object as the cause of the anomaly. There was no associated acoustic anomaly.

Gaskin Bank Survey Area

The Gaskin Bank Survey Area was selected in an attempt to locate the remains of a Second Stone Fleet vessel, *Marcia* that sank after striking the bottom while crossing the Port Royal Sound Bar on 7 January 1862. The 343-ton merchantman was purchased by the US Navy in Portland, Maine on 28 November 1861. The vessel was destined to be part of the Second Stone Fleet, which was to be sunk across the shipping channel leading into Charleston Harbor (Spence 1984:617; Mooney 1991:432-435). Two survey blocks were positioned in reference to previous survey areas as part of the on-going Port Royal Sound Survey to search for shipwrecks at the entrance to the sound (Figure 7.41). In survey block 2, a shipwreck symbol marked "PA", or "Position Approximate," was included within the confines of the search area. Three small magnetic anomalies (GB2-8, 9, 11) were detected around the shipwreck symbol, while the sonar failed to reveal any acoustic anomalies. Both survey blocks did not yield an anomaly of sufficient strength or duration to suggest the presence of a wooden vessel.

Gaskin Bank 1 Survey Block

On March 10 and 11, and May 30, 2003, MRD surveyed a block measuring 2,640 meters in length and 960 meters in width. The block covered an area approximately 2,534,400 square meters (Figures 7.42 and 7.43). Water depths in the survey block ranged from three to five meters. Nine magnetic anomalies were detected in the survey block. Of these magnetic anomalies, seven were under 10 gammas, dipolar in nature, and suggestive of small, single-source, ferro-magnetic cultural materials (GB1-1-3, 5-8). The remaining two anomalies ranged from 11.1 gammas to 12.9 gammas and are discussed below:

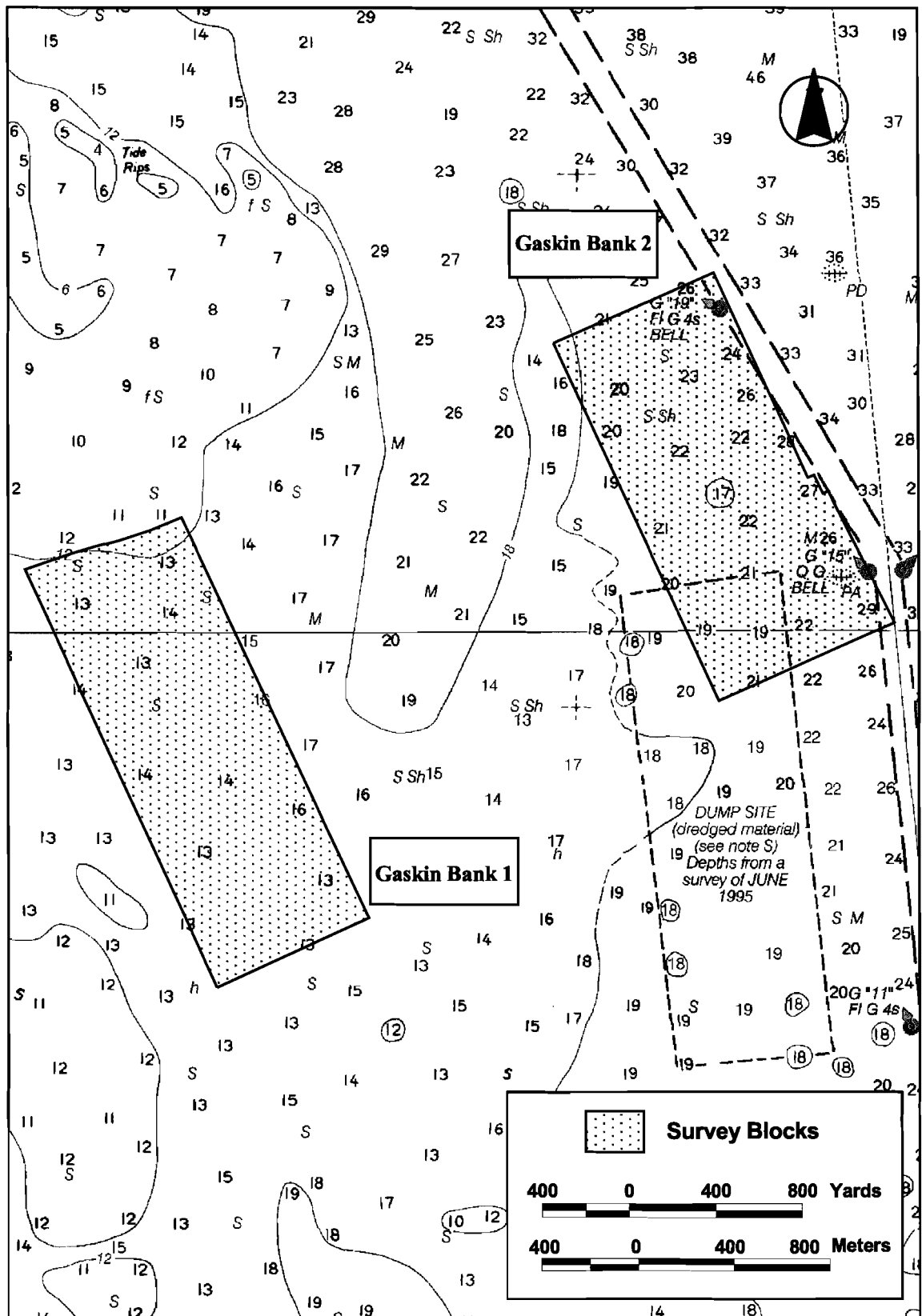


Figure 7.41: Gaskin Bank survey area (NOAA chart 11516, scale 1:40000, 1997).

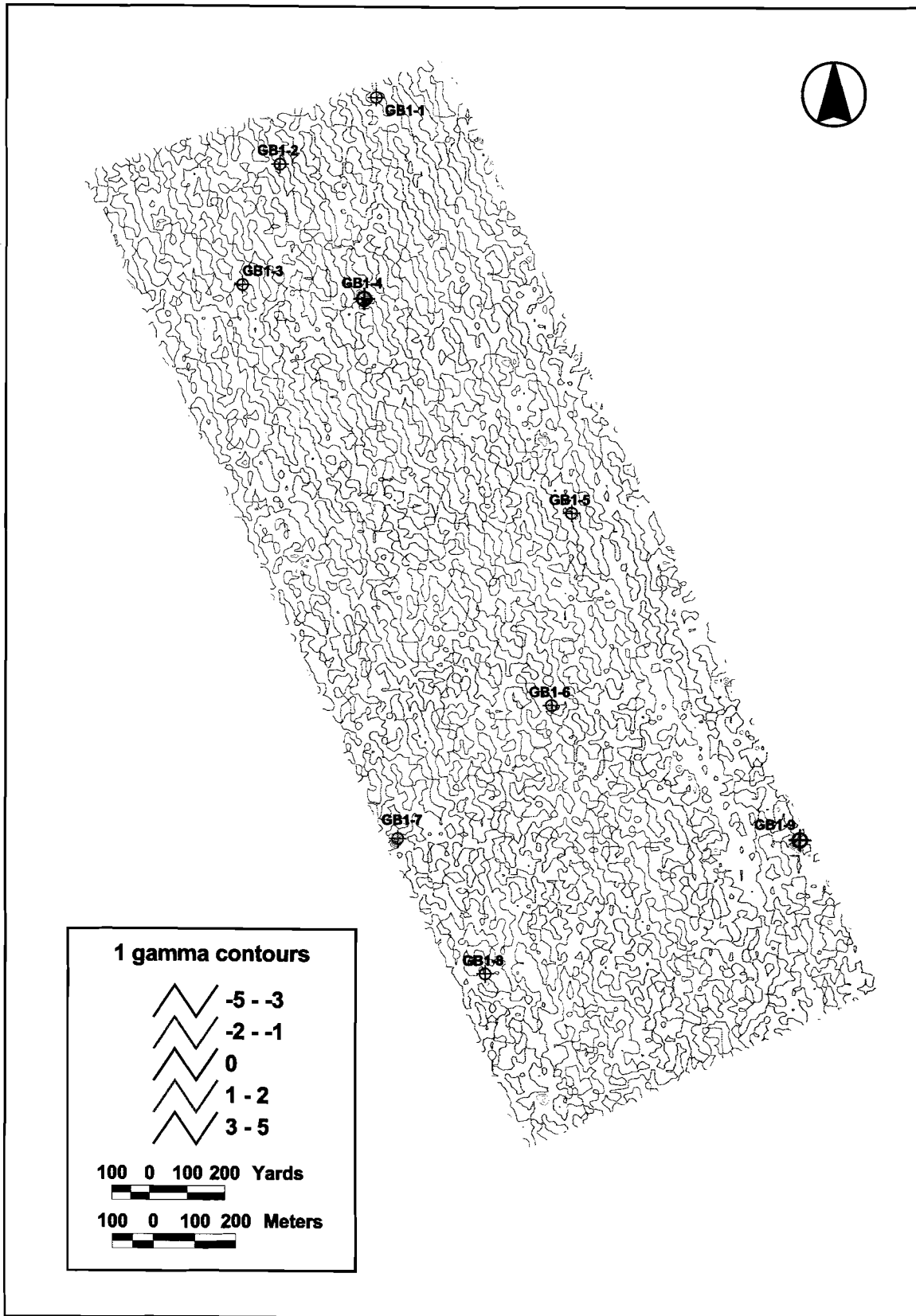


Figure 7.42: One gamma contours of Gaskin Bank 1 survey block and identified anomalies.

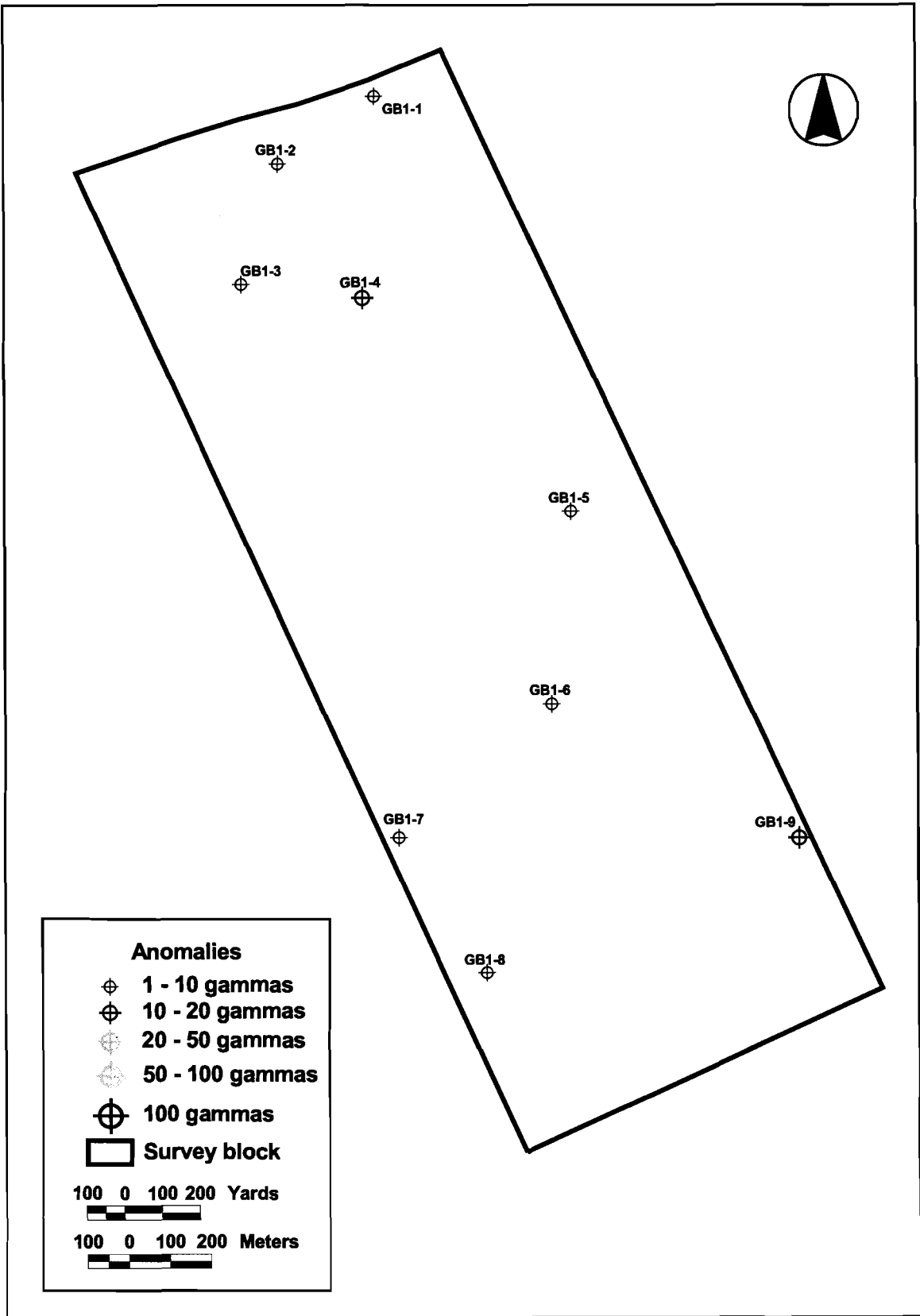


Figure 7.43: Gaskin Bank 1 survey block anomalies.

GB1-4 was a 12.9 gamma multi-component magnetic anomaly that lasted for six seconds. The anomaly disturbed two lanes and a 1,000 square meter area. Water depth at the anomaly was about four meters. The magnetics suggest the presence of several small, ferro-magnetic cultural objects as the cause of the anomaly.

GB1-9 was a 11.1 gamma multi-component magnetic anomaly that lasted for 11 seconds. The anomaly disturbed two lanes and a 1,003 square meter area. Water depth at the anomaly was approximately four meters. The magnetics suggest the presence of several small, ferro-magnetic cultural objects as the cause of the anomaly.

Gaskin Bank 2 Survey Block

On March 12-14, 2003, MRD surveyed a block measuring 2,255 meters in length and 1,111 meters at the widest part. The block covered an area approximately 2,322,920 square meters (Figures 7.44 and 7.45). Water depths in the survey block ranged from five to 15 meters. Thirteen magnetic anomalies were detected in the survey block. Of these magnetic anomalies, 10 were under 10 gammas, dipolar in nature, and suggestive of small, single-source, ferro-magnetic cultural materials (GB1-1-5, 7, 9, 11-13). The remaining three anomalies ranged from 10 gammas to 17.9 gammas and are discussed below:

GB2-6 was a 12.5 gamma multi-component magnetic anomaly that lasted for nine seconds. The anomaly disturbed two lanes and a 1,300 square meter area. Water depth at the anomaly was six meters. The magnetics suggest the presence of several small, ferro-magnetic magnetic cultural objects as the cause of the anomaly.

GB2-8 was a 10.6 gamma dipolar magnetic anomaly that lasted for seven seconds. The anomaly disturbed one lane and a 570 square meter area. Water depth at the anomaly was 10 meters. The magnetics and water depth suggest the presence of a small to medium-sized, single-source, ferro-magnetic magnetic cultural object as the cause of the anomaly.

GB2-10 was a 17.9 gamma dipolar magnetic anomaly that lasted for seven seconds. The anomaly disturbed two lanes and a 680 square meter area. Water depth at the anomaly was seven meters. The magnetics suggest a small to medium-sized, single-source, ferro-magnetic cultural object as the cause of the anomaly.

Whale Branch Survey Area

The Whale Branch Survey Area was conducted in an effort to locate the remains of USS *George Washington*, an Army gunboat sunk during the Civil War. Based on historical research and previous archaeological investigation, the northern shoreline of Port Royal Island was the primary focus of the search. Four survey blocks were conducted, with survey block 3 as the main search area, while the others were extensions upriver and downriver of that block in an effort to locate the gunboat (Figure 7.46). Lane

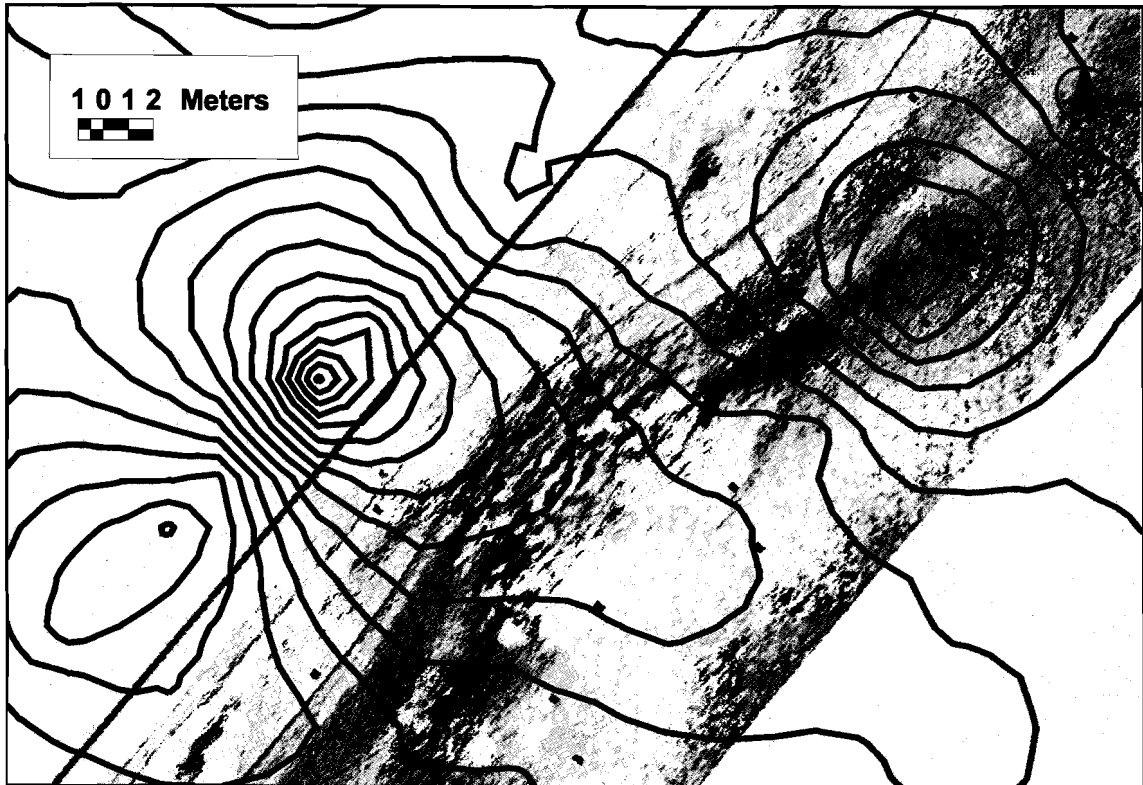
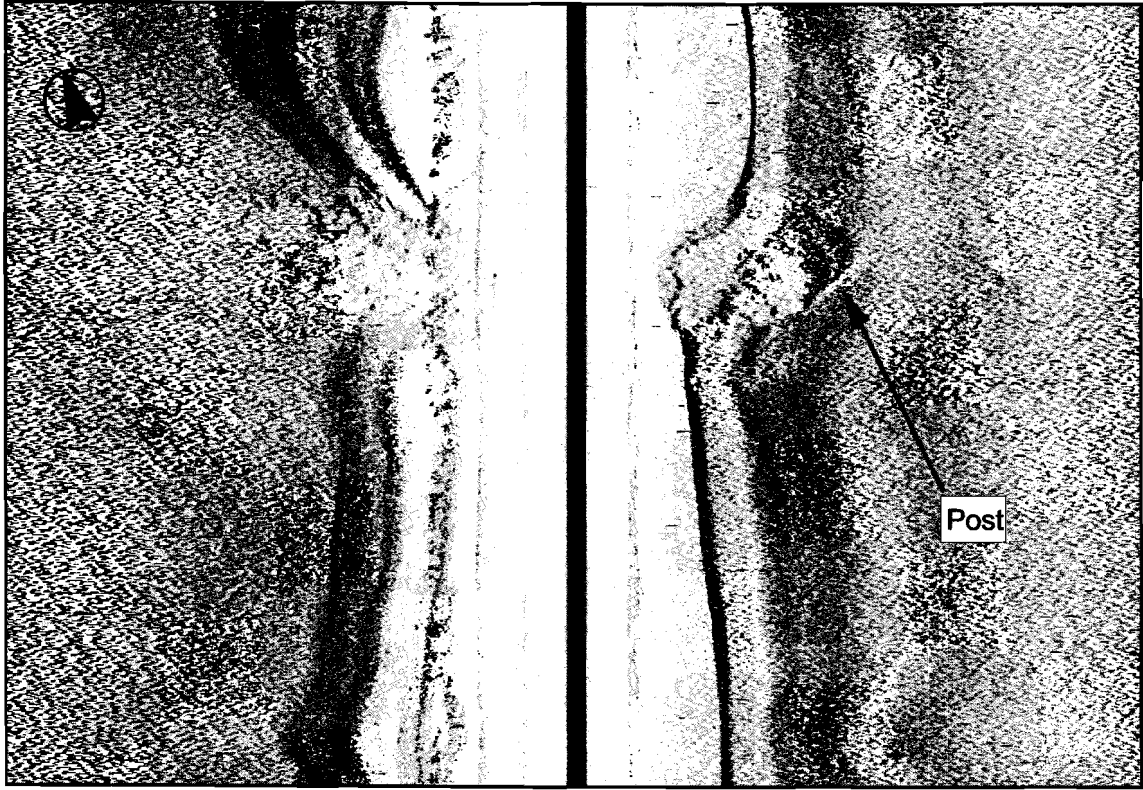


Figure 7.38: Sonograms of Skull Creek Wreck (38BU723). Top, sonogram of ballast mound, scale approximately 5 mm=1m; Bottom, one gamma magnetic contours overlaid ballast mound.

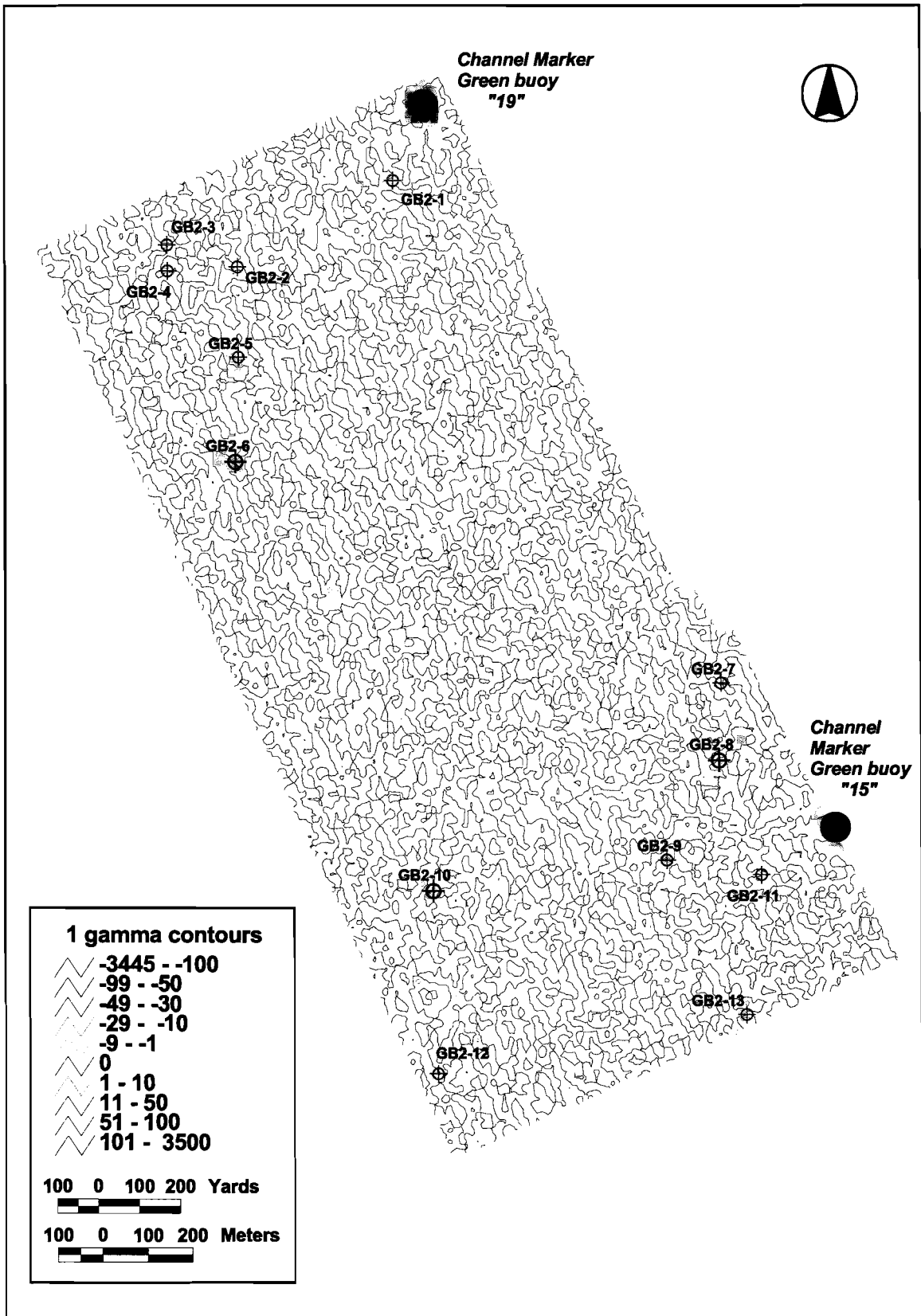


Figure 7.44: One gamma magnetic contours of Gaskin Bank 2 survey block and identified anomalies.

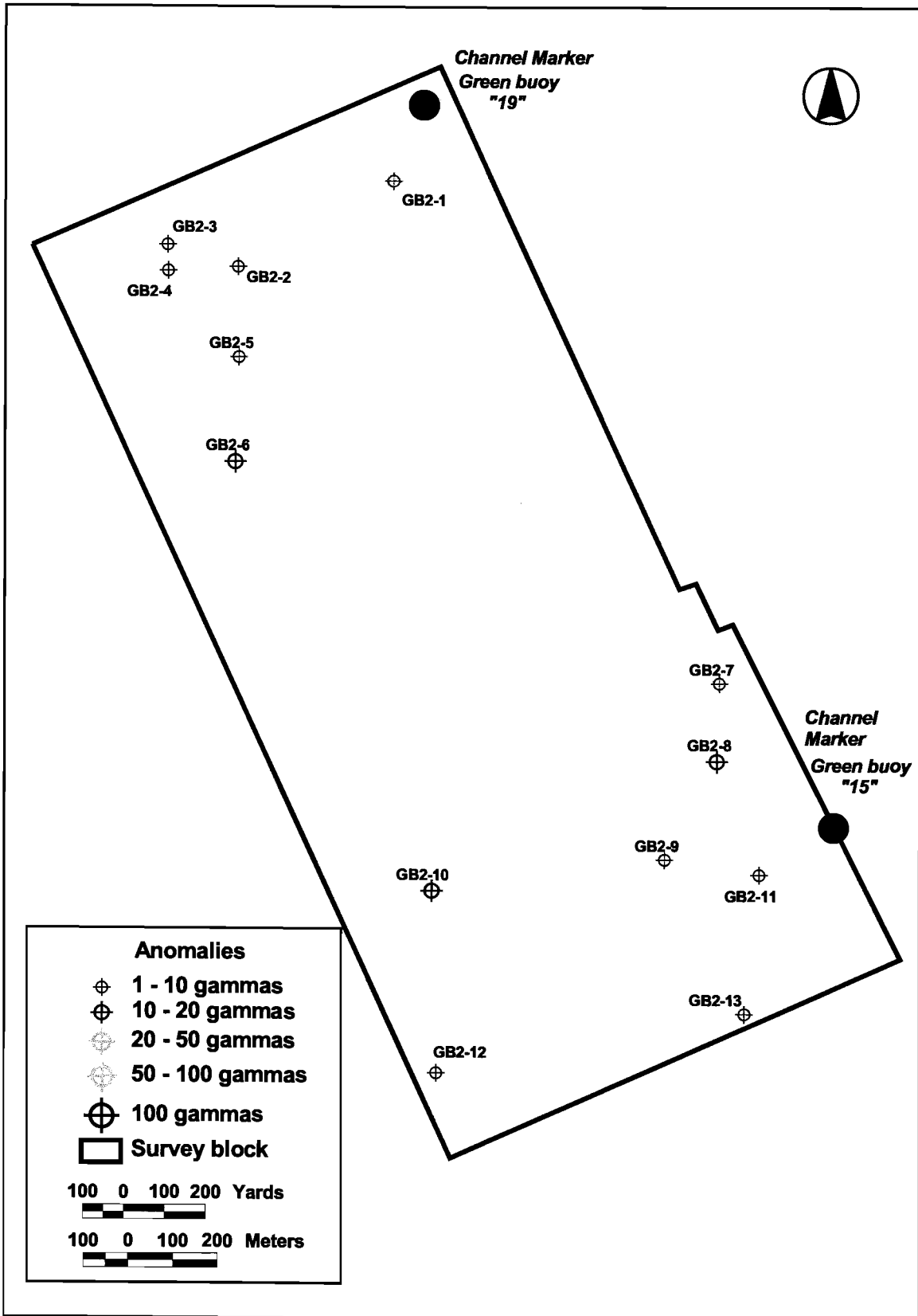


Figure 7.45: Gaskin Bank 2 survey block anomalies.

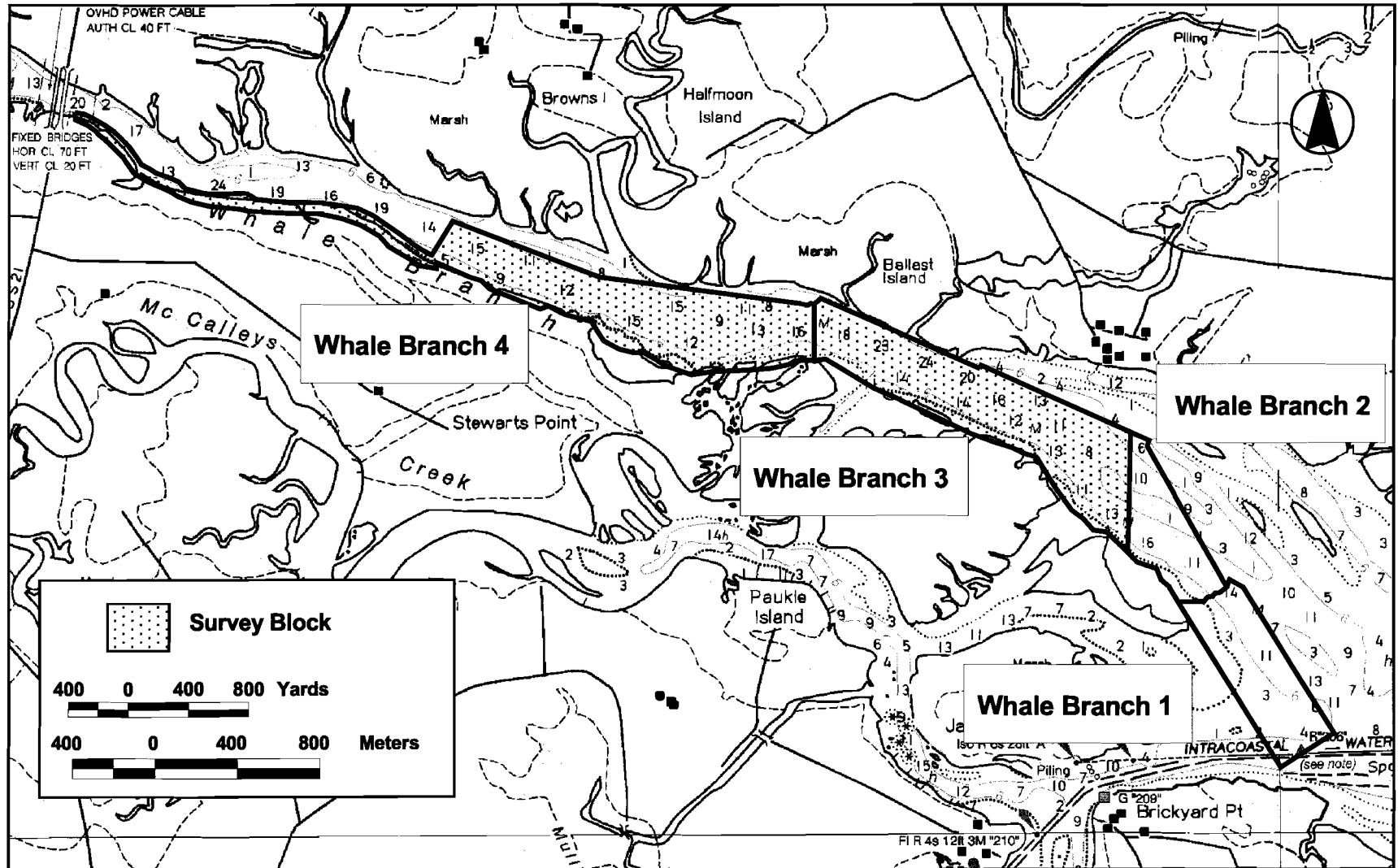


Figure 7.46: Whale Branch River survey area (NOAA chart 11519, scale 1:40000, 1997).

spacing in these blocks was 20 meters in an effort to speed the detection of a magnetic anomaly that would suggest the presence of the wreck.

On 9 April 1863, two Union vessels, USS *E. B. Hale*, a Navy vessel, and USS *George Washington*, an Army steamer, although on independent missions were cruising in company up the Whale Branch River. In the early morning hours of the tenth, the *E.B. Hale* left the *George Washington* at anchor and steamed towards Port Royal Ferry, eventually reaching the head of the Broad River later that morning. Steaming back towards Port Royal Ferry, the gunboat was informed of enemy firing on Union vessels further downriver. Steaming towards the sounds of battle, Lieutenant Edgar Brodhead, commander of *E.B. Hale* found, "When 3 miles below the ferry I came in sight of the wreck of the *Washington*, abandoned, burned, and sunk at the edge of a marsh on our side, some 500 yards from the shore. . ." (ORN, ser. 1, vol. 14:116). Helping rescue wounded soldiers and sailors from the wreckage and nearby marsh, *E.B. Hale* departed the scene and headed to Beaufort. In the meantime, Confederate soldiers salvaged various objects, mostly clothes, from the steamer (S. Elliot to Wife, 18 April 1863, Elliot Family Papers, USC Carolinana Library).

After an Army and Navy court of inquiry to determine the circumstances surrounding the loss of the Army gunboat, both pointing fingers at each other, efforts were made to cooperate in salvaging the vessel. On 12 April, *E.B. Hale* returned to the wreckage, reported as four miles below Port Royal Ferry, and proceeded to tow the wreck from the original site to an unknown location in the river. Lieutenant Brodhead stated that the wrecked gunboat was relocated within easy range of the *E.B. Hale's* 20-pdr Parrott rifle to shell the Confederate battery on Chisholm Island responsible for the gunboat's sinking. Additionally, the wreckage was deposited at an area where the *E.B. Hale*, 117 feet in length with a draft of 7 feet 6 inches, could be turned safely. Within range of an Union battery, the plan called for an Army unit to move to the wreck and to recover the guns from the wreck. Despite the covering fire of the Navy vessel the Army made no movement to salvage the guns (ORN, ser. 1, vol. 14:127).

In 1939, local crabbers located a 24-pdr bronze howitzer sticking out of the mud on the mainland side of the river. The howitzer, reportedly belonging to the gunboat, was removed from the marsh and brought to the Beaufort Museum where it remains today in the courtyard. A previous attempt to locate the *George Washington* was made by Howard Tower, an amateur archaeologist, under SCIAA search license number 29. On two separate occasions in 1983, Tower employed a magnetometer and conducted visual searches in an attempt to locate the gunboat. He had also made contact with one of the crabbers who had found the howitzer in 1939. Searching the area determined by the crabber as the original location of the howitzer yielded no magnetic anomalies. Searching again, but this time on the opposite shoreline on Port Royal Island, once more failed to detect any signs of the wreckage. The search was hobbled, however, by a malfunctioning magnetometer and relied strictly on visual sweeps of the bottom to find any visible remnants of the wreck. The search was abandoned after this last attempt (Howard Tower, Letter report for Salvage License no. 29, 25 January and 11 December 1983, on file at SCIAA/MRD).

The present location of the remains of USS *George Washington* is somewhat problematical due to the relocation of the wreck from the original wreck site. While the original position of the wreck of the gunboat was relatively precise, from three to four miles downriver from the Port Royal Ferry, now superimposed by the Highway 21 bridge, the removal of the gunboat by the *E.B. Hale* opens the current location to speculation based on imprecise measurements. In an effort to increase the chance of discovering the vessel, the survey blocks were oriented along the northern shoreline of Port Royal Island and stretched across Whale Branch River to the mainland. Numerous magnetic anomalies were detected in the survey area. Many of the anomalies were from modern magnetic cultural objects in the survey area including numerous crab traps and several docks along the southern shoreline of the river.

Some magnetic anomalies, however, were of interest. Along the marsh line in survey block 3, encompassing the historical distance of three to four miles from Port Royal Ferry, numerous large-scale magnetic anomalies were recorded. These large anomalies (WB3-29, 51, 54, 55, and 141) ranged in size from 107 to 383.8 gammas. These anomalies are in the right area of the original historical location of the wreck and may represent iron components that separated during the burning or as it was dragged away by the *E.B. Hale*. There were several other large anomalies in the other survey blocks, but only one that was very large, WB4-44, at 1,421.7 gammas. This anomaly, however, is located on the northern periphery of the river, or during the Civil War on the Confederate side. During low tide an oyster mound and some other debris, such as concrete block and stones, are visible. While out of historical position, in other words, not on the Union side, the anomaly bears investigating to determine the source of the anomaly. Additional historical research may also shed light on the final disposition of the gunboat remains to aid in the search.

Whale Branch 1 Survey Block

On February 21, 2003, the MRD surveyed a block measuring 1,172 meters in length and 383 meters in width. The block covered an area approximately 420,877 square meters (Figures 7.47 and 7.48). Water depths in the survey block ranged from one to six meters. Sixty-four magnetic anomalies were detected in the survey block. Of these magnetic anomalies, 46 were under 10 gammas, predominately dipolar in nature, and suggestive of small, single-source, ferro-magnetic cultural materials (WB1-1, 3-7, 12-21, 23, 26, 28-35, 37,39, 43, 44, 47-49, 51, 52, 54-64). The remaining anomalies ranged from 10 gammas to 114.9 gammas. Only those anomalies having the potential to represent a shipwreck consisting of steam machinery components are discussed below:

WB1-2 was a 114.9 gamma multi-component anomaly that lasted for nine seconds. The anomaly disturbed one lane and a 763 square meter area. Water depth at the anomaly was one meter. The magnetics suggest the presence of several large to medium-sized, ferro-magnetic cultural objects as the cause of the anomaly.

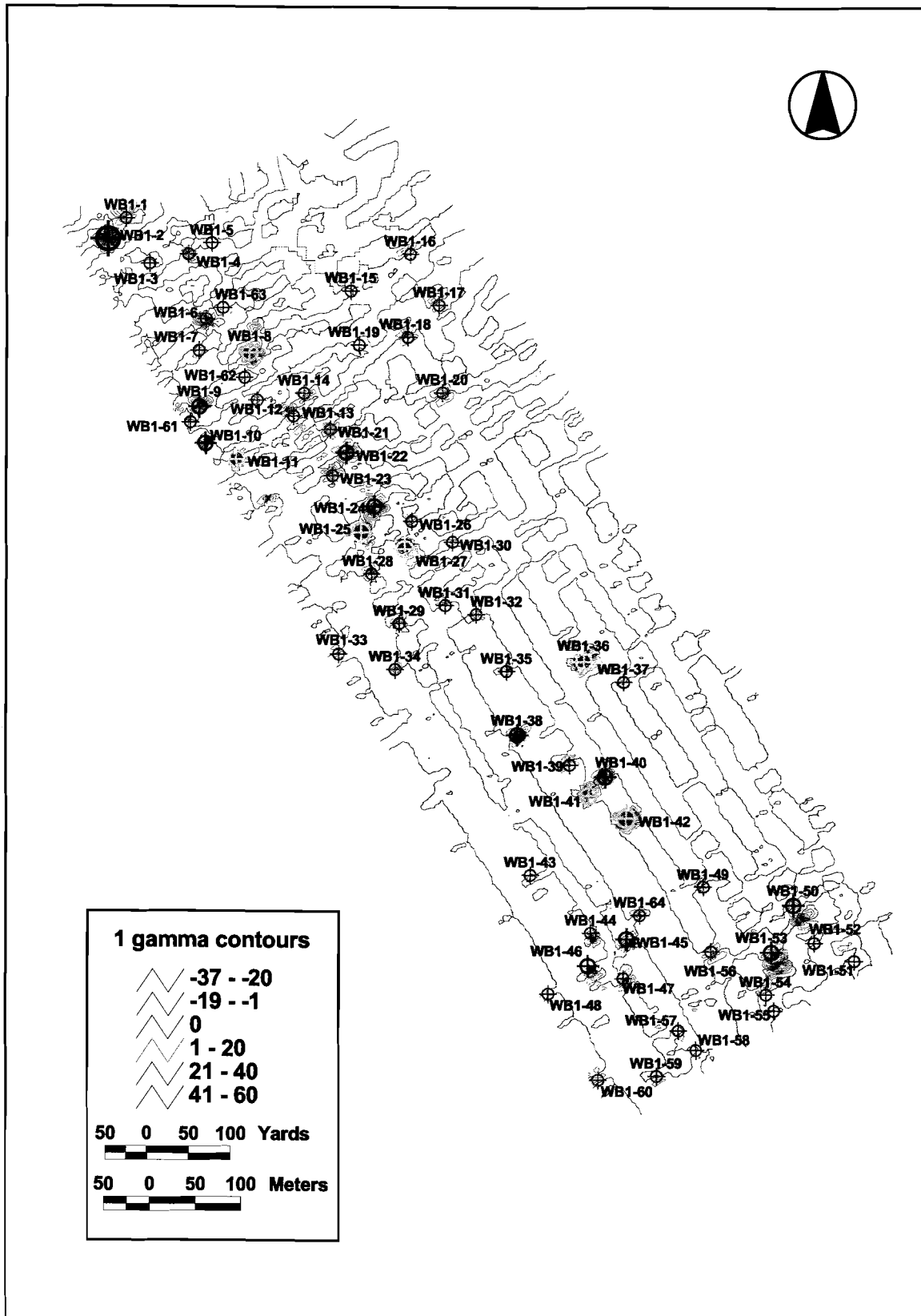


Figure 7.47: One gamma magnetic contours of Whale Branch 1 survey block and identified anomalies.

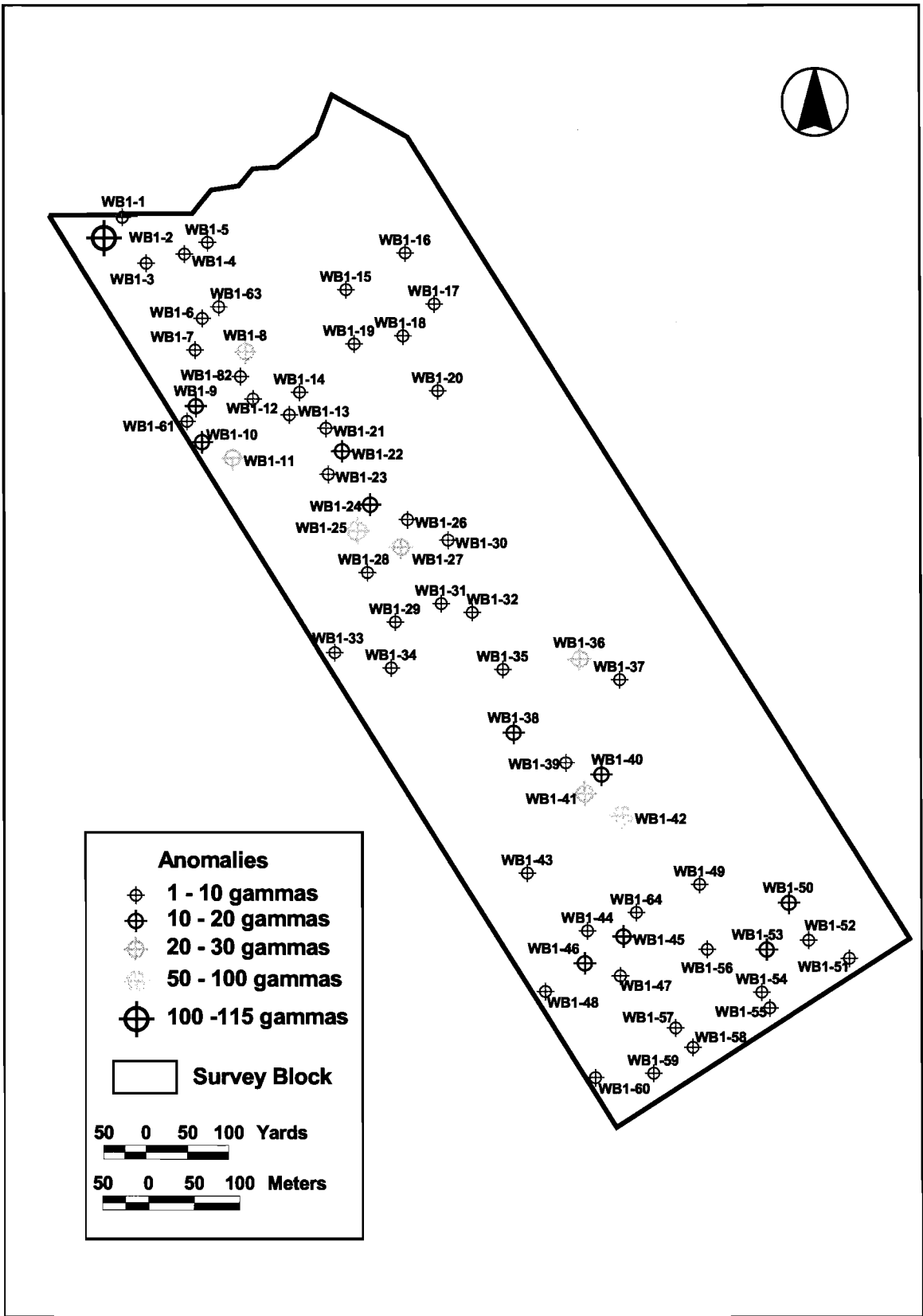


Figure 7.48: Whale Branch 1 survey block anomalies.

WB1-25 was a 64.7 gamma multi-component anomaly that lasted for nine seconds. The anomaly disturbed one lane and a 567 square meter area. Water depth at the anomaly was one meter. The magnetics and depth suggest the presence of several medium-sized, ferro-magnetic cultural objects as the cause of the anomaly.

WB1-42 was a 99.1 gamma multi-component anomaly that lasted for seven seconds. The anomaly disturbed two lanes and a 1,172 square meter area. Water depth at the anomaly was 1.5 meters. The magnetics suggest the presence of several small to medium-sized, ferro-magnetic cultural objects as the cause of the anomaly.

Whale Branch 2 Survey Block

On February 13 and 14, 2003, MRD surveyed a block measuring a maximum of 1,093 meters in length and a maximum of 725 meters in width. The block covered an area approximately 295,423 square meters (Figures 7.49 and 7.50). Water depths in the survey block ranged from one to six meters. Fifty-eight magnetic anomalies were detected in the survey block. Of these magnetic anomalies, 31 were under 10 gammas, predominately dipolar in nature, and suggestive of small, single-source, ferro-magnetic cultural materials (WB2-2-7, 11, 14, 15, 17, 25, 27, 29, 30, 32, 33, 35, 37, 39-43, 47, 48, 50-53, 55, 57, 58). The remaining anomalies ranged from 10 gammas to 63.3 gammas. Only those anomalies having the potential to represent a shipwreck consisting of steam machinery components are discussed below:

Cluster 1 consists of four medium-sized anomalies in close proximity to suggest a potential association to one another. This association of individual anomalies perhaps identifies the components of a potentially significant archaeological object:

WB2-8 was a 36.5 gamma multi-component anomaly that lasted for seven seconds. The anomaly disturbed one lane and a 325 square meter area. Water depth at the anomaly was four meters. The magnetics suggest the presence of small to medium-sized, ferro-magnetic cultural objects as the cause of the anomaly.

WB2-10 was a 43.2 gamma multi-component anomaly that lasted for seven seconds. The anomaly disturbed one lane and a 301 square meter area. Water depth at the anomaly was 3.5 meters. The magnetics suggest the presence of small to medium-sized, ferro-magnetic cultural objects as the cause of the anomaly.

WB2-12 was a 53.8 gamma multi-component anomaly that lasted for eight seconds. The anomaly disturbed two lanes and a 732 square meter area. Water depth at the anomaly was 3.5 meters. The magnetics suggest the presence of small to medium-sized, ferro-magnetic cultural objects as the cause of the anomaly.

WB2-13 was a 25.7 gamma multi-component anomaly that lasted for six seconds. The anomaly disturbed one lane and a 220 square meter area. Water depth at the anomaly was three meters. The magnetics suggest the presence of several small, ferro-magnetic cultural objects as the cause of the anomaly.

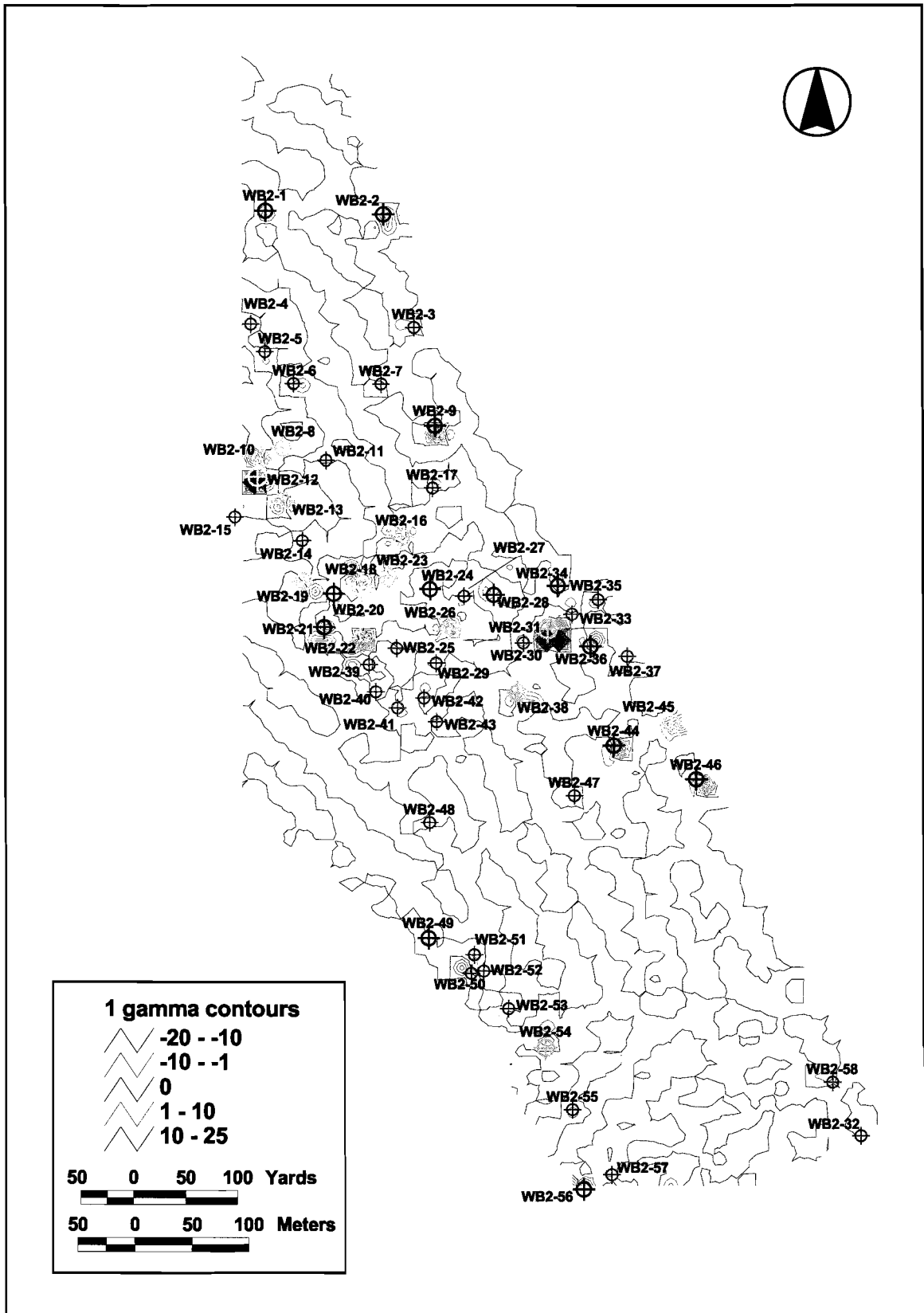


Figure 7.49: One gamma magnetic contours of Whale Branch 2 survey block and identified anomalies.

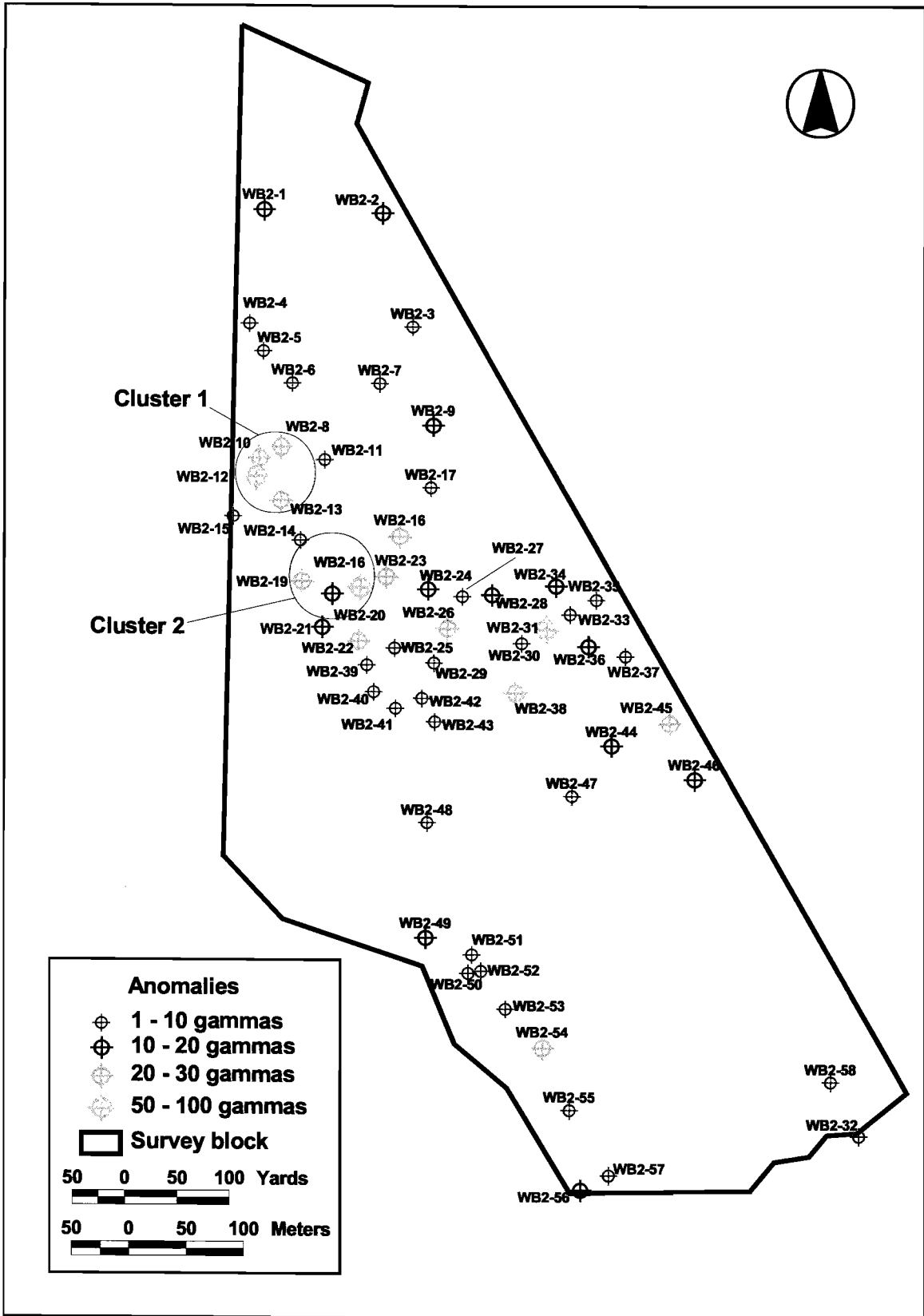


Figure 7.50: Whale Branch 1 survey block anomalies.

Cluster 2 consists of three anomalies in close proximity to suggest a potential association to one another. This association of anomalies perhaps identifies the components of a potentially significant archaeological object:

WB2-18 was a 56.7 gamma multi-component anomaly that lasted for 14 seconds. The anomaly disturbed one lane and a 762 square meter area. Water depth at the anomaly was 1.5 meters. The magnetics suggest the presence of several small to medium-sized, ferro-magnetic cultural objects as the cause of the anomaly.

WB2-19 was a 40 gamma multi-component anomaly that lasted for five seconds. The anomaly disturbed one lane and a 292 square meter area. Water depth at the anomaly was 3.5 meters. The magnetics suggest the presence of several small to medium-sized, ferro-magnetic cultural objects as the cause of the anomaly.

WB2-20 was a 16.3 gamma multi-component anomaly that lasted for five seconds. The anomaly disturbed one lane and a 140 square meter area. Water depth at the anomaly was two meters. The magnetics suggest the presence of several small, ferro-magnetic cultural objects as the cause of the anomaly.

WB2-31 was a 63.3 gamma multi-component anomaly that lasted for 12 seconds. The anomaly disturbed one lane and a 790 square meter area. Water depth at the anomaly was 1.5 meters. The magnetics suggest the presence of several small to medium-sized, ferro-magnetic cultural objects as the cause of the anomaly.

Whale Branch 3 Survey Block

On February 13, 2003, MRD surveyed a block measuring 2,204 meters in length and a maximum 720 meters in width. The block covered an area approximately 890,318 square meters (Figures 7.51 and 7.52). Water depths in the survey block ranged from one to 10 meters. One hundred and forty one magnetic anomalies were detected in the survey block. Of these magnetic anomalies, 101 were under 10 gammas, predominately dipolar in nature, and suggestive of small, single-source, ferro-magnetic cultural materials (WB3-1-4, 6, 7, 9-11, 14-25, 28, 30-41, 46, 47, 49, 52, 53, 57-63, 65-77, 79-86, 89, 92-94, 98, 99, 102, 104-106, 108, 110-115, 117, 118, 120-124, 127-129, 131-135, 137, 140). The remaining anomalies ranged from 10 gammas to 383.8 gammas. Only those anomalies having the potential to represent a shipwreck consisting of steam machinery components are discussed below:

WB3-13 was a 58 gamma multi-component anomaly that lasted for 31 seconds. The anomaly disturbed two lanes and a 4,050 square meter area. Water depth of the anomaly was two meters. The magnetics suggest the presence of several small to medium-sized, ferro-magnetic cultural objects as the cause of the anomaly.

WB3-29 was a 128.5 gamma multi-component anomaly that lasted for 15 seconds. The anomaly disturbed two lanes and a 2,200 square meter area. Water depth at the anomaly

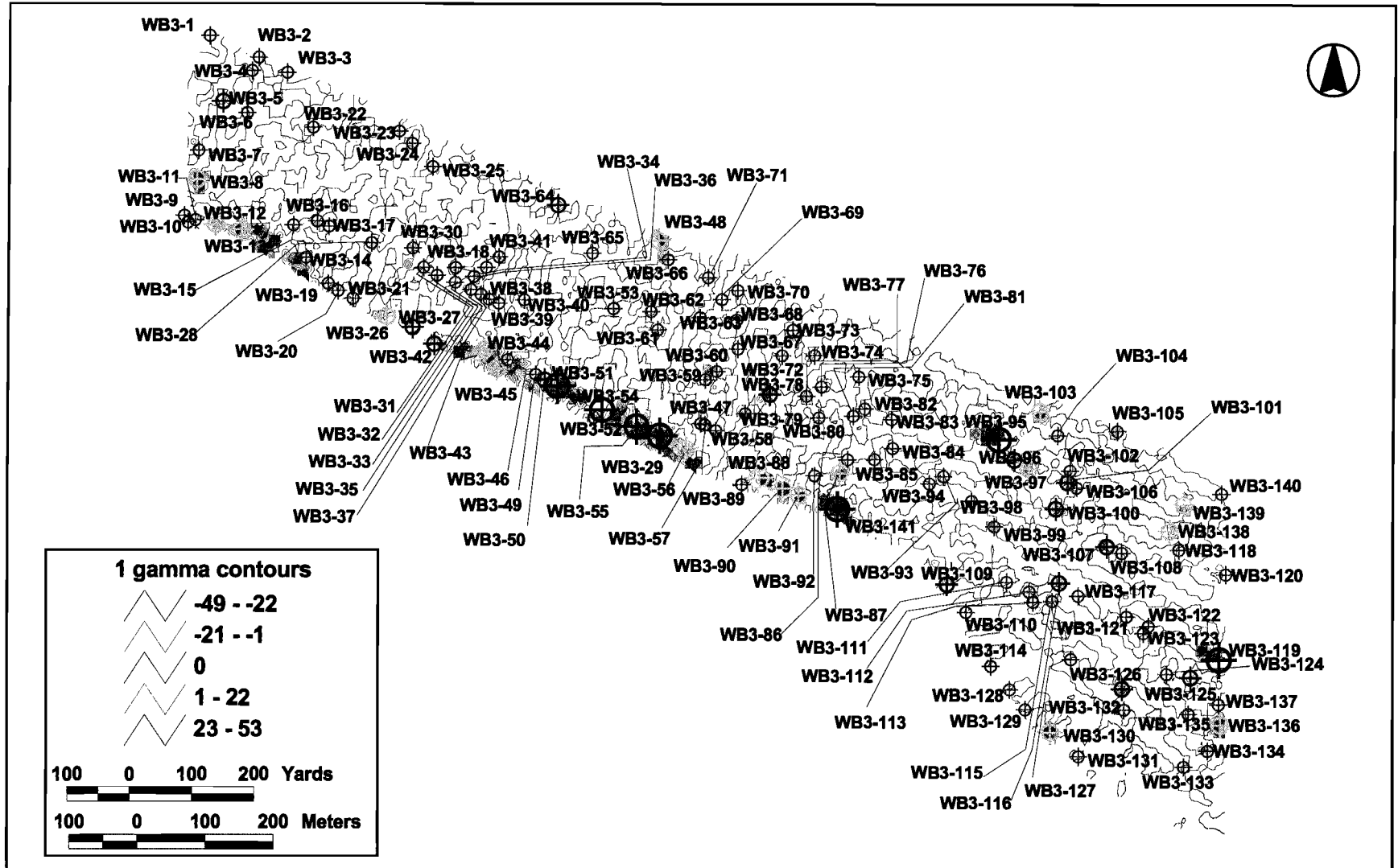


Figure 7.51: One gamma contours of Whale Branch 3 survey block and identified anomalies.

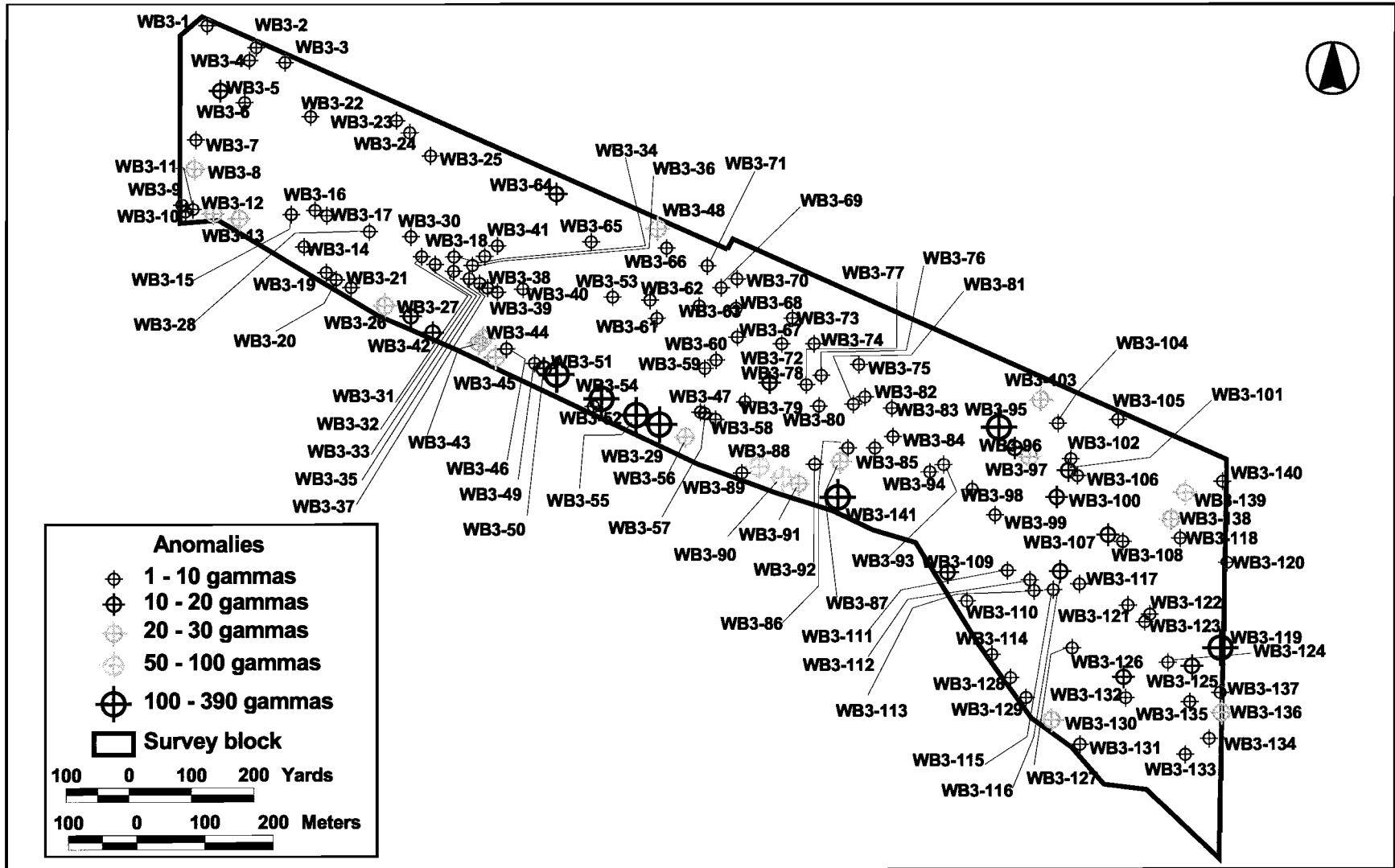


Figure 7.52: Whale Branch 3 survey block anomalies.

was two meters. The magnetics suggest the presence of several medium to large-sized, ferro-magnetic cultural objects as the cause of the anomaly.

WB3-51 was a 107 gamma multi-component anomaly that lasted for 22 seconds. The anomaly disturbed two lanes and a 3,000 square meter area. Water depth at the anomaly was two meters. The magnetics suggest the presence of several medium to large-sized, ferro-magnetic cultural objects as the cause of the anomaly.

WB3-54 was a 205.5 gamma multi-component anomaly that lasted for 23 seconds. The anomaly disturbed two lanes and a 3,200 square meter area. Water depth at the anomaly was two meters. The magnetics suggest the presence of several large, ferro-magnetic cultural objects as the cause of the anomaly.

WB3-55 was a 227.9 gamma multi-component anomaly that lasted for 19 seconds. The anomaly disturbed two lanes and a 2,240 square meter area. Water depth at the anomaly was two meters. The magnetics suggest the presence of several large, ferro-magnetic cultural objects as the cause of the anomaly.

WB3-95 was a 142.1 gamma multi-component anomaly that lasted for 26 seconds. The anomaly disturbed three lanes and a 2,300 square meter area. Water depth at the anomaly was 3.5 meters. The magnetics suggest the presence of several medium to large-sized, ferro-magnetic cultural objects as the cause of the anomaly.

WB3-119 was a 134.1 gamma multi-component anomaly that lasted for 26 seconds. The anomaly disturbed two lanes and a 2,000 square meter area. Water depth at the anomaly was 1.5 meters. The magnetics and depth suggest the presence of several medium to large-sized, ferro-magnetic cultural objects as the cause of the anomaly.

WB3-141 was a 383.8 gamma multi-component anomaly that lasted for 24 seconds. The anomaly disturbed two lanes and a 4,020 square meter area. Water depth at the anomaly was two meters. The magnetics suggest the presence of several large, ferro-magnetic cultural objects as the cause of the anomaly.

Whale Branch 4 Survey Block

On February 14 and 20, 2003, MRD surveyed a block measuring 2,320 meters in length and a maximum 507 meters in width. The block covered an area approximately 1,048,147 square meters (Figures 7.53 and 7.54). Water depths in the survey block ranged from one to six meters. Additionally, a single lane, 2,330 meters in length, followed the marsh contours from the Hwy 21 bridge to the beginning of the survey block to detect anomalies along the shoreline. One hundred and twenty one magnetic anomalies were detected in the survey block. Of these magnetic anomalies, 89 were under 10 gammas, predominately dipolar in nature, and suggestive of small, single-source, ferro-magnetic cultural materials (WB4-1-4, 9-13, 15-21, 23-36, 38-43, 45, 46, 49-55, 60, 61, 63, 65, 67-73, 75-83, 85-88, 90, 91, 94, 95, 98-100, 102-106, 108-111, 114-121). Anomalies 5-8, 14, 24, 56, 57, and 64 represent docks with or without boats

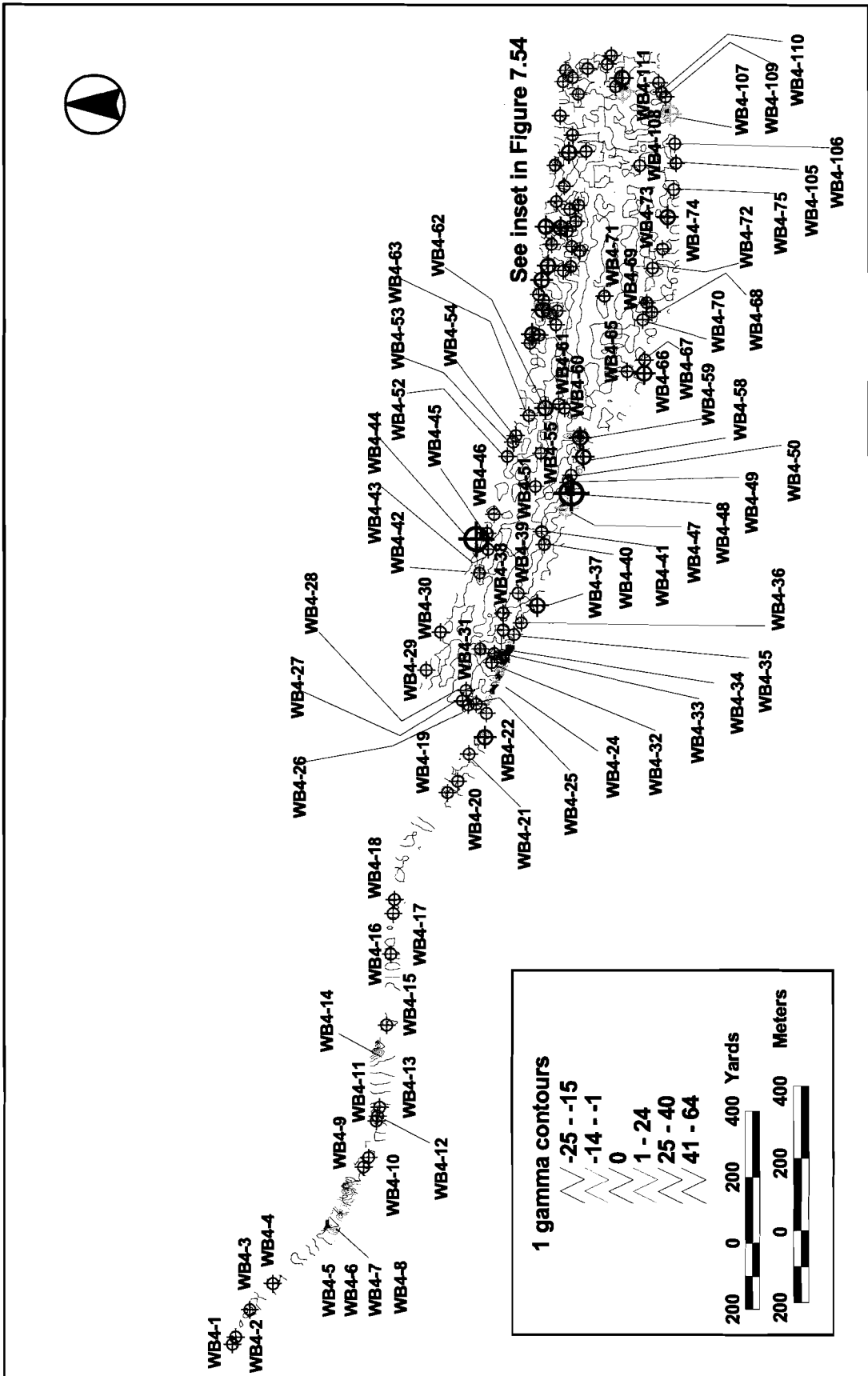


Figure 7.53: One gamma magnetic contours of Whale Branch 4 with identified anomalies.

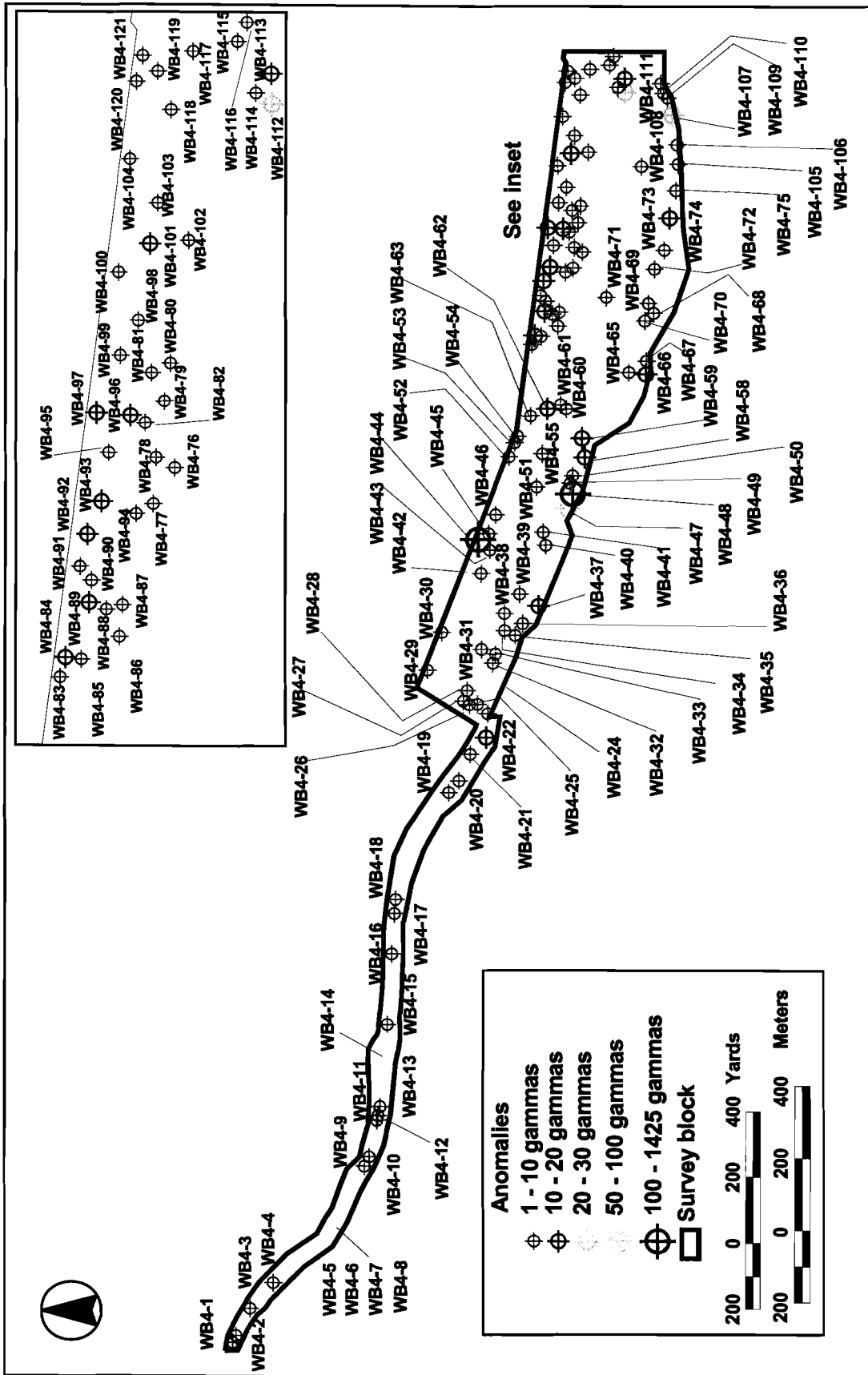


Figure 7.54: Whale Branch 4 survey block anomalies.

moored at them along the shoreline. The remaining anomalies ranged from 10 gammas to 1,421.7 gammas. Only those anomalies having the potential to represent a shipwreck consisting of steam machinery components are discussed below:

WB4-44 was a 1,421.7 gamma multi-component anomaly that lasted for 16 seconds. The anomaly disturbed two lanes over a 2,500 square meter area. Lack of water precluded additional lanes to the north to determine the actual size of the magnetic disturbance. Water depth at the anomaly was two meters. The magnetics suggest the presence of large, ferro-magnetic cultural objects as the cause of the anomaly. The anomaly is located adjacent to a small islet composed of some rock and oysters, and might also compose a portion of the land exposed at low tide.

WB4-48 was a 111.1 gamma multi-component anomaly that lasted for six seconds. The anomaly disturbed two lanes and a 1,380 square meter area. Water depth at the anomaly was two meters. The magnetics suggest the presence of several medium to large-sized, ferro-magnetic cultural objects as the cause of the anomaly.

Ground-truthing

WB4-44 was ground-truthed on September 26, 2003 and found to consist of a conglomeration of iron rods and crab traps. Several encrusted iron rods, around 2 centimeters (1 inch) in diameter, were found protruding approximately 60 centimeters (2 feet) from the bottom. Probing with a 1.2 meter (4 foot) hand-held probe revealed no underlying structure associated with the rods. The rods were lying south of a mud ridge, which was the small islet observed exposed during low tide. Lying to the north of the ridge were several unmarked crab traps. Pluff mud had built up on the north side of the ridge, while on the south side was a clay bottom smoothed by strong currents. Depth at high tide was approximately 4.5 meters (15 feet). Further investigation might be warranted for this site, but at this time it is thought to be composed of modern debris. Besides not finding any additional iron or wooden components at this site, the fact that the objects lie along the northern shoreline of Whale Branch River, or the Confederate side during the Civil War, suggests that this site is not related to the remains of the gunboat *George Washington*.

ACE Basin

The ACE Basin survey methods were similar to the Charleston Harbor survey operations in that the MRD was looking for specific known shipwrecks (Figure 7.55). The ACE Basin is comprised of the Ashepoo, Combahee, and Edisto Rivers and was the scene of several engagements between Union warships and Confederate land defenses. Two Union vessels, USS *Dai Ching*, a navy gunboat, and USS *Boston*, an army transport, were sunk during separate missions up the Combahee and Ashepoo Rivers. The MRD hoped to obtain a more precise position of the two wrecks, and to determine the archaeological integrity and environmental factors of each wreck. Fortunately, the general location of each shipwreck was known, but not yet referenced to DGPS. The

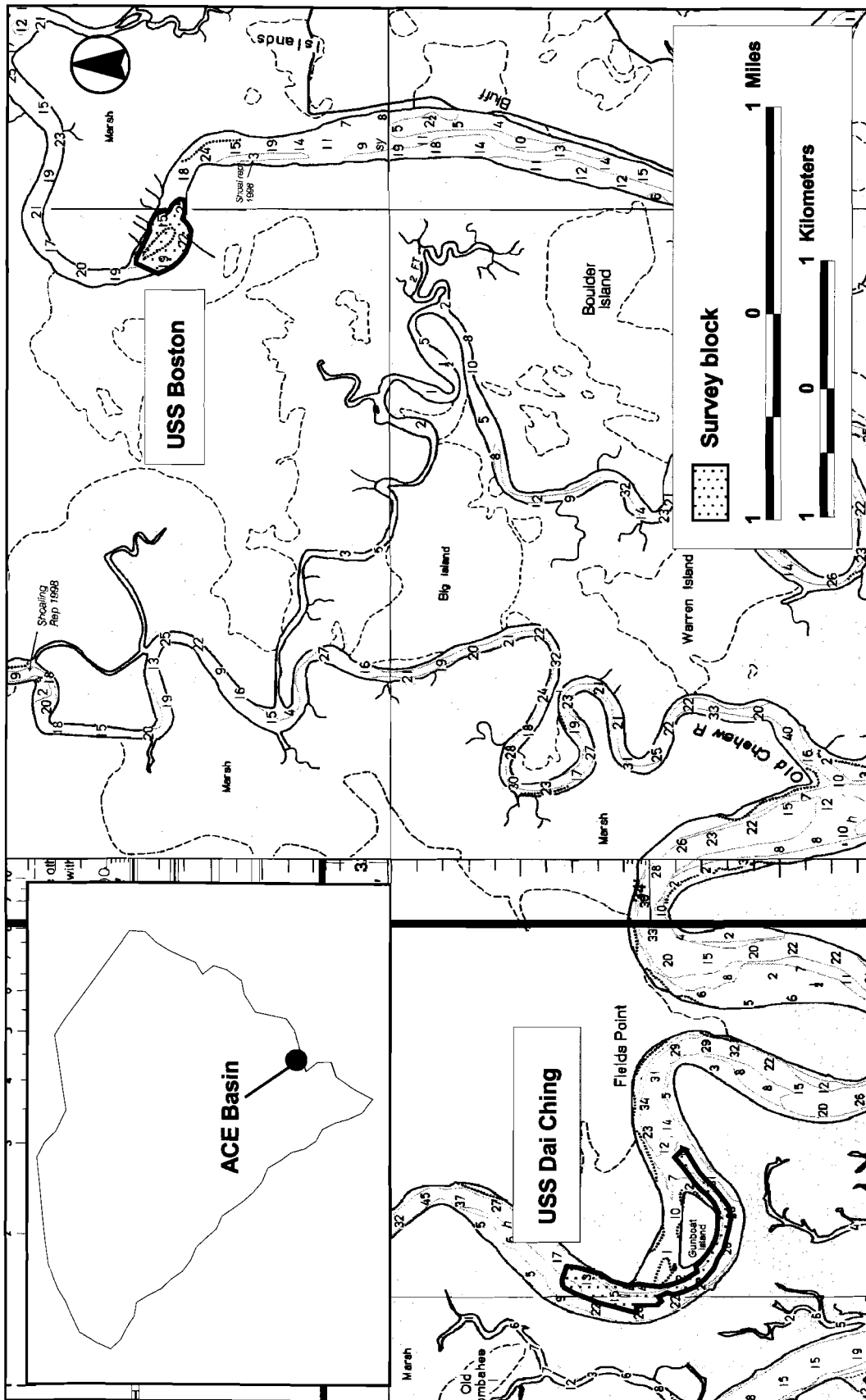


Figure 7.55: ACE Basin survey areas (NOAA charts 11517, scale 1:40000, 2001, and 11519, scale 1:40000, 1999).

MRD team surveyed both wrecks using the ADAP III remote sensing equipment. Both sites were relocated and positioned on modern charts.

The ACE Basin vicinity was the scene of numerous skirmishes between Federal and Confederate forces during the Civil War. Most the naval activities were combined operations with Army units in several unsuccessful attempts to break railroad lines and other objects of strategic importance. On 24-25 May 1864, the US Army and Navy combined their efforts to cut the Charleston and Savannah Railroad by burning the bridges over the South Edisto and Ashepoo rivers. The operation was deemed a failure by not reaching their objectives because of the loss of the US Army Steamer *Boston*. The operation began when the *Commodore McDonnough*, steamers *Chippewa*, *E.B. Hale* and *Vixen* were sent up the South Edisto River as a feint to the real mission up the Ashepoo River. The steamers *Boston* and *Edwin Lewis* with the US gunboat *Dai Ching*, were sent up the Ashepoo river on the night of the twenty-fourth to disembark the Ninth US Colored Troops under the command of Col. Thomas Bayley at Mosquito Creek. The plan was to flank the Confederates and attack the bridges. However, the federals had an unreliable pilot on board, who took the vessels six to eight miles past Mosquito Creek, even though they were hailed by a Confederate sentry asking, "what boat is that?" When Col. Bayley finally decided to turn back down river the *Boston* went aground and could not be pulled off. At sunrise a light battery of the Confederates opened fire, hitting the *Boston* repeatedly. The *Dai Ching* moved up to cover the evacuation of the *Boston*, which was then set afire burning to death 75 cavalry horses and eight team horses. The Union losses included 13 killed, wounded or captured. Col. Bayley was found innocent of all charges in the court-martial proceedings (ORN, ser. 1, vol. 35:7-9, 10-11, 400-401).

The *Dai Ching* was lost during an operation to assist an Army tactical maneuver. At the request of Gen. W.T. Sherman to Adm. Dahlgren, USS *Dai Ching* and the tug *Clover* were sent up the Combahee River to harass the right flank of the Confederates. The *Dai Ching* was ordered to reach Combahee Ferry. However, on the way up river they came upon a boat from the Confederate schooner, *Coquette*, which was lying two miles below the Confederate batteries at Tars Bluff. After taking the prize, *Dai Ching* proceeded upriver and, when a mile below the batteries, she came under fire. While trying to maneuver into a better firing position the pilot deserted his post and the *Dai Ching* went aground. The tug *Clover* came to take a line to tow her off, but when the line parted the tug abandoned the stricken vessel and moved down river. The tug did not respond to signals pleading for assistance, deserting the *Dai Ching* to her fate. After a seven-hour artillery duel, the *Dai Ching*, being heavily damaged and out of ammunition, was abandoned and set afire. The crew took to the marsh, and after hours of inaction, Acting Ensign Leach of the *Clover* was finally coerced into returning to pick up the survivors. In this action nine men were wounded, five were captured and Acting Ensign Leach was court-martialed (ORN, ser.1, vol. 16:190-194).

USS *Dai Ching* (38CN240)

During February 10 and 11, 2003, the Maritime Research Division conducted remote sensing operations in the Combahee River near Gunboat Island, to locate the

remains of the Union gunboat, USS *Dai Ching* (Figure 7.56). State site file information, recorded in 1975, placed a wreck, thought to be *Dai Ching*, at the center of the river, near the upstream end of the island, and assigned a Beaufort County site number to the site (38BU123). During the 2003 survey, MRD staff located the wreck approximately 250 meters upstream of the position recorded in 1975, which clearly placed it against the riverbank on the Colleton County side of the river. As a result of this survey, the site thought to be USS *Dai Ching* was assigned a new state site number, 38CN240.

The Division surveyed three survey blocks covering a distance from some 400 meters downstream of Gunboat Island to a point approximately one kilometer upstream of the island, a distance of a little over two kilometers. The first survey block consisted of seven lanes running the full length of the survey area. Towards the upstream extent of this block onboard instrumentation recorded a number of large magnetic anomalies, suggesting the presence of the wreck site. A second block, 605 meters long and seven lanes wide, overlapped and laterally extended the upstream portion of the first block. This block ran approximately parallel to the shore. However, due to the lack of river depth near the shore and the presence of a sand bar extending out from the point, the survey boat could not venture too close to the marsh or point. Consequently, while identifying numerous small magnetic hits along the shoreline, this block failed to encompass the wreck site itself, catching only the extreme northwest corner of the site.

A third block was run on a North/South axis off the point and cutting across the second block. This block was 450 meters long and 13 lanes wide and included one non-aligned lane that hugged the shoreline in approximately 0.6 meters of water. This lane picked up the numerous small anomalies along the shoreline, while the block encompassed the wreck site and identified its location directly off Gunboat Point, a marshy point approximately 400 meters upstream of the upstream end of Gunboat Island.

On the following day, the opposite side of the river was surveyed from a point approximately 500 meters upstream of the site to just downstream of Gunboat Island, revealing no magnetic or acoustic targets.

Magnetometer

Figure 7.57 depicts the magnetics of the site using a 10-gamma contour. While numerous magnetic anomalies of small to modest size occur along the shallower portions of the survey tract from approximately 250 meters upstream to 75 meters downstream of the wreck site, the largest and most intense anomalies occur in a 5,195-square-meter area. These anomalies cover an area approximately 90 meters long by 50 meters wide, suggesting a N-S orientation for the wreckage. The site is composed of a number of monopolar and dipolar magnetic anomalies indicating a multi-component site. The majority of those anomalies have gamma readings in the 100 to 600 gamma range, with a maximum reading of 2,566.4 gammas on an anomaly located towards the northern extent of the site and 1,101.6 gammas on an anomaly to the south. The maximum duration along the N-S axis is 50 seconds representing a distance of approximately 86 meters, or a little over one and one half the vessel's length of 170 feet (51.8 meters).

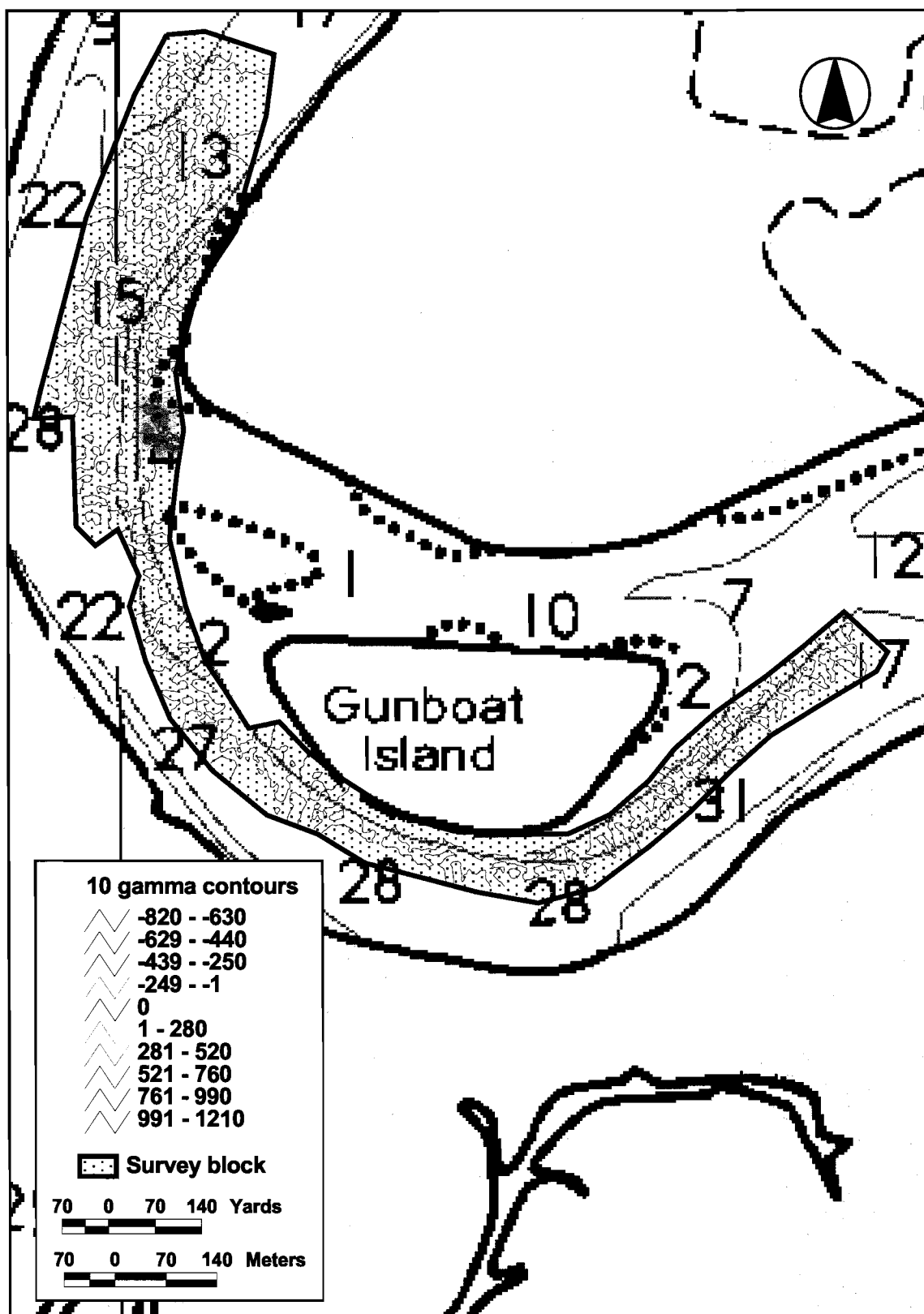


Figure 7.56: USS Dai Ching survey block with 10 gamma gradient magnetic contours (NOAA chart 11519, scale 1:40000, 1999).

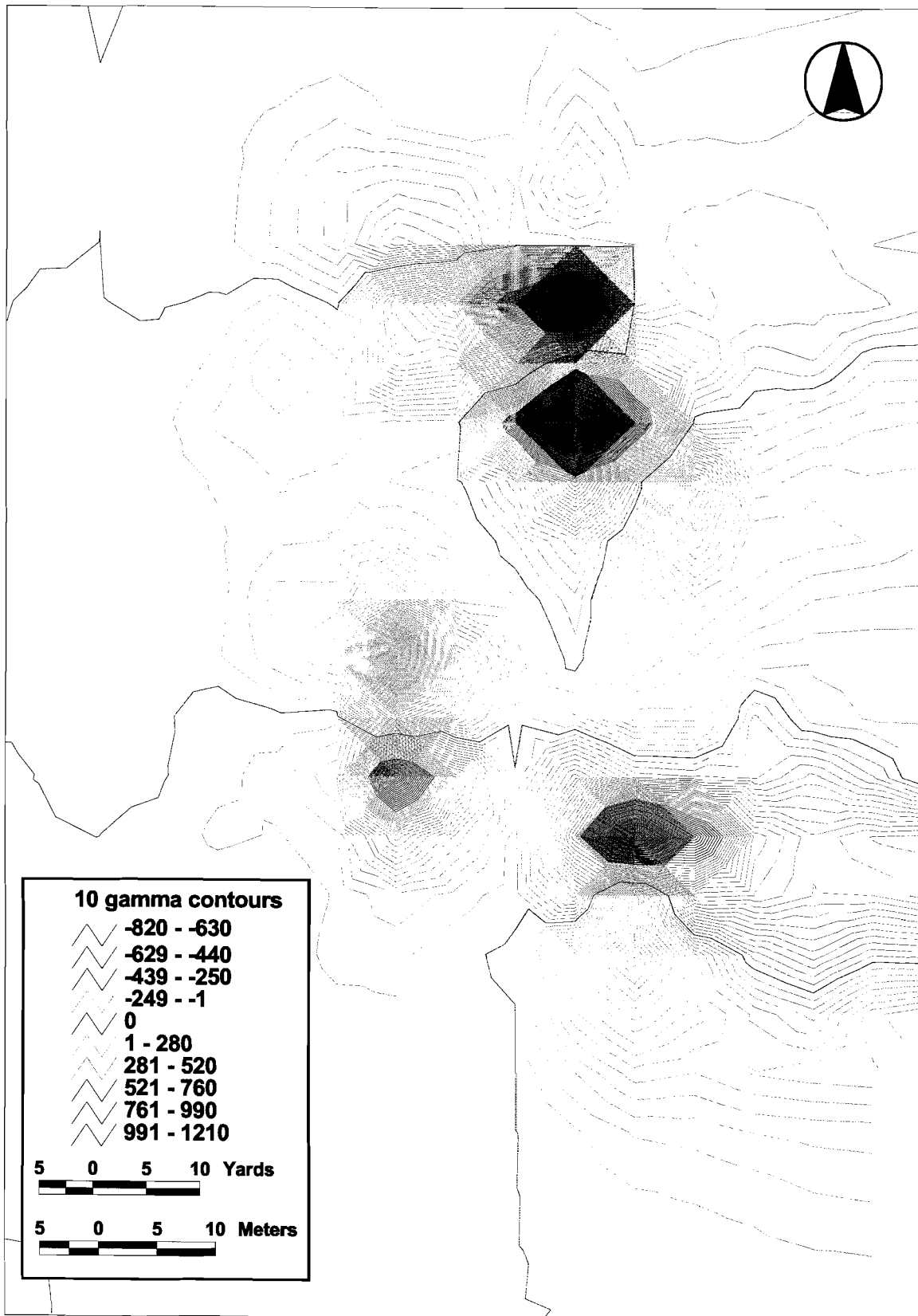


Figure 7.57: USS Dai Ching 10 gamma gradient magnetic contours.

Side Scan Sonar

A side-scan sonar survey, run in conjunction with the magnetic survey, revealed no culturally identifiable targets protruding from the river bottom.

Probing

On 18 and 19 February, 2003, the Division returned to the site with a water probe to test the site. Division staff placed buoys at points of greatest deflection of the largest upstream and downstream magnetics, a distance of approximately 40 meters (Figure 7.58). Working from an 18-foot Jon Boat, a total of 14 probes were conducted between the buoys. Probing indicated that much wood remained buried from two to two and one half meters below the river bottom along with large masses of oyster shell. Additionally, near the upstream buoys, staff encountered a large flat metal object buried approximately two and one half meters below the sand. While time limitations did not afford us the opportunity to delineate the physical extent of the wreckage, the results of probing activity confirmed a prodigious presence of wood, probably decking, along with a large metal object at the same relative level. Most importantly, the survey and probing provided a new and correct location for the site (in a different county) and confirmed that the wreck is protected by at least two meters of sand, essentially protecting the site from natural and all but the most persistent looters.

Discussion

The magnetometer survey suggests the hull of the wreck lies along a N-S orientation in 0.6 to 1.5 meters of water. While the larger magnetic anomalies confirm this orientation, several outlying magnetic features upstream and downstream of the site suggest that the site is partially scattered, likely due to contemporary shelling of the stricken vessel and the ensuing fire as well as environmental factors. A contemporary report of the loss of *Dai Ching*, by Lieutenant Commander Chaplin relates that, after grounding “while turning a very sharp bend,” Confederate shells hit the vessel more than 30 times before the order was given to fire the vessel. Once aflame, the main and mizzenmasts were seen toppling over the side. This suggests that pieces of the vessel were likely blown or fell overboard during the attack. Furthermore, within weeks of the event, Confederate salvage teams evidently conducted some salvage of the vessel and contents. In 1866, a private firm working under contract to the United States government proposed salvaging the vessel. However, nothing is known about the outcome of that contract.

From these events it appears likely that at least some of the remaining structure and/or contents of *Dai Ching* were salvaged and/or dispersed in the vicinity of the hull. The account of the grounding suggests that the vessel grounded on the opposite side of the river from the site of the magnetic anomalies (“headed downstream”...“while turning a very sharp bend”...ran “into the bank on our starboard bow”). This being the case, when the remaining hull, made buoyant by the loss of weight caused by the fire, made its way to the opposite bank, it would likely have left a debris field. The distance between

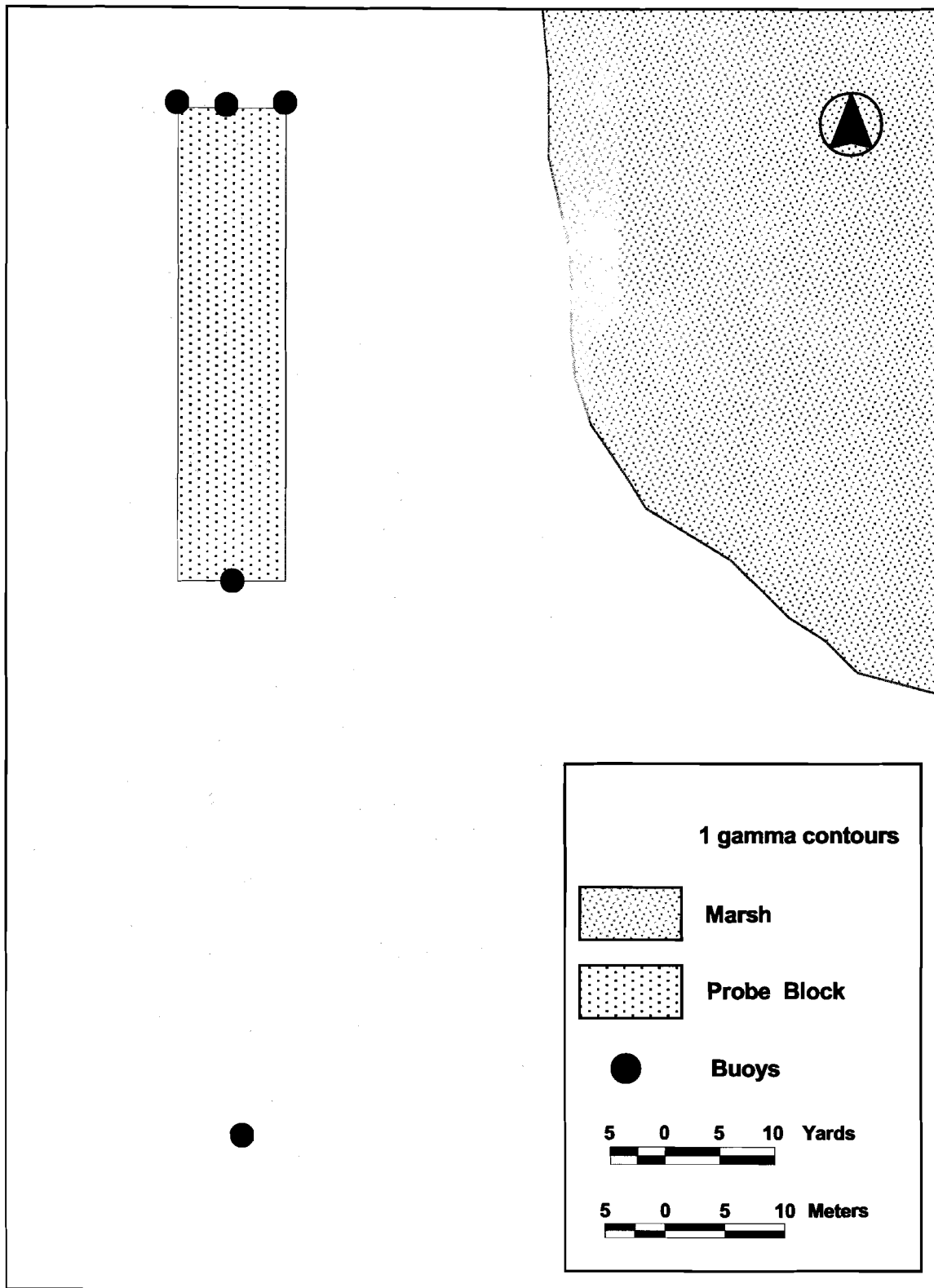


Figure 7.58: Area probed at the Dai Ching site (38CN240).

the points of steepest gradient of the most upstream and downstream magnetic anomalies approximates the as-built length of the vessel. However, the numerous outlying anomalies directly associated with the site and the numerous smaller anomalies scattered along the shallows upstream of the site suggest such a debris field.

USS *Boston* (38CN57)

Work on USS *Boston* was conducted on 12 February, 2003. Problems re-locating the remains of USS *Boston* had little to do with any erroneous recorded position of the site, but rather, with the depth of water over the site. USS *Boston* lies with its bow embedded in the downstream end of a sand bar, located in a bend at the center of the Ashepoo River. At low tide the bar is dry, while at high tide only a few feet of water covers the sand. During low water, the Division conducted a survey of the vicinity of the site with the idea of picking up any scattered remains from the site magnetically or acoustically. This survey identified numerous small magnetic anomalies, mostly on the edges of the sand bar. On the rising tide, we completed the lanes that ran over the bar, producing both the magnetic signature of the site and clear sonar images of the wreck. Survey lanes were then run at 90 degrees to the initial survey lanes, as well as several non-aligned passes over the wreck to capture sonar images from a variety of angles (Figure 7.59).

Magnetometer

The magnetometer survey yielded eight large, concentrated magnetic anomalies oriented NNW-SSE in two parallel rows. The overall dimensions of the block of anomalies is approximately 60 meters (NNW-SSE) by 42 meters (NNE-SSW), covering an area of approximately 2,400 square meters.

Figure 7.60 depicts the magnetics of the site using a 10-gamma contour. Using the 10-gamma contour, the concentrated grouping of magnetic anomalies occurs in a 2,400-square-meter area. However, the area of magnetic disturbance doubles when viewed using a 1-gamma contour. The two rows of anomalies line up along a line of approximately 325 degrees, suggesting a NNW-SSE orientation for the wreckage. The site is composed of a number dipolar and multi-component magnetic anomalies. The majority of those anomalies have gamma readings in the 30 to 80-gamma range, with a maximum reading of 268 gammas on the southeast most anomaly. The maximum duration along the NW-SE axis is 34 seconds, representing a distance of approximately 59.84 meters (196.28 ft), or a little less than six meters (19 ft) short of the vessel's as-built 215-foot length. The maximum duration across the site on a NE-SW axis is 24 seconds, representing approximately 42.24 meters (138.55 feet), substantially more than the anticipated beam of the steamer.

Numerous smaller magnetic anomalies, in the seven to 15 gamma range, occur along the channel formed by the river on the west side of the sand bar, along with a 43.7 gamma anomaly and 52 gamma anomaly, both located west of the site, at a distance of

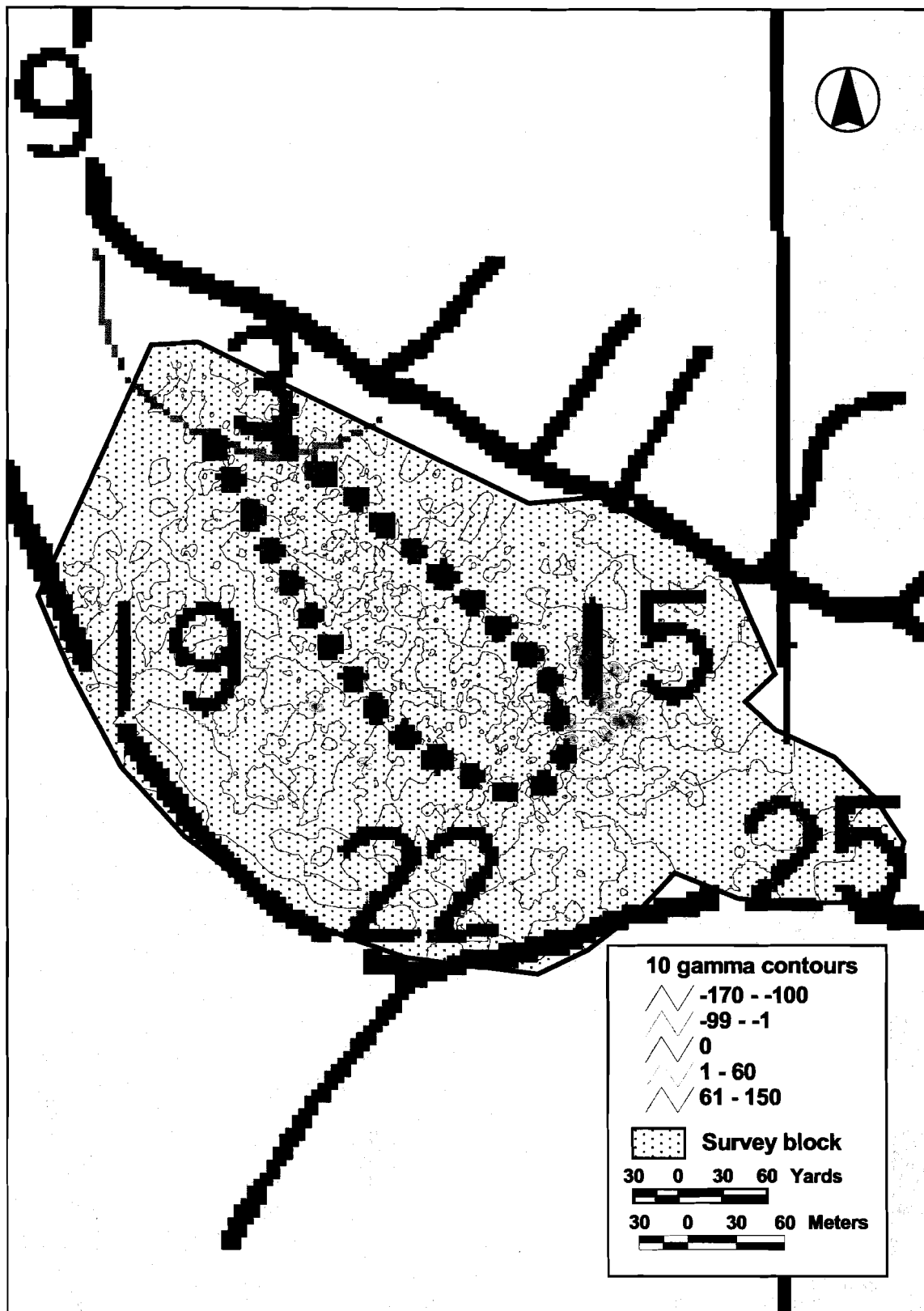


Figure 7.59: USS Boston survey block with 10 gamma gradient magnetic contours (NOAA chart 11517, scale 1:40000, 2001).

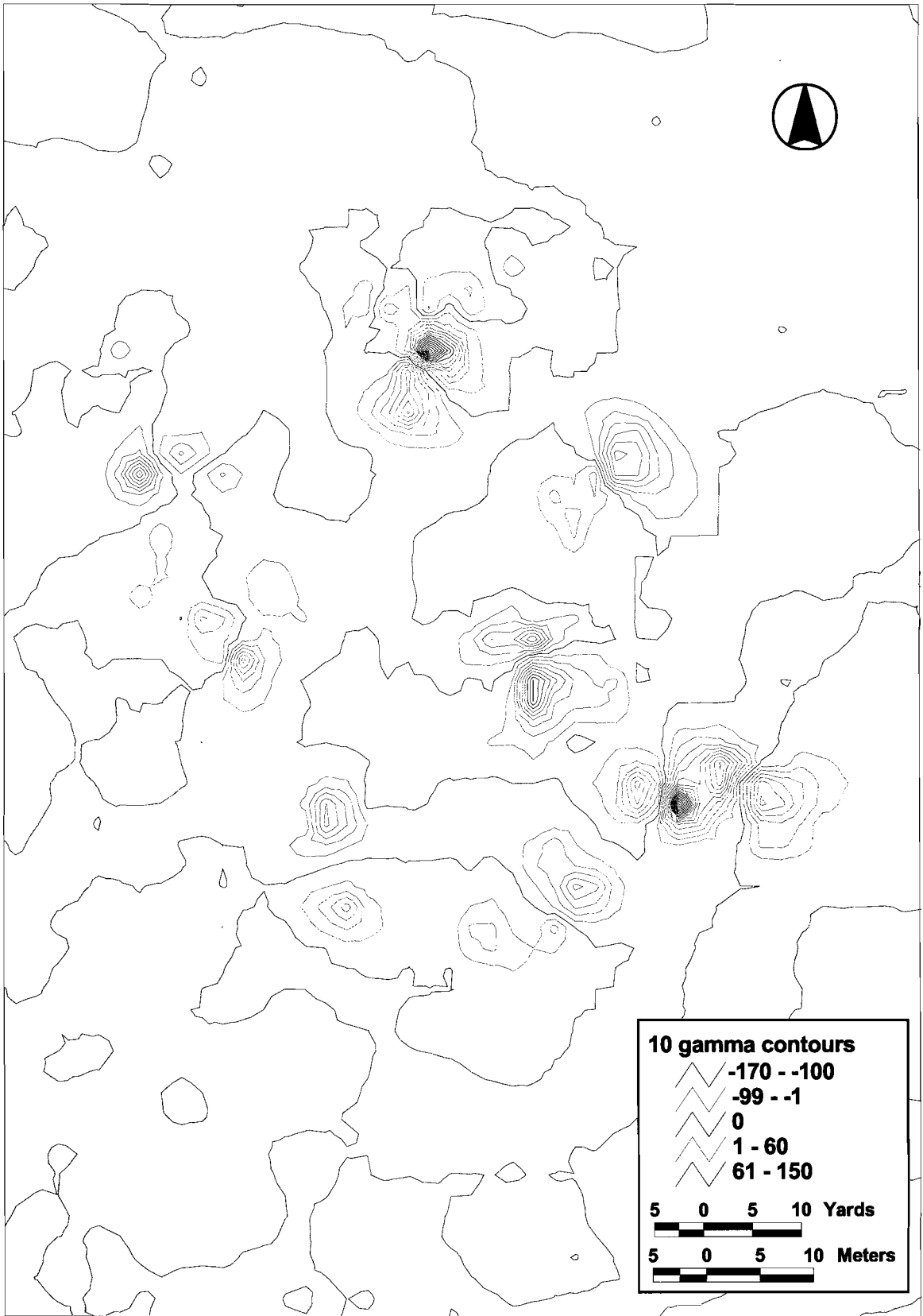


Figure 7.60: USS Boston 10 gamma gradient magnetic contours.

144 and 163 meters respectively. Additionally, there is a 37.7 gamma anomaly located beneath the sand bar approximately 173 meters NW of the site.

Side Scan Sonar

The acoustic record indicates that a significant amount of ship's structure remains above the river bottom, with some structural pieces extending approximately 1 meter above the river floor. The upstream end of the vessel, probably the bow, remains buried beneath the sand bar. Visible structures include sections of keelson and possibly bilge keelsons, engine bedding timbers, frames, and a number of beams and bulkhead timbers. The extent of the visible remains covers an area approximately 480 square meters.

Visible signs of the remains of the hull of *USS Boston* appear in 36 acoustic records from the survey. The images confirm that the hull lies along a bearing of approximately 342 degrees, or a little north of NNW. Figures 7.61 and 7.62 depict various aspects of the wreck site. Figure 7.61 is the only image that shows both ends of the wreck. Due to the shallow depth of water over the site, less than two meters at best, it was difficult to get the entire wreck onto one record. The sonogram suggested that the length of the exposed portion of the hull is approximately 48 meters (157 ft) and that the NNW end of the wreck terminates beneath the sand bar. The opposite end is indistinct. However, the presence of several sand ridges sweeping from the structure suggests the dynamic nature of the river at that point.

From all the sonar images, it is clear that much of the lower hull structure is present, while a substantial amount of the upper hull components have disappeared. Several large timbers run longitudinally throughout much of the hull, as well as a number of structures oriented athwartships. Numerous frames are present throughout the length of the wreck. Height calculations indicate that many of the frames extend up to 0.8 meter (2.6 ft) above the river bottom, while portions of the hull extend as high as 1 meter (3.28 ft) above the sand.

On both images, the longitudinal timbers are clearly visible, spaced approximately 1.5 to 2.0 meters (4.9 to 6.6 ft) apart. Also visible are the frames, approximately 0.5-meter (1.6 ft) apart and possible bulkheads. An extant beam of approximately 10 meters is suggested. The entire structure covers an area of approximately 480 square meters (approximately 48 meters by 10 meters) with an unknown amount of hull lying beneath the sand bar.

Discussion

Both the magnetometer survey and acoustic imaging demonstrate that the hull of the wreck lies along a NNW-SSE orientation in one to two meters of water. While the larger magnetic anomalies confirm this orientation, several outlying magnetic features in the sand bar and the river channel suggest that the site is partially scattered, likely due to contemporary shelling of the stricken vessel and the ensuing fire, as well as environmental factors and some modern salvage activities. A contemporary report of the

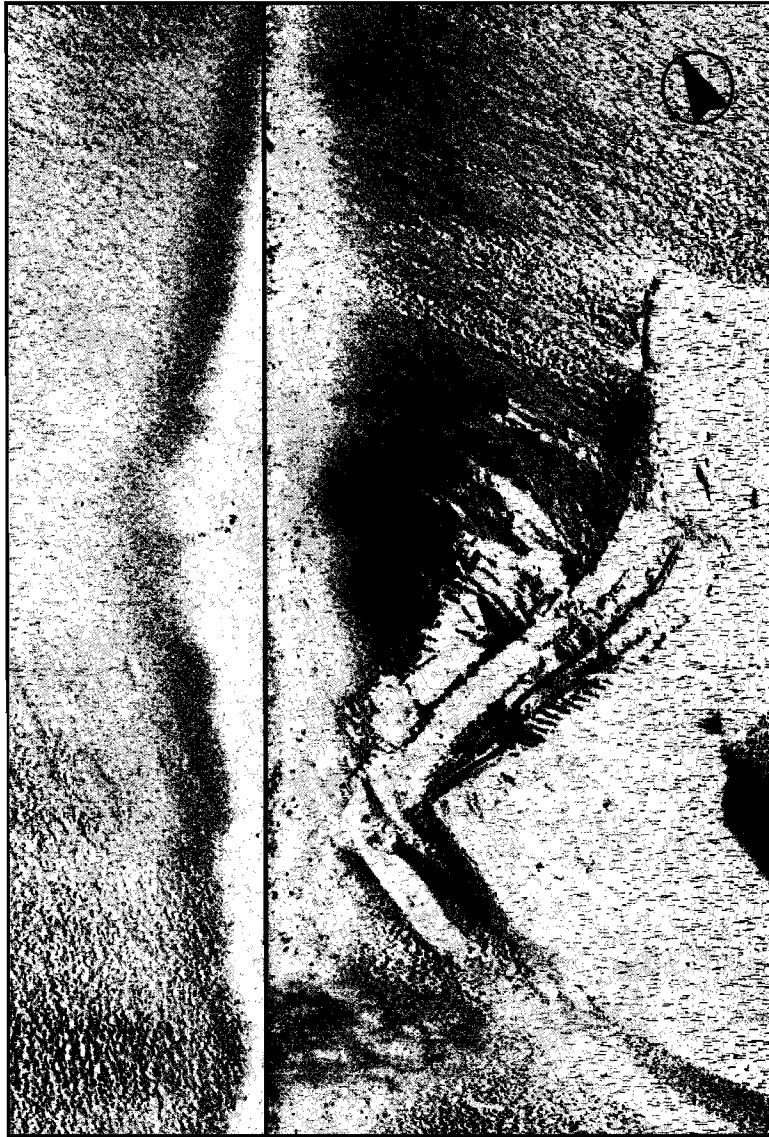


Figure 7.61: Sonogram of USS Boston. Scale is approximately 1.5 cm=5.0 m.

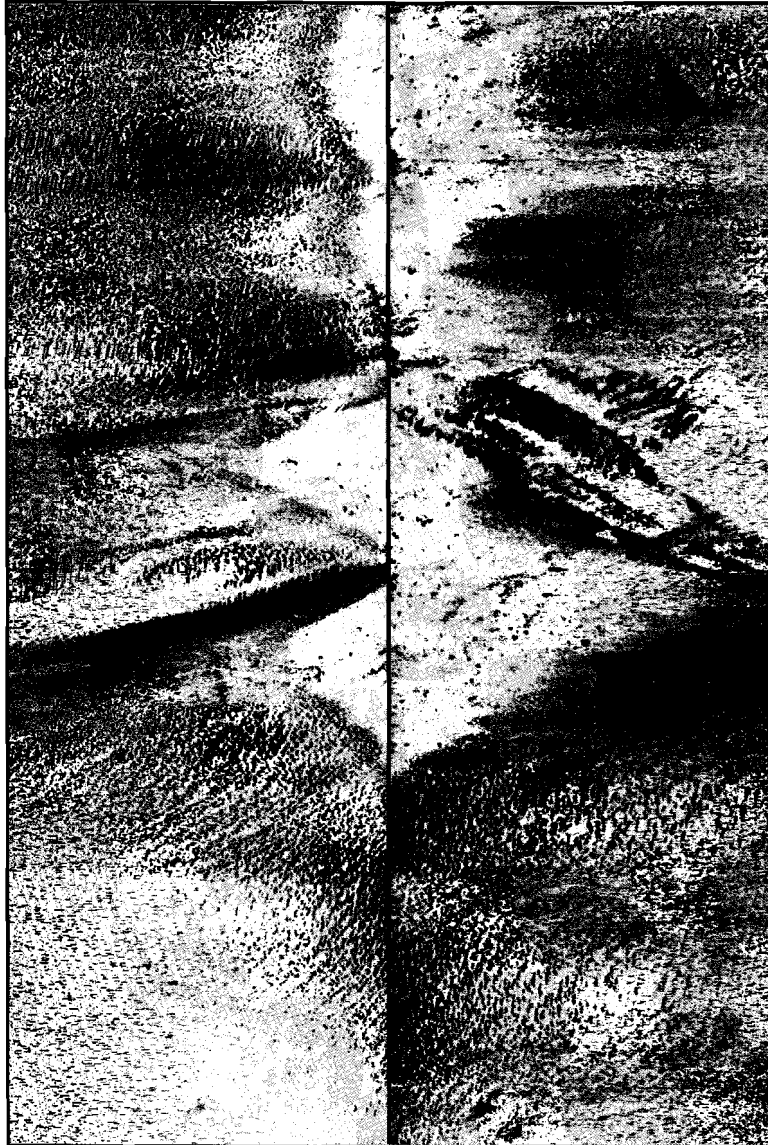


Figure 7.62: Sonogram of USS Boston. Scale is approximately 1.0 cm= 5.0 m.

loss of *Boston*, by Lieutenant Commander J.C. Chapman, relates that after grounding the vessel was likely struck by as many as 70 to 80 Confederate shells, with “one or two shots going through her boilers,” before the stricken vessel burned to the waterline, taking with it some 60 horses.

Contemporary salvage of the wreck was undertaken in 1866, when the engine and other items were removed by a group of private individuals under contract with the US Army. During the early 1980s, a Jacksonville, Florida, resident conducted some “light salvage” (i.e. no explosives were used). The salvage team recorded some hull measurements and recovered a large quantity of military artifacts, including hardtack biscuits, brass uniform buttons, sword fragments, knapsacks, uniforms, and a prodigious array of horse tack and accoutrements. Personal effects recovered included pocketknives, shoe fragments, clay pipes, and coins. The outlying magnetic anomalies may represent objects associated with the actual loss of the vessel, or may be related to either of these subsequent salvage activities.

Winyah Bay

USS Harvest Moon (38GE440)

By February 24, 1865, in the wake of the Union army’s incursions through South Carolina, Confederate forces had withdrawn from the Georgetown area, abandoning Battery White and other fortifications (ORN, ser.1, vol. 16: 370). Two days later, aboard his flagship, *USS Harvest Moon*, Rear-Admiral J. A. Dahlgren arrived in Georgetown. He reported that the town was occupied by six companies of marines, and Battery White by one company (ORN, ser. 1, vol. 16:272). On February 28, Dahlgren moved the *Harvest Moon* to a position off Battery White, some two miles below Georgetown, with the intent of inspecting the fortification. On the morning of March 1, 1865, the *Harvest Moon* weighed anchor and proceeded downstream for Charleston. Shortly before eight o’clock, the 193-foot-long steamboat struck a torpedo near Frazier’s Point. The blast tore a large hole in the starboard quarter and obliterated a section of the main deck, sending the stricken vessel to the bottom in less than five minutes (ORN, ser. 1, vol. 16:282).

Staff from the Maritime Research Division conducted work on the *Harvest Moon* site during the weeks of March 17 and April 1, 2003. The first week was spent conducting remote sensing and performing water probing. The bulk of the second week was reserved for the probing operation. Identification of the site was fairly straightforward. Not only was the location of the wreck marked on the nautical charts (Figure 7.63) and in the State Site Files, but also the smokestack protruded above the water at all but the highest tides.

The primary concern about conducting work at the site was the depth of water. The *Harvest Moon* lies deeply buried beneath the sediments of a wide, flat area some 500 meters from the navigation channel through Winyah Bay. At the highest tides, the bottom lies only five feet below the water’s surface, while, at low water, there is often

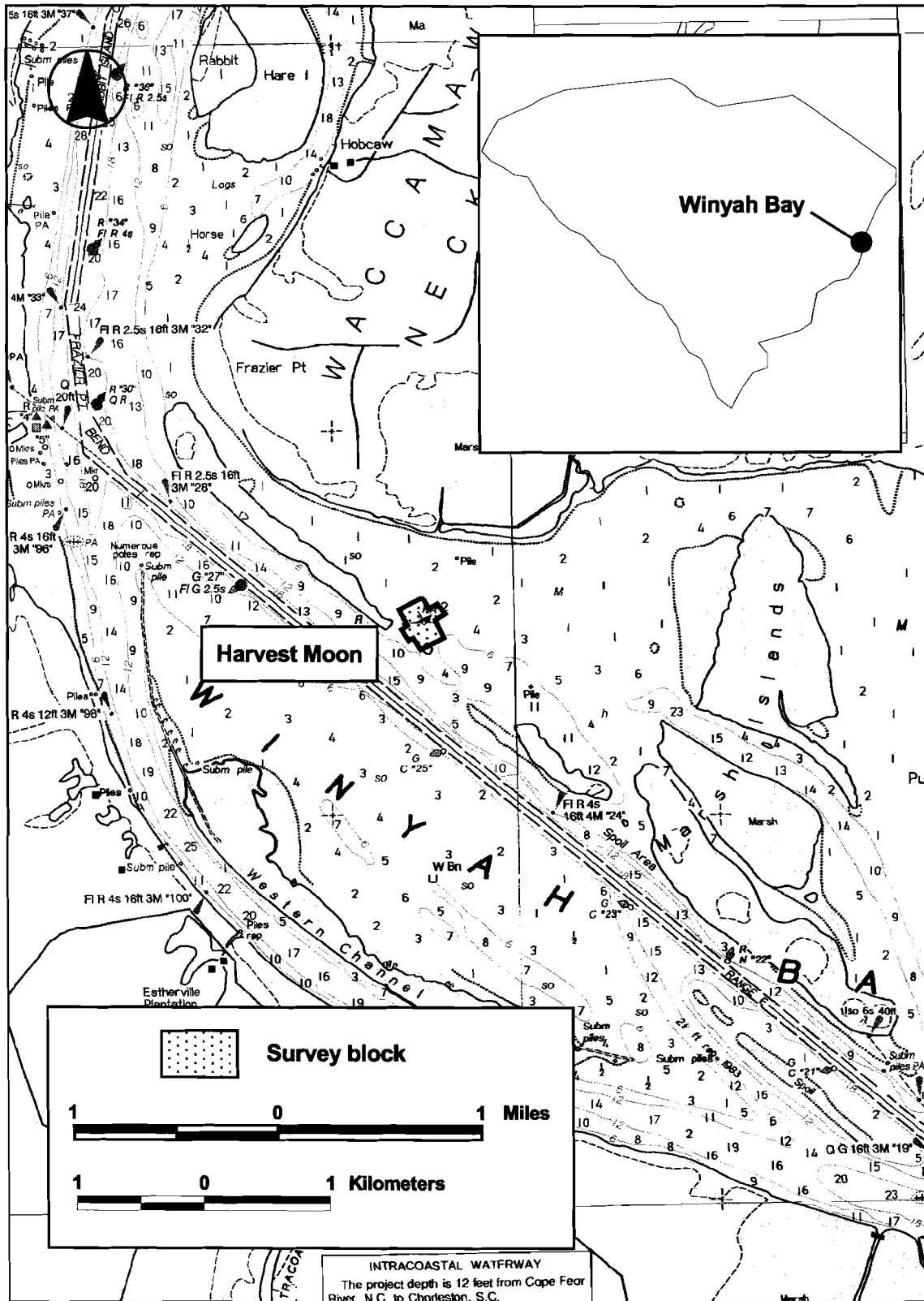


Figure 7.63: USS Harvest Moon survey area (NOAA chart 11532, scale 1:40000, 2002).

less than six inches of water over the site. Because the Division's survey and work boat draws a little over two feet of water at the motors, effective work time each day was restricted to approximately six-hour windows of opportunity in calm conditions. If a SE wind got up, waves began building along the three-kilometer reach of the bay, effectively diminishing the work time available to us. This was also the part of the 2003 field season when technical problems plagued the work, from computer freezes, loss of DGPS and depth data to temperamental pumps and burst hoses. Probably the most devastating calamity to strike the project was the collapse of one of the Division's boat trailers after a blocked drain hole caused the boat on it to fill with water during an overnight monsoon-style rainstorm.

The magnetometer and side-scan sonar survey was completed concurrently on March 17 and 18. During those days, a total of 57 lanes were run, covering an area of 58,820 square meters, centered on the smokestack (Figure 7.64). The Division ran 37 lanes in a NNW-SSE direction, estimating this to be the orientation of the long axis of the ship. Nineteen cross lanes were then run in a NE-SW orientation, as well as several non-aligned passes to further delineate magnetic anomalies and to produce clearer sonar images. Boat speed was kept to four knots as the magnetometer and side-scan sonar were being used concurrently. Each lane was constrained by dangers at its termini, by a shoaling bottom to the north and east, and by an island near the south ends of the NNE-SSE lanes.

Magnetometer

Figure 7.65 depicts the magnetics of the site using a 10-gamma contour. The field of the irregularly shaped concentration of anomalies is approximately 81 meters NNW-SSE and 67 meters NE-SW, encompassing an area roughly 5,427 square meters, centered on the smokestack. Viewing the site using a one-gamma contour doubles the area of magnetic influence but is less useful for interpretation. Additionally, there are numerous outlying anomalies scattered around, but close to, the main concentration, as well as several anomalies located 100 to 160 meters to the NW and N of the smokestack. The site is composed of a series of dipolar and multi-component magnetic anomalies. The majority of centralized anomalies have gamma readings in the 500–1600 range. However, readings of a far greater magnitude are found between 18-26 meters SW of the smokestack, where the contours reach 6,688.80 gammas, and 18 meters NNE of the stack, where an 11,063.8 gamma reading is found. Ironically, the magnetic readings nearest to the smokestack are relatively low, reaching only 284.30 gammas approximately three meters from the vertical iron tube. This may be due to the vertical orientation of the tube, which would show lower magnetic readings than if the smokestack were lying in a horizontal orientation. The smaller anomalies, located 50-160 meters from the main group are in the range of 10-43 gammas, and tend to be located NNE, NW and S of the smokestack.

With the sensor moving at four knots, and using the 10-gamma contour, the maximum duration along the NNW-SSE axis is 29 seconds, representing a distance of approximately 59 meters (195 ft), or 2 feet longer than the as-built length of the vessel.

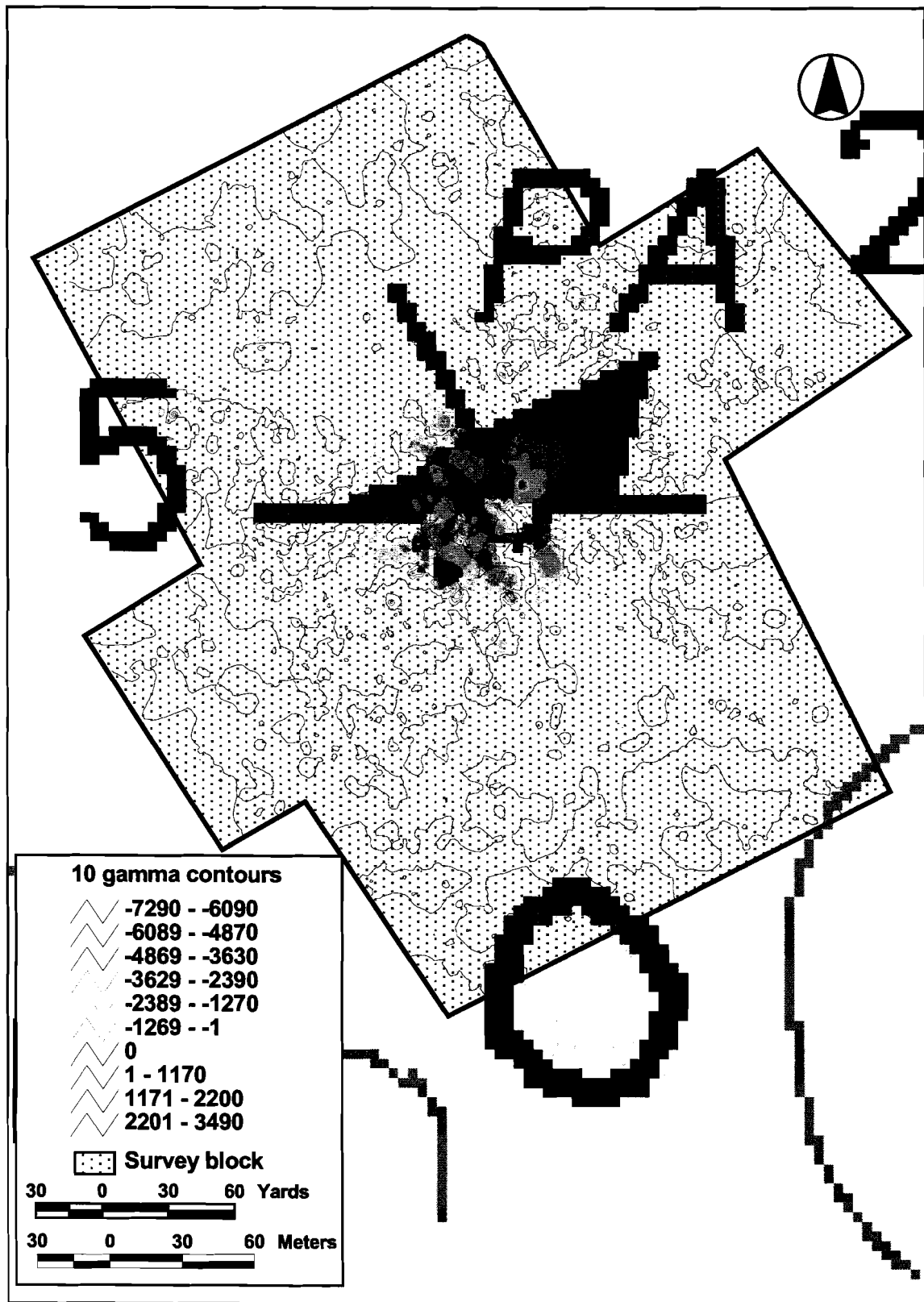


Figure 7.64: USS Harvest Moon survey block with 10 gamma gradient magnetic contours (NOAA chart 11532, scale 1:40000, 2002).

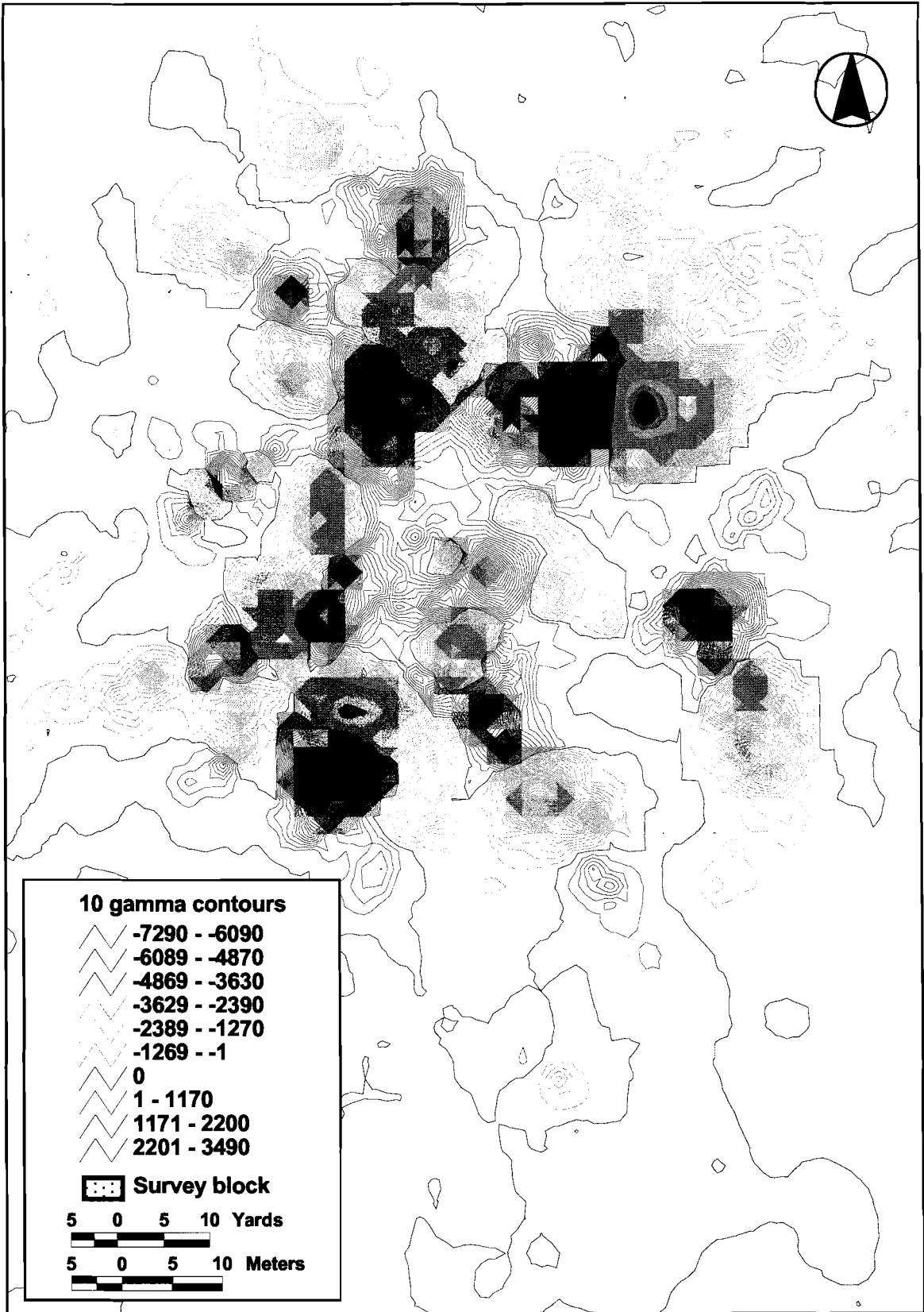


Figure 7.65: USS Harvest Moon 10 gamma gradient magnetic contours.

Along the NE-SW axis, the duration is approximately 22 seconds, representing approximately 45 meters (150 ft), significantly greater than the 29-foot-beam (8.8 meters) of the vessel.

Side Scan Sonar

Little physical evidence of the remains of the *Harvest Moon* appears on the 270 sonar records that cover the entire survey area. The majority of the sonar records depict a uniformly flat mud bottom, devoid of relief. In places, the surface of the mud is scarred by trails cut into its otherwise featureless surface by the skegs of motorboats. The most prominent feature is, of course, the smokestack, which protrudes above the surface of the water. Figure 7.66 clearly shows the curvature of the vertical iron tube, with an approximate diameter of 1.5 meters (4.9 ft). A horizontally oriented cylindrical object, apparently attached to the smokestack, protrudes to the SSE. This object, which protrudes slightly above the mud, appears to be approximately 3.5 meters long and from 0.6 to 0.8 meters in diameter.

Smokestack Recording

The smokestack is the only visible sign of the presence of wreck (Figure 7.67). The eroded top of the stack is visible at all but the highest tides, while a low water it protrudes more than a meter above the water of the bay. The double iron tube leans toward the SE at an angle of approximately 10 degrees from vertical. A layer of oysters covers the interior and exterior surfaces of the lower half of both tubes, with numerous loose oyster shells littering the bottom within the stack.

The 146-cm (57-3/4-in)-diameter smokestack is made up of two iron tubes of different diameters, one placed within the other. The inner tube is 111.76 cm (44 in) in diameter and is made up of several tube sections riveted atop one another. Each section is composed of two curved 1.27-cm (1/2 in)-thick wrought iron plates riveted together to form the tube section. The vertical seams of each section are placed at 90 degree to the one below it. The inner tube is centered within the outer tube and held in place by courses of iron bolts spaced 38.1 cm (15 in) apart. Each course contains 16, 41.5-cm (16-1/4-in)-long bolts, which are fastened through both tubes with 3.8-cm (1-1/2-in) square nuts. At low water, two courses of these bolts are visible. However, above these courses there is evidence for two additional courses, although the bolts that were once present have long since succumbed to the deleterious effects of the salt-water environment.

The outer tube appears to have been constructed in the same manner as the inner tube, with the vertical seams placed opposite those of the inner tube. One hundred and seventy centimeters below the top of the smokestack, there is an iron cylinder, lying in a horizontal orientation, protruding to the SSE. The cylinder appears to be attached to the smokestack at its NNW end. This is the same object shown in the sonar records (See Figure 7.66). Probing the curved iron suggests dimensions approximating those indicated in the sonar records. Above the cylinder, a collar-like cowling angles up to meet the smokestack.

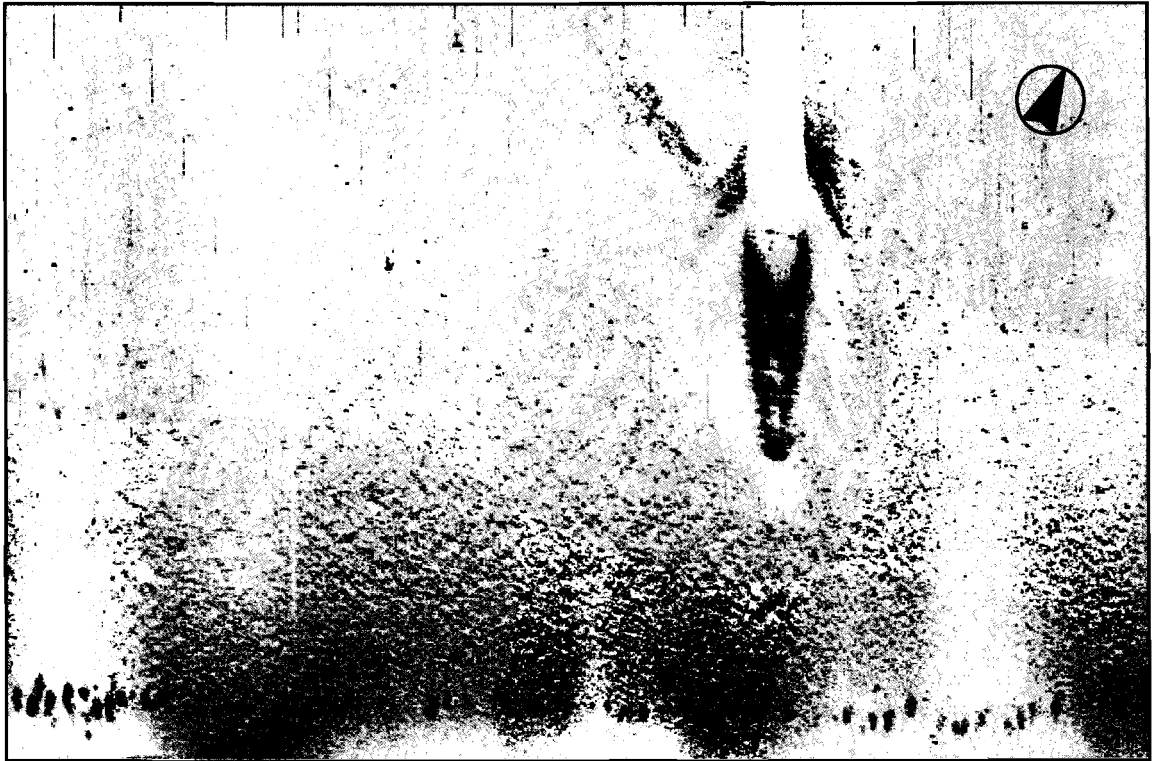


Figure 7.66: Sonogram of the smokestack and horizontal cylindrical object attached to it. Scale is approximately 5.0 cm=6.0 m.



Figure 7.67: Smokestack with inner and outer tubes. Outer diameter=146 centimeters.

Probing

After recording the smokestack, the crew proceeded to probe locations in the vicinity of the smokestack for evidence of ships' structure. However, due to high winds and building seas, this operation was terminated on March 19 after successfully probing 11 locations. A return to the site in April provided three and one half days of good conditions, during which time Division staff probed an additional 101 locations (Figure 7.68). To effectively use the six-meter-long water probe in the shallow water over the site it was necessary to work from both the 18-foot Jon boat and the 25-foot C-Hawk. The Jon boat provided a platform for the pumps, hoses, and accoutrements, while the C-Hawk's higher freeboard and cabin roof provided the probe operator a platform high enough to maneuver the unwieldy probe (Figure 7.69).

Of the 112 locations probed in March and April, 24 produced wood contacts, 24 indicated the presence of iron, and seven produced hard contacts that could have been either wood or iron. The remaining 56 locations produced either negative contacts (51), or the probe encountered hard-packed sand (5). All wood and iron contacts were made between 0.3 m (1 ft) and 3.77 m (12.4 ft) below the flat muddy bottom. However, the majority of the encounters occurred between 1.6m (5.2 ft) and 2.6 m (8.5 ft) below the sediment. The probe encountered three wood contacts at greater depth between three to nine m NW, and 25 m S of the smokestack.

Initial probe results suggested that the vessel lay in an orientation approximating NNW-SSE, an alignment that was later indicated when the balance of the probes were completed. Probing along that axis, and to several meters to each side, resulted in fairly consistent wood and iron contacts for approximately 28 m (93 ft) NNW of the smokestack. To the SSE of the smokestack, probe results were less consistent but occurred out to 31 m (102 ft). The total length of subsurface wood and iron contacts closely approximates the 193-foot (59 m) as-built length of the *Harvest Moon*, although some wood contacts were encountered farther to the NNW. Probing NE and SW of the projected centerline of the wreck provided wood and iron contacts out to approximately 9 m (29 ft, 6 in) to either side of the line.

Discussion

The *Harvest Moon* sank in five minutes after hitting a floating mine that holed her in the starboard quarter. The ship was headed downstream when she struck the mine and sank in 2 ½ fathoms (4.6 m; 15 ft) of water approximately 0.5 km from the main channel. Over the years, prodigious silting has taken place, covering all but the remaining vestiges of the smokestack in a thick mantle of heavy sediments. Interpretation of the wreck site follows multiple lines of evidence that include contemporary accounts of the sinking and subsequent salvage of the contents of the wreck as well as magnetometry and side-scan sonar data, data from the probing operation, and visual observations of the one remaining piece of ship's structure that is visible—the smokestack.

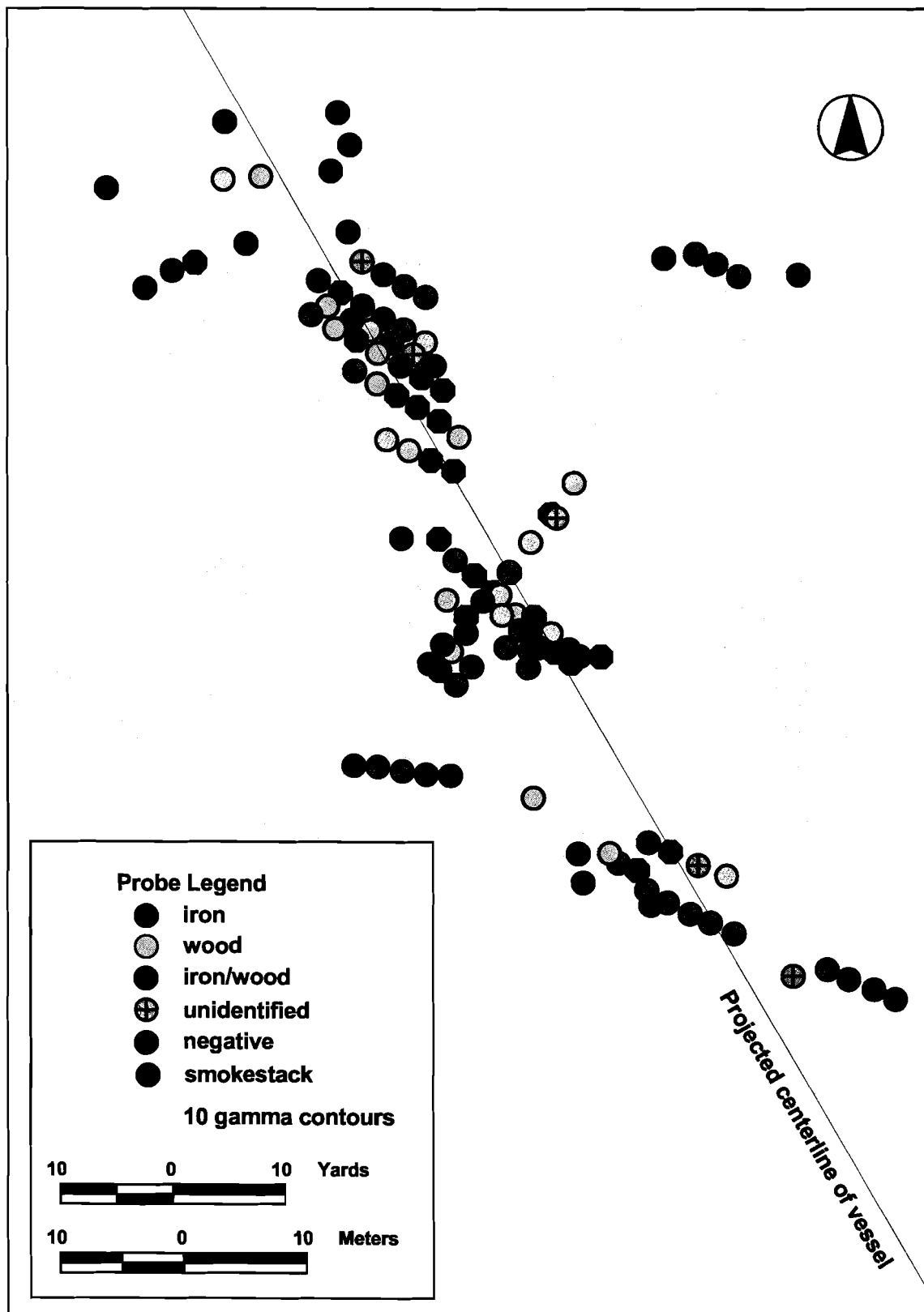


Figure 7.68: Probe locations and characterizations at the Harvest Moon site (38GE440).



Figure 7.69: MRD staffers Joe Beatty and Jim Spirek probing near smokestack.

The smokestack provides a static point from which to anchor the survey. At first, the presence of the smokestack presented a puzzle. From the log of the *Harvest Moon* there is the following entry, “Wednesday March 22st. Steamer Sweet Brier came alongside. Delivered to her water casks, rope, rigging and smokestack for tug Catalpa.” However, 170.18 cm (67 in) of the smokestack remains above the upper deck of the wreck. Undoubtedly, the original height of the smokestack exceeded that length by a considerable amount. Therefore, it can be concluded that the salvage operation removed a significant length of the iron smokestack, but left the lower portion still attached to the firebox below. The entries in the ship’s log for the salvage operation, which began the day after the sinking, March 2, 1865, and ended with abandonment of the vessel on April 21, 1865, were fairly specific in the objects removed from the vessel. No mention was made of the boiler or firebox, leading one to speculate that those objects remain beneath the smokestack. Furthermore, if those objects had been removed, there would have been little reason to leave the smokestack, not to mention very little structure to which the smokestack could remain attached. The document is quite clear that the salvage was comprehensive in its implementation and exerted extensive damage to the ship’s hull. The 10-degree tilt of the smokestack, apparently along the length of the hull, may indicate a disarticulation of the smokestack or firebox/boiler from the hull, or suggest a corresponding slope to hull along its length.

The probing operation provides the best evidence for a NNW-SSE alignment of the hull, also providing a rough correlation between consistent wood and iron contacts and the as-built length of the vessel. Probing also delineated the horizontal cylindrical iron object projecting from the smokestack below the cowling. Both the probe data and sonar records place this object to the SSE of the smokestack, ostensibly in line with the centerline of the hull.

Depths of wood and iron encountered by the water probe tend to confirm Dahlgren’s account that the ship sank in 2 ½ fathoms (4.6 m; 15 ft) of water. The most consistent depth at which wood was encountered is 4.1 m (13.5 ft) below grade. *Harvest Moon* was a wooden-hulled side-wheeler with a 10-foot (3-m) depth of hold. Two accommodation decks could have added another 14 feet (4.3 m) to the height of the upper deck of the vessel (Figure 7.70). It is at the upper deck level that the cowling, located during the probing operation, would have been situated. Using the above projected heights, the keel of the vessel could be as much as 24 ft (7.3 m) below the cowling, which currently sits at the mud line. However, the main deck, constructed of wood, would be located approximately 4.3 m (14 ft) below the cowling, very close to the 4.1-m (13.5-ft) depth of wood contacts encountered during the probing operation.

There is a large magnetic field around the wreck, with numerous significant anomalies, covering several thousand square meters. Given that the active salvage of the ship continued for more than a month, resulting in extensive damage to the hull, it would not be surprising to find an extensive debris field associated with the wreck. This field would contain numerous objects removed from the hull and scattered while the recovery vessels, which were anchored along either side of the stricken vessel, loaded the salvaged items. The results of the magnetometer survey tend to support this idea as most of the

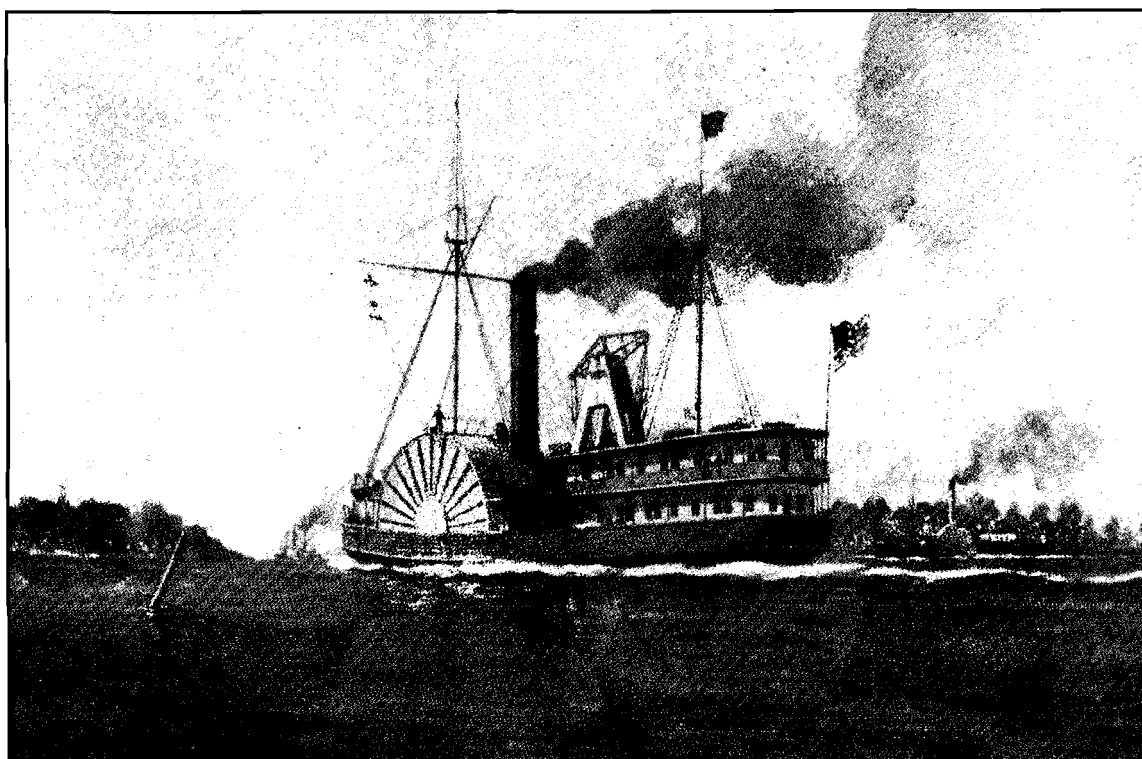


Figure 7.70: United States Steamer Harvest Moon (ORN,ser. 1, vol. 16;282-283).

anomalies having the greatest readings occur NE and SW of the projected longitudinal axis of the wreck, and very few anomalies located NNW and SSE of the projected ends of the hull. The debris field should also contain much wood and other structural pieces from the wrecked hull that were dispersed during the wrecking and salvage operation and through the action of river currents and storms.

The survey confirms that much of the *Harvest Moon* remains buried beneath the sediments of Winyah Bay, which are protecting the site from natural degradation and all but the most persistent looters. During the 1960s and 70s, projects were initiated to conduct work on the wreck in 1963 to raise and restore the vessel (Mooney 1991:266), and in 1974 to dredge a channel from the river to the site and salvage artifacts (Mark Newell, *Harvest Moon* project report on file at MRD/SCIAA). It is a credit to nature's protection of the site that neither project was successful.

Conclusion and Recommendations

Marine remote sensing surveys by their very nature are seldom, if ever, considered completed. There is always more that can be accomplished. So it is with this project. Much work was accomplished towards identifying and gathering baseline historical, electronic, physical, and observational data on naval shipwrecks in the waters of South Carolina. Likewise, a huge amount of data was gathered in and around Port Royal Sound concerning naval activity in that area of the state, and one newly-discovered shipwreck added to the South Carolina State Site Files. Further work that should be accomplished includes:

- complete surveys and gather baseline information on the remaining known naval shipwrecks in South Carolina waters;
- refine survey data on shipwrecks already surveyed;
- ground truth known Navy shipwreck sites;
- continue surveys to locate previously undiscovered or unverified naval shipwrecks and naval activity areas throughout the state.

CHAPTER 8

CONCLUSIONS AND RECOMMENDATIONS

The purpose of this project was to aid the Naval Historical Center with its responsibilities as mandated by the National Heritage Preservation Act to manage its cultural resources. The information contained in the report also serves to guide state submerged cultural resource managers in fulfilling their duties as co-stewards of these Navy shipwrecks. The project resulted in SCIAA reviewing, clarifying, and updating the status of the shipwrecks in the NHC database laid claim to by the Navy. Historical and archaeological research of these shipwrecks, as well as other naval assets, helped in developing the historical context and explaining the presence of these resources in the state. Additionally, remote sensing operations occurred at several selected shipwrecks and naval activity sites in Charleston, Port Royal, ACE Basin, and Winyah Bay which provided baseline environmental and archaeological data. The data obtained from the fieldwork and pertinent historical information was used to develop a Geographical Information System (GIS) project, which is expandable to allow for additional information. Topics discussed in relationship to these shipwrecks included analysis of the database by different categories, environmental contexts, and past management and research initiatives. The report concludes with several recommendations concerning any future actions regarding the state's naval legacy. Therefore, it is hoped that this report will prove useful for developing management policies and research strategies regarding these naval shipwrecks in South Carolina waters.

The NHC Navy shipwreck inventory submitted to the MRD consisted of approximately 96 shipwrecks. The inventory included a wide assortment of vessels including US Navy vessels, foreign warships, Confederate warships and blockade runners, US Army craft, vessels outside state waters, and shipwrecks of unknown affiliation. Research of primary and secondary historical sources, review of state archaeological site files, and other miscellaneous sources were used to discriminate USN shipwrecks in the database from the host of other ones. By these means, the MRD pared the inventory from 96 to 47 shipwrecks, consisting of solely USN vessels. In addition to vessels built strictly for naval purposes, the revised inventory consists of vessels chartered or purchased for naval usage, those that had formerly been navy vessels, or craft that were in the Continental Navy. Many of the additional shipwrecks were placed into tables by categories and made into appendices.

Historical and archaeological research produced a broad historical perspective of the Navy in South Carolina and more focused inquiry into each individual ship and post-depositional history as a shipwreck. The 47 Navy shipwrecks in South Carolina range from the Revolutionary War to World War II. The earliest wreck was a Continental vessel, *Queen of France*, that ultimately was scuttled to form a blockade of the Cooper River in Charleston. The majority of the wrecks are associated with the Civil War and consist of ironclads, gunboats, and the First and Second Stone Fleets, comprised of old New England whalers purposefully sunk to obstruct the channels leading into Charleston Harbor. The latest wreck was *YP-481*, a patrol boat that was abandoned in Charleston

Harbor following WWII. Navy shipwrecks in South Carolina have suffered similar fates as others in US waters including removal as navigational obstructions and disappearance into the fog of history.

Analysis of the Navy shipwrecks in South Carolina centered on historical period, cause of sinking, geographical distribution, environmental setting, location known or unknown, and whether a shipwreck was salvaged or not. The shipwrecks were also evaluated on their scientific, educational, and recreational potential. These categories offered an opportunity to systematically determine the archaeological significance of a site based on several factors. Examination of the circumstances and environments of the navy shipwrecks in the database offer a management tool by which to prioritize and direct resources for future archaeological inquiry by South Carolina and Navy submerged cultural resource managers.

In general, Navy shipwrecks in South Carolina date to the Civil War, were purposefully sunk, rest in the Atlantic Ocean, are in a location that is generally known, and have not been disturbed by salvage activities. The preponderance of the 31 whale ships used in the Stone Fleets skews this assessment regarding the reasons and dispositions of Navy shipwrecks in South Carolina. While the structural integrity of these wrecks is high, their archaeological significance lies not in the individual ship, but rather in the aggregate as navigational obstructions to meet the contingencies of naval warfare. The remaining 14 shipwrecks, with the exception of the scuttled *Queen of France* and abandoned *YP-481*, offer archaeological research potentials of revealing shipboard existence and technology from a particular moment in Navy history. Each of the shipwrecks has some scientific and educational potential to shed light on the historical period of operation, technology, among other research questions. The recreational value of these shipwrecks is low. Two shipwrecks with exposed structure, *Patapsco* and *Stono*, are situated squarely in a 1-2 knot tidal flow in Charleston Harbor. Visibility is also limited. These factors limit the recreational value to those willing to challenge the adverse conditions at these two sites. *USS Boston* is located in a river environment that contains both current and extremely low visibility. While outside South Carolina waters, *Hector* has the best potential as a recreational dive destination, despite its scattered state on the seafloor and remote location, some 16 km (10 miles) offshore and 36 km (22.5 miles) offshore from the nearest boat landing.

The naval shipwrecks residing on South Carolina bottomlands are each affected by their environmental context. A range of potential and known natural and cultural factors impact each site by varying degrees dependent primarily on their location. Some natural factors concerning these shipwrecks include, type of sediment overburden, wave action, currents, and biological degradation. Various cultural impacts consist of dredging, artifact collecting, looting, and commercial fishery operations. Each of these environmental factors bear on each site differently, and hence, affect their respective archaeological integrity.

Naval shipwrecks in South Carolina have been the focus of attention of would-be salvagers and state cultural resource managers since the 1950s, primarily directed

towards Civil War-era wrecks. The shipwreck receiving the earliest attention from salvagers was *Harvest Moon*. Nothing of note resulted from these efforts by separate groups during the 1960s and 70s. With the advent of state law in 1968 to address salvaging of shipwrecks, groups again expressed interests in recovering materials from naval wrecks. However, for the next two-and-one-half decades no salvage occurred on these shipwrecks. Not until the late 1980s was the first salvage operation on a naval shipwreck carried out in the state. From 1986 to 1990, the blockade runner *Stono* (ex. USS *Isaac Smith*) was partially salvaged under license from SCIAA. Artifacts were divided between the parties, with the State's share now in curation at SCIAA. The first archaeological investigation of a naval shipwreck was conducted on *Housatonic* under the auspices of the NHC and SCIAA in 1999. The project resulted in limited testing to determine the scope of structure and artifactual preservation. In the future, other cooperative ventures between the two agencies will reveal more about the naval wrecks in state waters.

During the course of the grant, from 1998 to 2003, four areas were chosen in which to undertake marine remote sensing operations to gather electronic data about Navy shipwrecks in South Carolina. In Charleston Harbor, electronic operations centered on the three ironclads, *Patapsco*, *Weehawken*, and *Keokuk*, and obtained magnetic, acoustic, and bathymetric data. The National Park Service had previously surveyed the site of *Housatonic* during the *H.L. Hunley* assessment in 1996. Each site had large amounts of iron remaining, and except for *Patapsco*, was buried under the sediments. Sonar revealed an outline of the hull of *Patapsco*, along with other exposed structural members.

In Port Royal Sound, the MRD's objective was to survey areas of Civil War naval usage and activity sites, including docks, repair facilities, and a possible naval shipwreck. The Port Royal Sound survey resulted in 15 survey blocks covering a 7.8-square-kilometer area. A total of 758 magnetic anomalies, and three acoustic anomalies, were detected in these survey blocks. The sources of the majority of the magnetic anomalies remain undetermined, but many are likely related to naval activity at these sites. Several magnetic and acoustic anomalies were ground-truthed. One such anomaly was identified as a naval vessel and associated artifacts, while others remain unidentified or are modern ferro-magnetic objects.

In the ACE Basin, two Civil War vessels were investigated to gather baseline magnetic and acoustic information. At the *Dai Ching*, hydraulic probing revealed wood and metal contacts buried in the sediments. At the *Boston*, sonar revealed a substantial amount of exposed ship structure wedged between two ridges of a sandbar. Scattered magnetic anomalies attest to past salvage activities at the sites, as well as on-going environmental dynamics.

At Winyah Bay, additional magnetic and acoustic information helped to determine the spatial extent of the *Harvest Moon*. Hydraulic probing helped researchers gain a three-dimensional understanding of the extant structure, while historical research suggests that the surviving wreck structure exists to the main deck. Overburden at the

site forms a protective mantle over the remains with the result of providing a stable local environment to aid in preserving the wreck from the elements.

The electronic data from the survey operations were post-processed into ArcView 3.2 and 3.3, a GIS-software, and geographically positioned over modern charts of Charleston Harbor, Port Royal Sound, Winyah Bay, and the ACE Basin. Additionally, georectified historic charts of Charleston Harbor and Port Royal Sound aided with the interpretation of survey data in those areas. The creation of the GIS database offers a platform from which to direct management and research initiatives and add updated information in a timely manner.

Recommendations

Several recommendations regarding management and fieldwork directed towards naval wrecks in South Carolina waters are herein suggested to continue the momentum initiated by this grant. Continued funding of the South Carolina naval wrecks initiative through the Department of Defense Legacy Resource Management Program grant would assist in perpetuating this momentum and facilitate the realization of the following recommendations.

- 1) Continue and develop partnership between NHC and SCIAA to manage Navy shipwrecks in South Carolina waters.

The partnership between the NHC and SCIAA in the 1999 *Housatonic* expedition should be emulated on other naval shipwrecks lying on state bottomlands. Benefits from this partnership included the combination of assets and talent to assist in defraying logistical, equipment, and personnel costs, and distributed responsibilities and duties between the two agencies.

- 2) Continue fieldwork operations based on priorities set by NHC and SCIAA.

These operations should be directed initially towards positioning easily locatable shipwrecks, gathering additional archaeological information of positioned shipwrecks, and surveying for the remaining shipwrecks. The locations of the majority of the shipwrecks in the database are unknown, although a general, discrete area is surmised for each wreck based on historical records and local knowledge. Efforts should be directed towards detecting these sites and accurately locating them with DGPS. The positioning of the first and second Stone Fleets would result in determining the location of 31 vessels, or about 75% of the naval wrecks in the state.

The position, in state waters, of seven US Navy shipwrecks is known, which include *Patapsco*, *Weehawken*, *Keokuk*, *Harvest Moon*, *Housatonic*, *Dai Ching*, and *Stono* (*Isaac Smith*). Archaeological inquiry at each of these sites should include recording the scope and character of the remaining wreckage. Currently, *Housatonic*, *Dai Ching*, *Harvest Moon*, and *Stono* have undergone some investigation. However, *Patapsco*, *Weehawken*, and *Keokuk* have not been inspected or probed. Future work

should be directed towards documenting those three sites. *Patpasco*, the only Civil War ironclad in South Carolina having portions of ship structure exposed, would prove an ideal candidate for site documentation. The other two sites, buried under several feet of overburden, would require extensive hydraulic probing to determine the depth of sediment at each site. Perhaps, if the depth of overburden covering parts of the site does not preclude archaeological investigation, conducting one or more test excavation units could help to ascertain the identity and preservation of ship structure at the site as was accomplished on the remains of *Housatonic*.

The location of the remaining shipwrecks in the inventory, namely *Queen of France*, *Ferret*, *Gallatin*, *Gunboat No. 157*, *Kingfisher*, *Robert B. Howlett*, *Marcia*, and *YP-481*, are problematical. While historical records mention the general location of each shipwreck, the records are not specific enough to allow relatively easy location the site. Time and effort would be necessary to search for these shipwrecks. Therefore, attempts to locate these shipwrecks should follow the two previous fieldwork priorities.

3) Prepare National Register of Historic Places nominations for known shipwrecks.

NRHP nominations should be prepared for all of the shipwrecks as information becomes available, but immediate priorities should include *Housatonic* and *Stono*. Archaeological and historical investigations from the 1999 *Housatonic* expedition have revealed information that can be used to prepare the nomination. In addition to representing the remains of a Union blockader, the ship is significant as the first casualty of submarine warfare. A NRHP nomination for *Stono* should be prepared as historical and archaeological work, albeit under the auspice of salvage, has revealed an extensive amount of information about the site. The site is significant for a number of reasons, most importantly as a rare example of Union blockader turned Confederate blockade-runner. The remaining shipwrecks require additional examination, including determining precise locations and extent of the archaeological remains, prior to NHRP nomination.

4) Continue building and maintaining the GIS database and datasets as information emerges.

As additional fieldwork and information relating to Navy shipwrecks accrues, the information should be processed into GIS format. Anticipated GIS themes or layers of information include georeferenced historical maps and charts, remote sensing data, and archaeological recordation of shipwrecks. This information should be standardized between the two agencies in order to maintain up-to-date duplicate GIS projects for reference and research purposes. An on-going GIS project should allow for quick management responses regarding potential impacts to Navy shipwrecks and guide research initiatives by NHC and SCIAA.

5) Research at the former Charleston Navy Shipyard and former Port Royal Naval Station.

The waterfront facilities of the Charleston Navy Shipyard on the banks of the Cooper River and the former Port Royal Naval Station on the banks of the Beaufort River represent the focal point of late-nineteenth and twentieth-century naval activity in South Carolina. Anticipated submerged or partially submerged archaeological features might include dry docks and piers, railway or crane tracks, slip ways for vessel launchings, scuttled vessels, and dumping grounds for shipyard debris. Investigation of the Cooper River waterfront should be a focal point, as well as Shipyard Creek, which runs through the yard area and has unidentified shipwrecks shown as obstructions on the navigation chart. Both these areas should be surveyed. Additionally, terrestrial features, such as, shipyard work zones, barracks, hospitals, and stores should be included in the research. This also holds for the former naval station at Port Royal, now the United States Marine Corps Recruit Depot, Parris Island. The remains of the first naval drydock in South Carolina are still extant, and other potential auxiliary components include docks and wharves, buildings, and abandoned vessels. Recording and inventorying these infrastructural resources to the archaeological record, along with naval shipwrecks, should illuminate more fully the naval presence in South Carolina.

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APPENDIX A

SOUTH CAROLINA UNDERWATER ANTIQUITIES ACT OF 1991

THE SOUTH CAROLINA UNDERWATER ANTIQUITIES ACT OF 1976; AS AMENDED 1982,1991, 2002.

S.C. Code Ann. § 54-7-610 (1991)

AN ACT TO AMEND CHAPTER 7, TITLE 54, CODE OF LAS OF SOUTH CAROLINA, 1976, RELATING TO SHIPWRECK AND SALVAGE OPERATORS, BY ADDING ARTICLE 5 SO AS TO ENACT THE SOUTH CAROLINA UNDERWATER ANTIQUITIES ACT OF 1991 AND TO PROVIDE PENALTIES FOR VIOLATIONS; AND TO REPEAL ARTICLE 4, CHAPTER 7 OF TITLE 54, THE SOUTH CAROLINA UNDERWATER ANTIQUITIES ACT OF 1982.

Whereas, it is the intent of the South Carolina "Underwater Antiquities Act of 1991 to preserve and encourage the scientific and recreational values inherent in submerged archaeological historic properties and paleontological properties for the benefit of all the people of the State; and

Whereas, submerged archaeological historic properties and submerged paleontological properties are a nonrenewable and finite resource, and that the conservation and preservation of that resource base is of the highest priority; and

Whereas, it is only incidental tot his purpose, and as a means of achieving this purpose, that licenses provided for in the South Carolina Underwater Antiquities Act of 1991 may be granted and the portions of the recovered objects may be transferred to the licensees. Now, therefore,

Be it enacted by the General Assembly of the State of South Carolina:

Underwater Antiquities Act

Section 1. Chapter 7, Title 54 of the 1976 Code is amended by adding:

"Article 5"

The South Carolina Underwater Antiquities Act of 1991

SECTION 54-7-610. Short Title

This article may be cited as the South Carolina Underwater Antiquities Act of 1991.

SECTION 54-7-620. Definitions.

As used in this article:

(1) "Artifact", "artifactual item", or "artifactual material" means any object or assemblage of objects found in an archaeological context which yields or is likely to yield information of significance to the scientific study of human prehistory, history, or culture, and which have remained unclaimed for more than fifty years.

(2) "Artifact recovery" means the recovery of artifactual material by hand or through excavation.

(3) "Beneath or substantially beneath" means permanently or periodically covered, in whole or in part, by the territorial waters of the State.

(4) "Commercial applicant" means an applicant for a license under this article for

purposes other than those of a noncommercial applicant, such as commercial salvage or income-producing purposes.

(5) "Complete paleontological specimen" means a fossil which is more than eighty percent intact and has recognizable diagnostic features for identification.

(6) "Data" means any information related to the site of submerged archaeological historic property or submerged paleontological property which includes, without limitation, artifactual and/or paleontological material, remote sensing survey charts, magnetic tape records of positions, site maps, feature plans, photographs, measurements, and historical documentation.

(7) "Data collection" means the accumulation of data through methods which do not include excavation. "Data collection" includes the collection of artifactual and/or paleontological material that is exposed or resting on, but not embedded in, submerged lands.

(8) Reserved.

(9) "Data recovery" means a systematic study carried out in accordance with a research plan which may include data collection, excavation, and artifact or fossil recovery.

(10) "Day" means a twenty-four hour period beginning at 12:00 midnight.

(11) "Debris field" means the area in which artifactual or paleontological materials associated with a site are found.

(12) "Director" means the Director of the Institute or a designee of the director.

(13) "Embedded" means firmly affixed in submerged lands such that the use of tools of excavation are required in order to move the bottom sediments to gain access to the submerged archaeological historic property or paleontological materials or any part of them.

(14) "Excavation" means the process of moving, removing, or disturbing bottom sediments to expose submerged archaeological historic property or submerged paleontological materials.

(15) "Field archaeologist" means a professional archaeologist selected by the licensee and approved by the institute to supervise operations under a license. The field archaeologist must meet or exceed the Standards of the Secretary of the Interior (48 F.R. 44738-44739) and act pursuant to the criteria set forth by the South Carolina State Historic Preservation Office Guidelines and Standards for Archaeological Investigations.

(16) "Field paleontologist" means a paleontologist selected by the licensee and approved by the museum to supervise operations under a license.

(17) "Historic property" means a district, site, building, structure, or object significant in the prehistory, history, upland and underwater archaeology, architecture, engineering, and culture of the State, including artifacts, records, and remains related to the district, site, building, structure, or object.

(18) "Immediate environment" means that area surrounding a submerged archaeological historic property or submerged paleontological site which, if disturbed, could result in substantive injury to the property, including, without limitation, the debris field.

(19) "Institute" means the South Carolina Institute of Archaeology and Anthropology.

(20) "Intensive survey" means a field and archival investigation of an area designed to gather and identify fully information about submerged archaeological historic properties sufficient to evaluate them in relation to National Register criteria of significance within specific historical contexts. It may also mean a field and archival investigation of an area designed to gather and identify fully information about submerged paleontological materials sufficient to evaluate them for geologic time period and species identification. Intensive survey may include data collection, test excavation, data recovery, and specimen recovery on a limited basis.

(21) "Licensee" means any person or entity authorized to perform certain recovery operations from a submerged archaeological historic property or submerged paleontological property under the provisions of this article by the South Carolina Institute of Archaeology and Anthropology. It is not a proof of qualification to skin or scuba dive nor that a person is qualified to skin or scuba dive.

(22) "Monitoring archaeologist" means an underwater archaeologist selected by the institute for the purpose of monitoring work activity under a license issued by the institute.

(23) "Monitoring paleontologist" means a paleontologist or Natural History Curator selected by the museum commission for the purpose of monitoring work activity under a license issued by the institute.

(24) "Museum Commission", "museum", "commission", and "State Museum" means the

South Carolina Museum Commission authorized by this article as custodians of paleontological materials.

(25) "National Register" means the National Register of Historic Places maintained by the Secretary of the United States Department of the Interior.

(26) "Navigable waters" means all waters belonging to the State which are navigable in fact or were navigable in the past. The term includes rivers and streams in which the tide ebbs and flows.

(27) "Noncommercial applicant" means a person seeking a license for the purpose of gathering scientific, historical, or architectural data for either:

(a) public exhibition, interpretation, or preservation and not for the purpose of producing income, profit, or gain; or

(b) mitigation of adverse effects of a proposed undertaking on submerged archaeological historic property or submerged paleontological property.

(28) "Object" means a material thing produced or resulting from human activity which has functional, aesthetic, cultural, historical, or scientific value and which includes artifactual material.

(29) "Paleontological materials", "materials", "specimen", "fossil", "fossil materials", or "paleontology materials" means any object or assemblage of objects found in a paleontological context including, but not limited to, plant and animal fossils such as bones, teeth, natural casts, molds, impressions, and other remains of prehistoric fauna which yield or are likely to yield information of significance to the scientific study or educational potential of the past. Faunal means fossilized plant and animal remains from past geologic periods including, but not limited to, molds, casts, bones, and teeth.

(30) "Paleontological property" means paleontological material or any site which contains paleontological material.

(31) "Paleontological recovery" or "fossil recovery" means the recovery of paleontological materials by hand or through excavation.

(32) "Person" means an individual, partnership, corporation, association, organized group of persons, or any other legal entity.

(33) "Preservation" means the identification, evaluation, recordation, documentation, curation, acquisition, protection, management, rehabilitation, restoration, stabilization, maintenance, and reconstruction of a submerged archaeological historic property or a submerged paleontological property.

(34) "Primary scientific value" means any submerged archaeological historic property or submerged paleontological property which:

(a) yields or may yield information of great importance or significance to state, regional, national or international history or prehistory. Significance may be judged by the potential of the property to provide information, its physical condition, the research questions it might answer, its educational or exhibit value, or its relationship to known archaeological and historical records and future research needs; or

(b) is included in, or has been determined, or may be eligible for inclusion in the National Register of Historic Places.

(35) "Reconnaissance survey" means a limited archival and field investigation, designed and accomplished in sufficient detail to make generalizations about the type, distribution, and value of an area's submerged archaeological historic properties or submerged paleontological sites, which may include data collection but may not include excavation, data recovery, or artifact recovery.

(36) "Recreational value" means value related to an activity which the public engages in, or may engage in, for recreation or sport, including, but not limited to, scuba diving and fishing.

(37) "Site" means:

(a) the location of an event, a prehistoric or historic occupation or activity, or a building or structure including a shipwreck, whether standing, ruined, or vanished, and its debris field where the location itself maintains historical or archaeological value regardless of the value of any existing structure;

(b) the location of an accumulation of paleontological material where the location itself maintains paleontological value.

(38) "State" means the State of South Carolina.

(39) "State Underwater Archaeologist" means a person appointed by the Director of the South Carolina Institute of Archaeology and Anthropology who administers this act.

(40) "State Historic Preservation Officer" means the individual who administers the State

Historic Preservation Program under the provisions of the National Historic Preservation Act of 1966.

(41) "Structure" means a constructed work made up of interdependent and interrelated parts in a definite pattern of organization.

(42) "Submerged" means beneath or substantially beneath the territorial waters of the State or submerged at mean low tide.

(43) "Submerged archaeological historic property" means any site, vessel, structure, object, or remains which:

(a) yields or is likely to yield information of significance to scientific study of human prehistory, history, or culture; and

(b) (i) is embedded in or on submerged lands and has remained unclaimed for fifty years or longer; or

(ii) is included in, or has been determined, or may be eligible for inclusion in the National Register of Historic Places.

The term includes archaeological material, which includes, but is not limited to, abandoned shipwrecks and their contents and individual assemblages of historic or prehistoric artifacts.

(44) "Submerged lands" means lands beneath or substantially beneath the territorial waters of the State or which are submerged at mean low tide.

(45) "Submerged paleontological property" means any object or assemblage of objects found in a paleontological context which yield or are likely to yield information of significance to the scientific study or educational potential of the past faunal diversity, past environments, geologic time, or other paleontological concerns.

(46) "Substantive injury" means any action or influence which causes a change in the archaeological or paleontological context, the structural integrity, or the physical condition of a site as to render it more vulnerable to loss, damage, destruction, or diminution of historic or paleontological value.

(47) "Territorial waters" means the navigable waters of the State, namely, all tidal waters within the boundaries of the State up to, but not above, the line of mean low tide and seaward to a line three geographical miles distant from the coastline of the State measured by reference to mean low tide elevation as defined in the Geneva Convention, Article 11, and such other waters of the State as may be included within the term "lands beneath navigable waters" as defined in the Federal Abandoned Shipwreck Act of 1987.

(48) "Undertaking" means an activity by the institute or South Carolina Museum Commission, which would otherwise require a license under this article. "Undertaking" does not include activities which, in the State Underwater Archaeologist's determination, must be conducted within sixty days in order to preserve submerged archaeological historic property or submerged paleontological property that is or may be of primary scientific value or of major archaeological, anthropological, or historic value and threatened with imminent destruction or substantial damage.

SECTION 54-7-630. Title to all submerged paleontological property and submerged archaeological historic property and artifacts in state; may be conveyed to licensee.

(A) All submerged archaeological historic property and artifacts and all submerged paleontological property located on or recovered from submerged lands over which the State has sovereign control, are declared to be the property of the State.

(B) Title to submerged archaeological historic property and artifacts and all submerged paleontological property, or a portion of the property recovered from submerged lands over which the State has sovereign control, may be conveyed by the State to a licensee pursuant to a license issued by the institute.

SECTION 54-7-640. Custodians of submerged archaeological historic property and artifacts, submerged paleontological material, and other things of value.

(A) The custodian of submerged archaeological historic property and artifacts owned by the State or on state submerged lands is the South Carolina Institute of Archaeology and Anthropology. The South Carolina Institute of Archaeology and Anthropology may promulgate regulations as necessary to carry out

its duties under this article.

(B) The custodian of all submerged paleontological material is the South Carolina Museum Commission. The institute, after consultation with the South Carolina Museum Commission, may promulgate regulations regarding submerged paleontological property as necessary for this purpose. For the purposes of this article, and where submerged paleontological property is involved, the institute shall consult with the South Carolina State Museum.

(C) The custodian of any other things of value not provided for in this section is the State Budget and Control Board, which may promulgate regulations as necessary for this purpose.

SECTION 54-7-650. Licenses to conduct activities affecting submerged archaeological historic properties or paleontological properties; disposition of recovered property; permission to recover other property.

(A) A person desiring to conduct activities pursuant to this article in the course of which submerged archaeological historic properties or paleontological properties may be removed, displaced, or destroyed shall apply to the institute for a license to conduct the activity. If the institute finds that the granting of the license is in the best interests of the State, it may grant it for the time and under the conditions the institute considers appropriate to this article.

(B) The institute may enter into agreements with licensees for the disposition of recovered submerged archaeological historic property and submerged paleontological property.

(C) The disposition may include division of the recovered property with the licensee.

(D) The division may be in value or in kind, with the institute acting as arbiter of the division in the best interests of the State and giving due consideration to the fair treatment of the licensee. Any agreement entered into by the institute must provide for the licensee to receive reasonable compensation for any recovered submerged archaeological historic property or submerged paleontological property claimed and turned over to the State.

(E) No license is required of the institute or, where submerged paleontological property is involved, the South Carolina Museum Commission, which may conduct any undertakings provided for by this article. All recovered submerged archaeological historic property and submerged paleontological property belong to the State.

(F) Any persons desiring to recover anything of value other than submerged archaeological historic property or submerged paleontological property must obtain permission from the State Budget and Control Board under the terms the board determines.

(G) A person may not knowingly recover, collect, excavate, or disturb a submerged archaeological historic property or submerged paleontological property on submerged lands over which the State has sovereign control without a license from the institute.

(H) The institute shall issue and administer licenses for any activity involving the recovering, collecting, excavation, or disturbance of submerged archaeological historic property and submerged paleontological property on submerged lands over which the State has sovereign control.

SECTION 54-7-660. No license required for non-disturbing inspection, study, and the like.

A person may inspect, study, explore, photograph, measure, record, conduct a reconnaissance survey, use magnetic or acoustic detection devices, or otherwise use and enjoy a submerged archaeological historic property and/or submerged paleontological property without being required to obtain a license if the use or activity does not:

- (1) involve excavation, destruction, substantive injury, or disturbance of the historic property, a paleontological site, or its immediate environment;
- (2) endanger other persons or property; or
- (3) violate other regulations or provisions of federal, state, or local law or ordinance.

SECTION 54-7-670. Hobby licenses; reports of hobby divers as to finds; restrictions.

(A) A person desiring to conduct temporary, intermittent, recreational, small scale, noncommercial search and recovery of submerged archaeological historic property or submerged paleontological property

shall apply for a hobby license from the institute. Any person collecting from state property such as river banks or beaches below the mean low watermark shall apply for a license.

(B) A person desiring to apply for a hobby license shall submit a completed application on a standard form prescribed by the institute together with a license fee. A license fee of five dollars for residents of this State and ten dollars for nonresidents must be charged for a six-month hobby license. A license fee of eighteen dollars for residents of this State and thirty-six dollars for nonresidents must be charged for a two-year hobby license.

(C) This nonexclusive statewide license may be granted optionally for a six-month or two-year period and must be renewed within the period for which the license is granted.

(D) Licenses may be granted to individuals or members of an immediate family.

(E) Hobby license holders may not exercise the privileges of their licenses in waters for which any type of exclusive license has been granted and is in effect or in waters for which such exclusive licenses become effective during the life of that exclusive license.

(F) This section limits the recovery of objects or materials from submerged archaeological historic property and submerged paleontological property under a hobby license to a limited number of objects which can be recovered by hand. All powered mechanical dredging and lifting devices and buoyancy equipment except a personal flotation device of any sort are prohibited including, but not limited to, prop wash, air lift, water dredge, and pneumatically-operated lift bags under the license.

(1) A person with a hobby license may collect from submerged lands of this State a reasonable number of artifactual items and/or complete and fragmented fossil specimens a day that:

(a) are exposed or resting on the bottom sediments of submerged lands; and

(b) do not require excavation to recover.

(2) No artifactual or paleontological materials may be recovered from submerged lands of this State unless they can be obtained by hand.

(3) No specimen may be recovered from a fossil specimen with joined or interrelated elements before contacting the museum.

(G) (1) All persons who have collected objects in accordance with Section 54-7-670 shall furnish the institute with a report which is to include a list of the objects and a description of the places from which the objects were recovered. Hobby divers are also encouraged, but not required, to include photographs or drawings of artifacts recovered and rough sketch plans of the site or map of the location with the exception of shipwreck sites covered under item (2) of this subsection. Reports submitted under a two-year hobby license must be filed within ten days following the end of the calendar quarter in which the activities took place. All reports under this license must be filed with the institute prior to submitting application for renewal of a hobby license. The institute will not consider applications for renewal until all outstanding reports have been received.

(2) No more than ten artifacts a day may be recovered from a shipwreck site. Divers may not destroy the integrity of the ship's structure by removing or moving timbers, fittings, fastenings, or machinery. Hobby divers who have recovered any artifacts from a shipwreck site must include in the report both a locational reference to the shipwreck site by locating the site on a topographic or hydrographic chart and a sketch map of the wreck site showing the location from where the artifacts were recovered in relation to the wreck.

(3) (a) The institute shall review each list of objects and within sixty days from the receipt of the quarterly report release title to all artifacts reported.

(b) Objects recovered that are not considered by the institute to be artifactual items may be retained by the persons who collected the objects.

(c) If the institute has not acted by the end of the sixty days, title to the artifactual material recovered and listed on the hobby diver's report is automatically conveyed to the licensee.

(d) If the institute has determined that the licensee has violated any of the terms of this article, the institute may require that the artifacts be turned over to the institute and revoke the license.

(H) (1) All persons who have collected fossil specimens in accordance with this section shall furnish the museum commission with a report, which must include a list of the fossils and a description of the places from which the fossils were recovered. Hobby divers are also encouraged, but not required, to include photographs or drawings of fossils and rough sketch plans of the site or map of the location. Reports submitted under two-year hobby licenses must be filed within ten days following the end of the calendar quarter in which the activities took place. All reports under this license must be filed with the institute prior to submitting application for renewal of a hobby license. The institute will not consider applications for renewal until all outstanding reports have been received.

(2) (a) The museum shall review each list of specimens and within sixty days from receipt of the quarterly report release title to all specimens reported.

(b) Specimens recovered that are not considered by the museum to be paleontological material may be retained by the persons who collected the fossils.

(c) If the museum has not acted by the end of the sixty days, title to the paleontological material recovered and listed on the quarterly report is automatically conveyed to the licensee.

SECTION 54-7-680. Repealed by 2002 Act No. 364, Section 13, eff September 26, 2002.

SECTION 54-7-690. Intensive survey licenses; data recovery licenses; waiver; applications.

(A) The institute may issue an intensive survey license or a data recovery license. Each license is exclusive to the applicant so that, for the duration of the license and any applicable exclusive interest period, the institute may not issue a license to any other person for the same location.

(B) An intensive survey license may be issued to an applicant to carry out an intensive survey for the purpose of delineating the boundaries of a specific location which the applicant believes may contain submerged archaeological historic property or submerged paleontological property.

(C) A data recovery license may be issued to an applicant to conduct data recovery on submerged archaeological historic property or submerged paleontological property if the applicant has submitted positive results of an intensive survey license which was previously issued by the institute for the same location. The results must include, as applicable:

(1) documentary archival evidence, and if no documentary evidence is found, primary and secondary sources consulted must be listed;

(2) electronic remote sensing data; and/or

(3) artifactual or fossil specimen evidence recovered from a proven site context.

(D) A person who seeks to excavate or disturb submerged archaeological historic property or submerged paleontological property shall apply for a license from the institute. Upon receiving a report of a submerged archaeological historic property or submerged paleontological property, the institute shall, within sixty days of receipt of the report, assess the property to determine its significance.

(E) The institute may waive the requirement of a license under this article if the activity underlying the license is an undertaking that is subject to Section 106 of the National Historic Preservation Act and the applicant is complying with the provisions of that law and any corresponding regulations.

(F) Applications for licenses must be made upon standard forms prescribed by the institute. Each application must include at least:

(1) the precise position of the project location including a map of sufficient detail to enable the location to be accurately depicted on a standard marine navigational chart;

(2) the depth of the project location;

(3) the applicant's opinion based upon archival or archaeological research as to specific characteristics of the submerged archaeological historic property including, at a minimum and where applicable, size, age, type and identity, methods and materials of construction, and the general condition of the property. In the case of submerged paleontological property, the applicant's opinion based upon archival or paleontological research as to specific characteristics of the submerged paleontological material including, at a minimum and where applicable, size, geologic time period, type and identity, and the general condition of the fossils. The institute may also require the applicant to submit pertinent archival,

archaeological, paleontological, and other research data utilized by the applicant as the basis of the applicant's opinion;

(4) a proposed research plan which must conform to the standards of underwater archeology established by the institute and designed to recover relevant scientific, historical, architectural, paleontological or other data as well as artifacts. It must be in a form prescribed by the institute and detail the proposed techniques and methods of excavation, recovery, conservation, inventory, recordation, storage of recovered materials, dissemination of data, and the proposed starting date and length of time expected to be devoted to the work. The proposed research plan must also consist of:

(a) a description of the proposed methodology, identification, documentation, or other treatment of submerged archaeological historic property or submerged paleontological property that identifies the project's goals, methods, and techniques, expected results, and the relationship of the expected results to other proposed activities or treatments;

(b) a justification of the specific techniques and methods proposed to be used;

(5) information regarding the personnel who will be performing the work. This information must include at least the following:

(a) the name and address of the applicant;

(b) the name and address of the field archaeologist who will be immediately supervising the work;

(c) the names and addresses of all persons who will participate in the work; and

(d) a listing for each individual, including the field archaeologist, of his relevant experience, training, and certifications in maritime archeology or related fields.

(6) a listing of the proposed equipment to be used in the work or that will be available for use;

(7) a copy of the applicant's most current financial statement and an explanation of the applicant's proposed resources financially to support the work; and

(8) the appropriate license application fee.

SECTION 54-7-700. Exclusive license for excavation or disturbance of submerged archaeological historic property and submerged paleontological property; conditions for issuance.

(A) The institute may issue an exclusive license for the excavation or disturbance of submerged archaeological historic property and submerged paleontological property on submerged lands over which the State has sovereign control to any person or entity for the time and under the conditions as the institute considers appropriate. After an agreement has been entered into pursuant to Section 54-7-650(B), licenses may be issued if the institute determines that:

(1) issuance of the license is in the best interests of the State; and

(2) the applicant has completed an application which includes a research plan that meets standards established by the institute regarding professional qualifications, techniques, and methodology for recovery and dissemination of data and proper conservation of information and materials.

(B) The institute may not issue an exclusive license to a person or entity seeking title to a submerged archaeological historic property or submerged paleontological property or a portion of such property, or to a person or entity seeking to utilize a submerged archaeological historic property or submerged paleontological property for commercial salvage or other income-producing purposes, unless:

(1) issuance of a license is consistent with the purposes of subsection (A)(2) of this section;

(2) the applicant has provided the institute with some form of assurance acceptable to the institute that the project will be carried out and completed in accordance with the research plan approved by the institute; and

(3) the institute finds one or more of the following conditions met:

(a) the property to be excavated or disturbed is, in the opinion of the institute, threatened with imminent destruction or substantial damage by natural factors or by human factors unrelated to the commercial excavation or disturbance of the submerged archaeological historic property or submerged paleontological property in question;

(b) the submerged archaeological historic property or submerged paleontological

property is not, in the opinion of the institute, of primary scientific value, of major archaeological, anthropological, historical, recreational, or other public value;

(c) the proposed disturbance will be minor in scale and will produce information relevant to the goals of the South Carolina Institute of Archaeology and Anthropology or the South Carolina Museum Commission regarding the management and preservation of submerged archaeological historic property and submerged paleontological property; or

(d) that the subject property of the license will not be excavated by any other person in the foreseeable future and that property will remain submerged until that time.

(C) The institute may apply the requirements of subsection (B) of this section to all noncommercial applicants.

(D)

(1) The institute may require a licensee to assist in defraying the cost of the institute's and/or museum's review, administration, and supervision of the license.

(2) The application fee for an intensive survey license is fifty dollars for residents and one hundred dollars for nonresidents. The application fee for a data recovery license is five hundred dollars for residents and one thousand dollars for nonresidents.

(3) The institute reserves the right to waive the license application fee, in whole or in part, if the institute considers it appropriate in order to adjust the reasonableness of the fee as a proportion of the potential value and risk in undertaking the licensed project to the anticipated costs of the institute to review, supervise, and administer the license.

(4) The license application fee must be refunded if the institute rejects a license application.

SECTION 54-7-710. Criteria for determining whether to issue exclusive license; public hearing optional.

(A) The institute shall consider at least the following criteria when determining whether or not to issue an exclusive license:

(1) the degree of archaeological, anthropological, historical, paleontological, and scientific importance and public educational potential of the proposed property, including, without limitation, its eligibility for inclusion in the National Register;

(2) the date the application was received in order to give priority to the first applicant requesting a license for a particular project location;

(3) the degree and scope of planning undertaken by the applicant including project readiness and financial feasibility and commitment to undertake and complete the work;

(4) the degree of training and experience of the applicant, his personnel, or his field archaeologist or field paleontologist in the field of maritime archeology or paleontology and underwater fossil recovery;

(5) the extent to which the applicant's responses in the application are thorough;

(6) the extent to which the applicant possesses, or will possess at the beginning of the work, the necessary equipment to undertake the license activity; and

(7) the degree of public benefit to be derived from issuance of the license in relation to the degree of harm to the state's submerged archaeological historic property or submerged paleontological property to be expected from issuance of the license.

(B) The institute may not issue an exclusive license under this article unless:

(1) the institute has made a written determination that issuance of the license is in the best interest of the State; and

(2) the institute has made a written determination that the applicant has submitted a complete application, including a research plan, in form and content satisfactory to the institute which satisfies all of the requirements of this section.

(C) Accompanied by the applicant, a representative of the institute and/or the museum may visit the proposed project location to determine the license area boundaries and to confirm the information required.

(D)

(1) The institute may require a public hearing before a decision regarding the issuance of an exclusive license.

(2) Public notice of an application must be posted in a prominent place at the institute and may be circulated to state, federal, and local agencies as appropriate.

(3) The public hearing may be held at a location designated by the institute.

(4) At a hearing the applicant shall present his application to the institute, agencies, and the public and allow questions, comments, and responses by these groups.

SECTION 54-7-720. Delayed issuance of license; denial of license; reconsideration of denial.

(A) (1) The institute may approve an exclusive license application from a commercial applicant but delay issuance of the license until the following conditions have been satisfied within a time period determined by the institute:

(a) the applicant has designated and, if required, placed into escrow the costs associated with the institute's monitoring of the work undertaken, if monitoring is required by the institute;

(b) the applicant has identified and received the institute's approval of the facility proposed to conduct conservation of any recovered artifacts and fossils needing stabilization or articulation;

(c) in the case of a data recovery license, the institute and the applicant have agreed upon all issues of disposition and title to submerged archaeological historic property or submerged paleontological property which may be recovered by the applicant;

(d) the applicant has furnished the institute with a form of assurance acceptable to the institute and adequate to guarantee that if work under the license is interrupted or abandoned, the necessary archaeological and/or paleontological fieldwork, analysis, report preparation, conservation, and curation will be carried out in accordance with the research plan approved by the institute. This assurance may be in the form of escrowed funds, a letter of credit, a performance bond, or other type of assurance acceptable to the institute. The type and amount of assurance may be negotiated between the applicant and the institute, but the amount normally must be a sum equal to at least one-third the amount budgeted and approved by the institute for field recovery, unless a lesser amount is determined by the institute to be acceptable; and

(e) any other condition that the institute considers necessary to protect the integrity of submerged archaeological historic property or submerged paleontological property.

(2) The requirements of item (1) of this subsection also apply to noncommercial applicants for exclusive licenses who are seeking title to submerged archaeological historic property or submerged paleontological property, other than an agency or unit of the State.

(B) If the institute determines not to issue a license, the institute shall issue a written notice of denial.

(C)

(1) An applicant may request reconsideration of a denial by submitting a written request to the institute which must be received within thirty days following the date of the institute's denial notice. The request for reconsideration must address each reason for the denial and provide documentation supporting reasons for reconsideration of the issues.

(2) Any person aggrieved by the decision of the institute may request an institute hearing.

(3) The hearing must be held and the institute's final decision issued within sixty days of the date of the hearing.

SECTION 54-7-730. Provisions which must be shown on license issued by institute.

(A) Each license issued by the institute must contain at least the following provisions:

(1) the duration of the license;

(2) the boundaries of the area in which the work will be undertaken;

(3) a description of the scope of work to be undertaken by the licensee and, if a data recovery license, a description of the artifactual and/or paleontological materials expected to be recovered;

(4) a listing of the key personnel including the field archaeologist who will be conducting

the work; and

(5) a description of the expected types of activity which must be undertaken by the licensee in order to restore the submerged lands following completion of the intensive survey or investigation.

(B) A license issued by the institute may contain provisions requiring monitoring of the license activity by a monitoring archaeologist and/or a monitoring paleontologist in order to ensure compliance with the provisions of the license and this article. These provisions, if any, must be so noted on the license.

SECTION 54-7-740. Additional provisions applicable to licenses issued by State Underwater Archaeologist.

For each license issued by the State Underwater Archaeologist the following provisions also apply:

(1) (a) The assignment of additional personnel or any change in the personnel from that scheduled in the application to perform the work is subject to prior approval by the institute in order to assure that the overall qualifications of the licensee are consistent with those originally considered by the institute in the issuance of the license.

(b) The institute must be afforded at least ten business days to review the qualifications of proposed new personnel before approving their assignment. If the institute fails to respond within the ten-day period the new personnel are considered approved.

(2) (a) At all times there must be a person designated by and acting for the licensee aboard any vessel or present at any phase of the work carried out under the license who is responsible for the work and the proper accounting of all artifacts and fossil specimens located or recovered and who must be familiar with and responsible for compliance with the terms and requirements of the license.

(b) At all times the work must be under the immediate supervision of a professional field archaeologist with training or experience in maritime archeology that is acceptable to the institute or, where a paleontological property is involved, a field paleontologist or museum curator that is acceptable to the museum.

(c) The monitoring archaeologist, if any, shall ensure that the field archaeologist complies with the research plan approved by the institute.

(d) The monitoring paleontologist, if any, shall ensure that the field paleontologist complies with the research plan approved by the institute and museum.

(e) Any disputes or differences of opinion between the field archaeologist and the monitoring archaeologist must be resolved by the monitoring archaeologist.

(f) Disputes or differences of opinion between the field paleontologist and the monitoring paleontologist must be resolved by the monitoring paleontologist.

(g) If a license contains monitoring provisions, the licensee shall act in accordance with the direction given by the monitoring archaeologist and/or monitoring paleontologist, especially with respect to:

(i) methods of handling any artifact or fossil specimen so as to minimize any risk of loss, damage, substantive injury to, or deterioration of, the artifact or specimen;

(ii) methods of preserving from damage, decay, or deterioration any artifact or fossil specimen by contact with air, light, or otherwise;

(iii) methods of entering upon or dealing with any site so to avoid as much as possible any damage to the site; and

(iv) methods of cataloguing, indexing, or recording any artifacts and/or fossil specimens found upon or in the vicinity of any site whether or not those artifacts or specimens are brought to the surface.

(3) (a) Changes in financial support or equipment for the project from that listed on the license application must be approved by the institute.

(b) The licensee shall notify the institute in writing of changes or proposed changes in financial support or equipment from that noted in the license application. The notice shall contain information regarding the change in the form and detail required by the institute. The institute must be afforded at least ten business days to review the changes before making a decision whether or not to

approve them. If the institute fails to respond within the ten-day period, the changes are considered approved.

(c) If the institute determines that changes or proposed changes in the financial support or the equipment for the project from that listed in the license application decrease materially the licensee's ability to carry out and complete the project in accordance with the research plan approved by the institute, the State Archaeologist may revoke the license.

(4) (a) The institute may require that security be provided and maintained for sites where submerged archaeological historic property or submerged paleontological property are discovered that are sufficiently significant to warrant protection.

(b) If the institute determines that a site warrants protection, the licensee is responsible for providing and maintaining security for the site.

(c) The State is not responsible for marking or protecting a site except as the institute may determine to be desirable in the administration of this article.

(5) During work carried out under a license granted by the institute, the applicant shall maintain logs of all activities related to the license on standard forms prescribed by the institute which must include:

(a) a day log;

(b) a survey log;

(c) a diving log;

(d) a photographic log; and

(e) an artifact log, including a catalogue numbering system prescribed by the institute.

(6) (a) The licensee may not use any means of survey or excavation that would destroy or substantially injure a submerged archaeological historic property or submerged paleontological property before its location has been documented.

(b) The licensee may not use explosives, cutterhead dredges, draglines, clam dredges, airlifts, suction dredges, propwash deflectors, or other grossly destructive devices in any aspect of activities covered under a license without the prior written consent of the institute.

(7) (a) Recovery of artifacts and/or fossils may be made only under the supervision of the monitoring archaeologist in accordance with the research plan approved by the institute.

(b) Large artifacts such as cannons, anchors, and hull remains that have not been specified for recovery in the license may not be recovered unless the licensee has obtained specific written permission from the institute.

(c) Before a division of artifacts and/or fossils in accordance with the method established at the issuance of the license, the licensee may not:

(i) devise, bequeath, transfer, convey, or dispose of by any manner an artifact or fossil recovered under the authority of a license; or

(ii) melt, render down, or in any way change the shape, character, or form of an artifact or fossil recovered under the authority of a license.

(8) (a) The licensee is wholly responsible for transporting, storing, and stabilizing all artifacts and fossils raised under the license and for the costs associated with these activities. The licensee is wholly responsible for conserving all artifacts and/or fossils to which the licensee receives title in a division.

(b) The licensee shall deliver by a safe means all artifacts and/or fossils recovered during each calendar month through the duration of the license to the conservation facility approved by the institute in accordance with Section 54-7-720(A)(1)(b) for secure storage until the artifacts and/or fossils are treated or disposed of in accordance with the license. The licensee shall ensure delivery of the artifacts and/or fossils to the conservation facility within a time that has been specified in the license.

(c) Every artifact and fossil delivered for storage to the conservation facility must be catalogued on an inventory form. The inventory form shall indicate receipt of the artifacts and/or fossils through the signature of a person authorized by the facility to receive the artifacts and fossils from the licensee. One copy of the inventory must be retained by the licensee, one copy must be transmitted to the institute, and one copy must be kept with the artifacts and/or fossils at the conservation facility.

(d) The institute may designate separate storage areas for artifacts and fossils

which are bulky and of a comparatively low intrinsic historical, scientific, or educational value from those items of high intrinsic historical, scientific, or educational value.

(e) While any artifact or fossil is in storage, the State may use whatever means appropriate to inspect, document, conserve, record, and analyze the artifact or fossil.

(9) (a) The licensee shall comply fully with all applicable federal, state, or local safety regulations governing activities exercised under the privileges of the license.

(b) The licensee shall agree to indemnify the State and the institute from liability in accordance with Section 54-7-820(B).

(c) The licensee shall maintain adequate insurance coverage for workers' compensation and liability to cover all activities under the license.

(10) The licensee shall remove all waste, refuse, rubbish, or litter from the submerged lands caused by the licensed activity.

(11) (a) The licensee shall comply fully with all federal, state, and local laws and regulations which govern the activities exercised under the privileges of the license and shall apply for, receive, and fully comply with all necessary licenses and permits.

(b) The licensee shall ensure that its operations are conducted in a manner so as not to impede navigation in existing federal or state navigation channels or to damage or destroy important natural areas, geologic formations, ecological preserves, or habitat areas.

(12) In addition to any monitoring requirement that may be set forth in the license, a representative of the institute or, where paleontological property is involved, a representative of the museum may visit and be present at the location of operations carried out under a license including diving operations, storage, conservation, recordation, or any other aspect of the operations for which a license has been granted in order to ensure compliance with the license and this article.

(13) (a) A representative of the institute or other designated state enforcement authority may at any time require the licensee to produce the license for examination.

(b) A representative of the institute may examine all work done or being done under the license.

(14) Licensees shall maintain records and file reports of activities as the institute specifies in the license. All records must be open to inspection by representatives of the institute or, where paleontological property is involved, representatives of the museum during reasonable working hours.

(15) A license, or any part of a license, may not be assigned by the licensee to another person including a successor in interest of the licensee without the prior written consent of the institute. The work covered by a license may not be contracted or subcontracted by the licensee to any party not addressed by the license without the prior written consent of the institute.

(16) The licensee shall retain full responsibility for the operations conducted under the license whether or not any of the work has been contracted or subcontracted. At all times there must be a person designated by the licensee aboard a vessel or present at any phase of the operation conducted under the privileges of the license who must be responsible for the work and who is familiar with the law, stipulations, and directives concerning the work and who is responsible for compliance with them in order to insure preservation of submerged archaeological historic property and/or submerged paleontological property.

(17) The licensee shall prohibit its agents or employees from retaining any artifact and/or fossil specimens from a site.

(18) (a) No applicant may be granted more than one exclusive license for the same time period.

(b) To afford adequate protection for the interest of the State, it is the policy of the institute to limit the number of licenses granted to those that can be properly supervised, monitored, and administered by the authorized agents of the institute.

SECTION 54-7-750. Additional provisions pertaining to intensive survey licenses.

(A) The conditions set forth in this section for intensive survey licenses apply in addition to the terms and conditions for all licenses.

(B) (1) The institute may issue an intensive survey license for up to a defined one square mile

area.

(2)

(a) The institute may issue an intensive survey license for up to ninety days.

(b) The licensee may request in writing renewal of the license for one additional period of up to ninety days. Upon application and payment to the institute of an additional fee in the same amount as the initial fee no later than fifteen days before the expiration of the license, the institute may renew a license under which the work has adhered to the license if the institute finds the renewal to be in the best interest of the State.

(c)

(i) Upon written request and payment to the institute of an additional fee in the same amount as the initial fee, at any time throughout the duration of a license, the licensee may reserve intensive survey rights in the square mile sections immediately surrounding and contiguous to the license area. Unless specifically approved in writing by the institute, the licensee may not carry out any activity in the reserved area until the institute's issuance of an additional license for the reserved area.

(ii) The institute may issue an additional intensive survey license for the requested reserved area without any subsequent additional fee if the institute has determined that the licensee has adhered to the terms of the initial license.

(C) With a minimum of disturbance to the site the licensee shall:

(1) identify the source of anomalies;

(2) delineate the extent of the site; and

(3) evaluate the potential characteristics and significance of the submerged archaeological historic property or submerged paleontological property in consultation with the monitoring archaeologist or other representative of the institute or museum.

(D) The licensee may not recover artifacts and/or fossil materials other than a limited number of small diagnostic artifactual and fossil materials that are useful in dating the site or in otherwise determining site significance.

(E) If the institute determines that the licensee has carried out the intensive survey in compliance with the license and this article, the institute may:

(1) retain the state's title and control of those artifactual and fossil items that the institute considers to be of primary scientific value or of major archaeological, anthropological, historical, paleontological, recreational, or other public value; and

(2) release the state's title to those artifactual and fossil items the institute does not consider to be of primary scientific value or of major archaeological, anthropological, historical, recreational, or other public value.

(F) (1) (a) Unless waived in writing by the licensee, the licensee has an exclusive interest for data recovery purposes in the intensive survey license area for one hundred eighty days from the expiration date of the license. The licensee must apply for a data recovery license in accordance with the provisions of this article within the one hundred eighty-day period in order to exercise the licensee's exclusive interest.

(b) If the licensee has reserved intensive survey rights in areas immediately surrounding and contiguous to the licensed one square mile section, then, unless waived in writing by the licensee, the licensee has an exclusive interest for data recovery purposes in those reserved areas, if an intensive survey has been conducted in those areas, for one hundred eighty days from the expiration of a license related to those areas that has been issued to the licensee. The licensee shall apply for a data recovery license in accordance with the provisions of this article within the one hundred eighty-day period in order to exercise the licensee's exclusive interest.

(2) If the institute does not receive the data recovery license application for the surveyed area within the one hundred eighty-day period or the extended period, the institute may then accept license applications from other persons.

SECTION 54-7-760. Additional provisions pertaining to data recovery licenses.

(A) The conditions established in this section for data recovery licenses apply in addition to the terms and conditions for all licenses established in Sections 54-7-670 through 54-7-730.

(B) (1) An applicant may not be issued more than one license at a time for a single submerged archaeological historic property or submerged paleontological property unless the institute determines that the applicant is capable of carrying out all proposed activities in a manner satisfactory to the institute and that the licenses can be properly supervised and administered by the institute.

(2) The institute may issue a data recovery license for an appropriate period not to exceed one year. The licensee may request in writing renewal of the license for the same additional period. Upon application and payment of an additional fee not later than thirty days before the expiration of the license, the institute may renew a license under which work has adhered to the license if the institute finds the renewal to be in the best interest of the State.

(C) (1) In areas disturbed under license, all artifacts encountered must be recovered by the licensee, with the exception of large artifacts such as cannons, anchors, and hull remains which would require special handling, storage, and preservation. The licensee shall contact the institute when large artifacts or hull remains are involved.

(2) In areas disturbed under license, all specimens encountered must be recovered by the licensee, with the exception of fragile fossils which would require special handling, storage, and preservation or complete or partial intact skeletal remains. The licensee shall immediately contact the museum if complete or partial intact skeletal remains are found if the fossil needs special handling to insure its preservation on excavation.

SECTION 54-7-770. Modification of licenses; property disposition agreements.

Upon the written request of the licensee, or if considered necessary by the institute, the institute may issue a modification to the license that can add, delete, or modify provisions contained in the license if the modification is consistent with this article.

(1) The institute may determine that with respect to a particular application for a data recovery license, it is in the best interest of the State to do either, or a combination of the following:

(a) retain the state's title and control of all or a portion of recovered submerged archaeological historic property or submerged paleontological property; or

(b) enter into a disposition agreement and convey the state's title to all or a portion of recovered submerged archaeological historic property or submerged paleontological property.

(2) (a) A data recovery license issued by the institute also may include a disposition agreement that authorizes the state's conveyance of title to submerged archaeological historic property or submerged paleontological property, or a portion of the property, if:

(i) the institute and the applicant have agreed upon a division of the artifacts and/or fossils expected to be recovered which may be in value, in kind, or a combination of both; and

(ii) the applicant has agreed that its share of the division constitutes reasonable compensation for the recovery of artifacts and/or fossils to which the institute determines to retain the state's title.

(b) The institute shall act as arbiter of the division of artifacts and fossils giving due consideration to the fair treatment of the applicant and acting in the best interest of the State which may include the desire to maintain the integrity of a collection as a whole.

(c) The terms of a disposition agreement must include a provision that, except as provided in item (d) of this subsection, following the actual disposition of the artifacts and/or fossils, the licensee owns the artifacts and/or fossils free and clear of any interest of the institute or the State.

(d) The terms of a disposition agreement may include:

(i) an option or right of first refusal by the institute to purchase from the licensee after disposition of title one or more artifacts and/or fossils about which the institute has made a written determination to be of archaeological, anthropological, historical, recreational, or other public value to warrant reacquisition by the institute in certain circumstances; and

(ii) the terms of additional compensation to be received by the licensee if, after recovery of the artifacts and/or fossils, the institute elects to retain title to more artifacts and/or fossils than as originally provided in the disposition agreement.

(3) A representative of the institute or, where submerged paleontological property is

involved, a representative of the museum, and the licensee shall inspect all artifacts and/or fossils recovered under the license within a reasonable time following recovery but in no event later than sixty days after the expiration of the license.

(4) The institute and the licensee shall carry out the terms of disposition of artifacts as agreed upon in the license which will allow for a reasonable time for photography, study, research, and conservation of the artifacts and/or fossils.

(5) The licensee is not entitled to claim any sum other than payment, if any, which may be provided for under the disposition agreement and is not entitled to claim reimbursement of expenses of data recovery.

(6) For a commercial applicant for a data recovery license, the applicant, if licensed, must receive at least fifty percent of the artifacts and/or fossils recovered in value or in-kind.

SECTION 54-7-785. Finder of wreck other than licensed salvor; share of recovery.

If the finder of a wreck is other than the licensed salvor (commercial applicant), the finder must receive twenty-five percent of the licensed salvor's share.

SECTION 54-7-790. License not required of institute or of museum.

(A) A license is not required of the institute for any undertaking otherwise requiring a license under this article.

(B) A license is not required of the museum for any undertaking involving paleontological property otherwise required under this article.

SECTION 54-7-800. Suspension of license; revocation or restoration; grounds for revocation; notice and hearing; appropriation of data and artifacts recovered as result of violation of Article.

(A) The institute may suspend operations under a license at any time for just cause if it has reason to believe that the terms and provisions of a license or other applicable law or regulation are being violated. Within ten days of the suspension, the State Underwater Archaeologist or his designee shall begin investigating the facts underlying a suspension. Upon conclusion of this investigation, the State Underwater Archaeologist shall issue a written determination recommending either that the license be restored or that the license be revoked. If the State Underwater Archaeologist recommends revocation of the license, then the license shall remain suspended until the matter is resolved as provided in this section.

(B) The State Underwater Archaeologist may revoke a license for:

- (1) failure to begin work under the terms of the license within the first one-third of the period of the license;
- (2) failure to work diligently toward completion of the project after it has been started or failure to maintain a presence on the site if weather permits;
- (3) if a licensee knowingly makes or causes to be made a false statement or report that is material to an action taken by the institute;
- (4) failure to comply with any of the provisions of the license;
- (5) violation of this article or any other pertinent law or regulation; or
- (6) when a license has been issued based upon incorrect information, mistaken belief, or clerical error, or any other just cause as provided by this article.

(C) (1) The institute shall serve a notice of intent to revoke a license upon the licensee with a brief statement of the reasons alleged.

(2) The licensee may request a hearing within thirty days of receiving the notice by filing a written request for a hearing with the institute.

(3) The hearing must be held in accordance with Article 3, Chapter 23, Title 1, and the Administrative Procedures Act .

(D) The institute or anyone authorized by the institute may appropriate any artifacts and data that have been collected or recovered as a result of a violation of this article. The appropriated artifactual materials must be managed, cared for, and administered by the institute and the appropriated paleontological materials must be managed, cared for, and administered by the museum until a hearing can

be held.

SECTION 54-7-810. Violation of Article a misdemeanor; penalties.

(A) (1) A person who violates any of the provisions of Section 54-7-650(G), 54-7-660, or 54-7-670 is guilty of a misdemeanor and, upon conviction, must be punished by a fine of not more than fifty dollars. If a person holds a hobby license issued under these sections, the license may be revoked by the institute.

(2) Each day a violation continues constitutes a separate offense.

(B) (1) A person who violates the terms of an exclusive license to utilize a submerged archaeological historic property or paleontological property for commercial salvage or other income producing purposes issued pursuant to Section 54-7-690 is guilty of a misdemeanor and, upon conviction, must be punished by a fine of not more than ten thousand dollars or imprisonment for not more than one year, or both. If the person holds a license issued under that section, the license may be revoked by the institute.

(2) Each day a violation continues constitutes a separate offense.

SECTION 54-7-815. Excavation or salvage of certain sunken warships unlawful

Notwithstanding any other provision of law, no person may excavate or salvage any sunken warship submerged in the waters of the Atlantic ocean within three miles of the South Carolina coast where there are, or it is believed that there are, human remains without the approval of the State Budget and Control Board. A person violating this section is guilty of a felony and, upon conviction, must be fined in the discretion of the court or sentenced to a term of imprisonment not to exceed five years, or both.

SECTION 54-7-820. Retention and confidentiality of data provided to institute; exemption from liability; discovery of human remains or grave sites; issuance of licenses and administration of article; waivers and variances.

(A) The institute reserves the right to retain and distribute for research or educational purposes data provided to the institute under this article. All archaeological and paleontological records of the South Carolina Institute of Archaeology and Anthropology and the South Carolina Museum Commission pertaining to submerged archaeological historic properties and submerged paleontological properties, including, but not limited to, actual locations of the properties or mandatory reports from licensed divers concerning locations of the properties or objects or materials recovered from such properties, are not considered public record for purposes of the Freedom of Information Act. These records may only be opened when the State Underwater Archaeologist considers that it is in the best interest of the State to allow access to the records upon good cause shown by the persons petitioning to open the records.

(B) The State and the institute are not liable or responsible for any accident, injury, or other harm sustained by any person or loss, damage, or harm to any vessel, equipment, or property in any way connected or associated with activities conducted on or about submerged lands with or without a license. Licensees shall agree to protect, indemnify, and hold harmless the institute and the State against liabilities, suits, actions, claims, demands, losses, expenses, and costs of every kind incurred by, or asserted or imposed against, the institute or the State as a result of or in connection with the license. All money expended by the institute or the State as a result of these liabilities, suits, actions, claims, demands, losses, expenses, or costs, together with interest at a rate not to exceed the maximum interest rate permitted by law, is due and payable immediately and without notice by the licensee to the institute or the State, as appropriate.

(C) (1) If, in the course of activity licensed under this article a person discovers human remains or an apparent grave site, the person shall:

(a) leave the remains undisturbed unless the remains are a person who died in the course of diving operations or other immediate cause, including, but not limited to, drowning, boating accident, or homicide;

(b) immediately notify the State Underwater Archaeologist or a representative of

the institute; and

(c) suspend activity at the site until permitted to resume by the institute.

(2) The State reserves the right to recover human remains for the purpose of study or reburial in accordance with any pertinent federal or state law.

(D)

(1) Except as may be otherwise specifically provided, the State Underwater Archaeologist is designated to issue licenses and otherwise administer this article.

(2) The institute may establish from time to time detailed guidelines containing archeology standards, processing requirements, and other requirements or matters relating to the administration of this article.

(E) The institute may waive or vary particular provisions of this article to the extent that the waiver or variance is not inconsistent with this article and if, in the written determination of the institute, the application of a provision of this article in a specific case or in an emergency situation would be inequitable or contrary to the purposes of the article.

SECTION 54-7-830. Privately-owned land not subject to Article.

Nothing in this article may be construed to limit or prohibit the use of privately-owned land by its owner or require the owner to obtain a license required by this article for any activity on his privately-owned land.

SECTION 54-7-840. Educational program; underwater archaeologist on staff of institute.

The institute shall:

(1) establish and maintain an educational program for the training of interested members of the public in the identification, recordation, and registration of submerged archaeological historic property and certify those who have successfully completed such training; and

(2) ensure that at least one member of the staff of the institute is qualified by training and experience in the field of underwater archaeology.

SECTION 54-7-850. Retention and use of license fees.

All license fees received by the institute pursuant to this article may be retained without regard to the fiscal year of receipt and must be used only to implement this article.

APPENDIX B

UNITED STATES NAVY SHIPWRECKS OUTSIDE SOUTH CAROLINA** (in date order)

VES_NAME	PREV_NAME	VES_TYPE	WRECK	LOC_ST	LOCATION	COMMENTS
GUNBOAT 159 (USS)		64.5-FOOT GUNBOAT-2 GUN	1810	SC	ATLANTIC OCEAN	LOST AFTER DEPARTING CHARLESTON ON SEPTEMBER 9 1810 WITH SUPPLIES FOR GUNBOATS STATIONED OFF GEORGIA COAST.
GUNBOAT 161 (USS)		64.5-FOOT GUNBOAT-3 GUN	1813	SC	ATLANTIC OCEAN	LOST OFF THE GEORGIA COAST NEAR ST. MARY'S GEORGIA IN HURRICANE DURING SEPTEMBER 16/17 1813.
GUNBOAT 164 (USS)		64.5-FOOT GUNBOAT-3 GUN	1813	SC	ATLANTIC OCEAN	LOST OFF THE GEORGIA COAST NEAR ST. MARY'S GEORGIA IN HURRICANE DURING SEPTEMBER 16/17 1813.
ERICSSON (USS)		150-FOOT TORPEDO BOAT	1912	SC	ATLANTIC OCEAN	MOVED TO CHARLESTON NAVY BASE 1908. DECOMMISSIONED 4/5/1912. SUNK 11/24/1920 POSSIBLY NEAR NORFOLK VIRGINIA.
GRAVEN (USS). ALSO TORPEDO BOAT DESTROYER NO. 10	T.A.M. CRAVEN (1900). COMMISSIONED 1900 1902 AND 1907	151-FOOT TORPEDO BOAT	1913	SC	ATLANTIC OCEAN	DECOMMISSIONED AND STRUCK AT CHARLESTON NAVY YARD 11/14/1913. SUNK AS A TARGET SOON AFTER. LOCATION UNKNOWN.
WILKES (USS)		175-FOOT TORPEDO BOAT	1914	SC	ATLANTIC OCEAN	BASED IN CHARLESTON 11/23/1908. STRUCK FROM NAVAL VESSEL REGISTER 11/15/1913. PRESUMED USED AS TARGET AND SUNK DATE AND LOCATION UNKNOWN.
GRAMPUS (USS)		92-FOOT SCHOONER-12 GUN	1843	SC	ATLANTIC OCEAN	LOST BETWEEN MARCH 14 AND APRIL 15 1843 AFTER LEAVING CHARLESTON FOR NORFOLK VA.
BALAO (USS)	SS-285 (1943).AGSS-285 (1957)	311-FOOT AUXILLARY SUBMARINE	1963	SC	ATLANTIC OCEAN	STRUCK FROM NAVAL VESSEL REGISTER 8/1/1963. SUNK IN 468 FATHOMS 9/6/1963.
SOLEY (USS) DD-707		376.5-FOOT DESTROYER	1970	SC	ATLANTIC OCEAN	DECOMMISSIONED 2/13/1970 AT CHARLESTON NAVY BASE SC. STRUCK FROM NAVAL VESSEL REGISTER 7/1/1970 AND USED AS A TARGET 9/18/1970. LOCATION UNKNOWN.
HOBBY (USS) DD-610		348-FOOT DESTROYER	1972	SC	ATLANTIC OCEAN	STRUCK FROM NAVAL VESSEL REGISTER 7/1/1971. SUNK 6/28/1972. LOCATION UNKNOWN.

** USS *Hector* is located approximately 10 miles off Cape Romaine, South Carolina. The vessel does not appear in this inventory. However, it is included in the inventory of US Navy wrecks in South Carolina State waters (See Chapter Two) because of its positive identification and close proximity to South Carolina Territorial waters.

APPENDIX C

CONFEDERATE NAVY SHIPWRECKS AND BLOCKADE-RUNNERS IN SOUTH CAROLINA (in alphabetical order)

(* refers to shipwrecks for which SCIAA has accurate GPS coordinates)

VES_NAME	PREV_NAME	VES_TYPE	WRECK	LOC_ST	LOCATION	COMMENTS
BEATRICE		167-FOOT SIDE-WHEEL STEAMER BLOCKADE RUNNER	1864	SC	CHARLESTON HARBOR	GROUNDING ON SULLIVAN'S ISLAND NEAR BOWMAN'S JETTY WHILE INBOUND FOR CHARLESTON ON 11/27/1864. SHELLED AND BURNED BY UNION TROOPS. DEEMED A TOTAL LOSS.
CELT		160-FOOT SIDEWHEEL STEAMER BLOCKADE RUNNER	1865	SC	CHARLESTON HARBOR	RAN AGROUND ON SULLIVAN'S ISLAND EAST OF BOWMAN'S JETTY WHILE OUTBOUND FROM CHARLESTON ON 02/14/1865. 190 COTTON BAILS SALVAGED BY UNION FORCES BUT HULL AND MACHINERY WAS A WRITE-OFF.
CHARLESTON (CSS)*		180-FOOT CASEMATE IRONCLAD RAM-6 GUNS	1865	SC	CHARLESTON HARBOR	BURNED AND BLOWN UP OFF MARSHALL'S WHARF TO PREVENT CAPTURE 2/18/1865 PRIOR TO SURRENDER OF CHARLESTON. POSSIBLY DEMOLISHED AND SALVAGED DURING THE EARLY 1870S. STERN SECTION WITH PROPELLER AND BROOKE RIFLE RECOVERED DURING HARBOR DREDGING OFF CHARLESTON AQUARIUM MAY BE FROM CSS CHARLESTON. REMAINS REDEPOSITED NEAR DRUM ISLAND. SEE SCIAA FOR COORDINATES.
CHICORA		150-FOOT CASEMATE IRONCLAD RAM	1865	SC	CHARLESTON HARBOR	BURNED AND BLOWN UP OFF MARSHALL'S WHARF TO PREVENT CAPTURE 2/18/1865 PRIOR TO SURRENDER OF CHARLESTON. POSSIBLY DEMOLISHED AND SALVAGED DURING THE EARLY 1870S.
COLUMBIA (CSS)		216-FOOT CASEMATE IRONCLAD RAM-6 GUNS	1865	SC	CHARLESTON HARBOR	SNAGGED ON SUNKEN WRECK NEAR FORT MOULTRIE 01/12/1865. RAISED BY USN & TOWED TO NORFOLK 5/1865. SOLD BY USN FOR SCRAP 10/15/1867.
CONSTANCE*	CONSTANCE.	201-FOOT STEAMER BLOCKADE RUNNER	1864	SC	CHARLESTON HARBOR	STRUCK THE WRECKS OF THE GEORGIANA AND MARY BOWERS WHILE INBOUND FOR CHARLESTON AND SANK NEARBY BETWEEN 08/22/1864 AND 10/06/1864. STATE SITE FILE 38CH77. REMOTE SENSING SURVEY BY SCIAA IN 2001.
DAVID (CSS)		50-FOOT STEAM TORPEDO BOAT	1865	SC	CHARLESTON HARBOR	THIS CRAFT ALONG WITH 5 OTHER VESSELS OF THIS CLASS WERE BEACHED AND ABANDONED ALONG THE COOPER AND ASHLEY RIVERS IN FEBRUARY 1865. THREE REMOVED BY UNION FORCES DISPOSITION OF REMAINING THREE CRAFT UNKNOWN.

VES_NAME	PREV_NAME	VES_TYPE	WRECK	LOC_ST	LOCATION	COMMENTS
EDWIN		STEAM BLOCKADE RUNNER	1862	SC	CHARLESTON HARBOR	RUN ASHORE ON MORRIS ISLAND NEAR LIGHTHOUSE INLET TO AVOID CAPTURE 05/08/1862. CONTEMPORARY SALVAGE OF CARGO. DISPOSITION OF VESSEL UNKNOWN.
FLAMINGO		270-FOOT SIDEWHEEL STEAMER BLOCKADE RUNNER	1864	SC	CHARLESTON HARBOR	SHOMETTE (1976) DATE LOST 10/23/1864, ALTHOUGH POSSIBLY WRECKED OFF CHARLESTON 1865. A CONTEMPORARY CHART SHOWS VESSEL WRECKED OFF BATTERY RUTHLEDGE. LOCATION: BETWEEN BOWMAN'S JETTY & DRUNKEN DICK SHOALS.
FLORA		200-FOOT SIDEWHEEL STEAMER BLOCKADE RUNNER	1864	SC	CHARLESTON HARBOR	GROUNDING OFF BEACH CHANNEL 10/22/1864 AND DESTROYED BY UNION GUNS. DISPOSITION OF WRECK UNKNOWN.
GENERAL CLINCH		131-FOOT SIDEWHEEL STEAMER TRANSPORT PATROL VESSEL	1863	SC	CHARLESTON HARBOR	SUNK 1863. MAY HAVE BEEN RAISED IN 1864 AND USED AS BLOCKADE RUNNER.
GEORGIANA*		205-FOOT IRON SCREW STEAMER	1863	SC	CHARLESTON HARBOR	RUDDER DAMAGED BY GUNFIRE. GROUNDING OFF ISLE OF PALMS TO PREVENT CAPTURE. ABANDONED AND BURNED 3/18/1863. SOME CONTEMPORARY SALVAGE OF CARGO BY UNION FORCES. SOME MODERN SALVAGE IN THE LATE 1960S AND EARLY 1970S. STATE SITE FILE 38CH53. REMOTE SENSING SURVEY BY SCIAA IN 2001.
H.L. HUNLEY*		45-FOOT SUBMARINE	1864	SC	CHARLESTON HARBOR	SUNK USS HOUSATONIC IN CHARLESTON HARBOR 2MI FROM BATTERY MARSHALL 2/17/1864 AND WAS SUBSEQUENTLY LOST. PUT ON NATIONAL REGISTER 12/29/78. DISCOVERED 05/03/1995. SCIAA/NHC/NPS INVESTIGATED 1996. RECOVERED 08/08/2000. STATE SITE FILE 38CH1651.
INDIAN CHIEF		STEAMER	1865	SC	CHARLESTON HARBOR?	RECEIVING SHIP AND TENDER FOR TORPEDO OPERATIONS. BURNED AT HER MOORINGS IN THE COOPER RIVER TO PREVENT CAPTURE 2/18/1865 PRIOR TO EVACUATION OF CHARLESTON.
JOHN RANDOLPH		108-FOOT PADDLE WHEELED STEAMER	1865	SC	UNKNOWN	SERVED AS TROOP TRANSPORT AROUND CHARLESTON FROM FALL 1861. FITTED AS BLOCKADE RUNNER IN 1864. LOST IN LATE JANUARY 1865. CURRENT LOCATION AND CONDITION UNKNOWN.
LIVERPOOL		SCHOONER-RIGGED BLOCKADE RUNNER	1862	SC	GEORGETOWN	PURSUED BY USS KEYSTONE STATE AND RAN AROUND 04/10/1862 NEAR NORTH INLET WHILE ATTEMPTING TO REACH GEORGETOWN. SET AFIRE AND DESERTED TO PREVENT CAPTURE. STATE SITE FILE 38GE64.

VES_NAME	PREV_NAME	VES_TYPE	WRECK	LOC_ST	LOCATION	COMMENTS
MARION		SIDEWHEEL STEAMER	1863	SC	ASHLEY RIVER MOUTH	LEASED BY THE CONFEDERATE GOVERNMENT 1861. USED BY CSA AS TRANSPORT AND SUPPLY VESSEL AND LAYING MINES IN CHARLESTON HARBOR. ACCIDENTALLY SANK IN THE ASHLEY RIVER NEAR MOUTH OF WAPOO CREEK 4/6/1863 AFTER STRIKING A MINE. SOME CONTEMPORARY SALVAGE. SOME ARTIFACTS REMOVED BY SPORT DIVERS.
MARY BOWERS*		SIDE-WHEEL STEAMER BLOCKADE RUNNER	1864	SC	CHARLESTON HARBOR	STRUCK THE SUBMERGED HULL OF THE GEORG/ANNA WHILE INBOUND FOR CHARLESTON 08/31/1864. SANK WITHIN MINUTES ATOP THE GEORGIANNA. SOME CONTEMPORARY SALVAGE. SOME MODERN SALVAGE OF CARGO UNDER A STATE LICENSE DURING 1960S AND 1970S. REMOTE SENSING SURVEY OF WRECK CONDUCTED BY SCIAA IN 2001. STATE SITE FILE 38CH53.
MINHO*		175-FOOT STEAMER BLOCKADE RUNNER	1862	SC	CHARLESTON HARBOR	RUN ASHORE NEAR BOWMAN'S JETTY ON SULLIVAN'S ISLAND BY USS FLAMBEAU WHILE INBOUND FOR CHARLESTON 10/02/1862. MUCH OF THE CIVILIAN AND MILITARY CARGO SALVAGED IN 1862. SOME MODERN SALVAGE UNDER A STATE LICENSE DURING THE 1980S. REMOTE SENSING SURVEY OF WRECK CONDUCTED BY SCIAA IN 1995 AND 2001. STATE SITE FILE 38CH880.
NELLIE	CAWTABA 1857; NELLIE 1861	177-FOOT SIDE-WHEEL STEAMER BLOCKADE RUNNER	1862	SC	CHARLESTON HARBOR	RAN ASHORE BY UNION CRUISERS NEAR SOUTH END OF ISLE OF PALMS (THEN NAMED LONG ISLAND). MUCH OF THE CARGO SALVAGED IN 1861. LOCATION AND CONDITION OF WRECK UNKNOWN.
NORSEMAN		SCHOONER-RIGGED PROPELLER-DRIVEN STEAMER BLOCKADE RUNNER	1863	SC	CHARLESTON HARBOR	STRUCK A SUNKEN WRECK OR SNAG OUTBOUND FROM CHARLESTON AND SANK IN 12 FEET OF WATER. POSSIBLY 1.5 MILES OFF ISLE OF PALMS.
PALMETTO STATE (CSS)		150-FOOT IRONCLAD RAM GUNBOAT	1865	SC	CHARLESTON HARBOR	DESTROYED NEAR TOWN CREEK TO PREVENT CAPTURE AT EVACUATION OF CHARLESTON 2/18/1865. POSSIBLE LOCATION BENEATH STATE PIER 8 AT CHARLESTON DOCKS NEAR TOWN CREEK.
PEEDEE (CSS)*		170-FOOT DOUBLE-SCREW SLOOP GUNBOAT	1865	SC	PEEDEE RIVER	3-MASTED SCHOONER RIG. SCUTTLED TO PREVENT CAPTURE JUST DOWNSTREAM OF THE SC HWY 301 BRIDGE. PROPELLERS SALVAGED IN 1926 AND PUT ON DISPLAY AT FLORENCE CITY MUSEUM. ENGINES AN SOME HULL SALVAGED IN 1954. SOUTH CAROLINA STATE SITE FILE 38FL81.

VES_NAME	PREV_NAME	VES_TYPE	WRECK	LOC_ST	LOCATION	COMMENTS
PETREL	ECLIPSE (CHARLESTON PILOT BOAT). RENAMED WILLIAM AIKEN US REVENUE CUTTER SCHOONER UNTIL DECEMBER 1860. SOLD RENAMED PETREL AND GRANTED LETTER OF MARQUE 07/10/1861	PRIVATEER SCHOONER	1861	SC	ATLANTIC OCEAN. 32DEG 30MIN; 79DEG 09MIN	SUNK BY USS ST LAWRENCE 7/28/1861.
PRESTO	FERGUS 1863	210-FOOT SIDE- WHEEL STEAMER BLOCKADE RUNNER	1864	SC	CHARLESTON HARBOR	RAN AGROUND NEAR BATTERY RUTLIDGE ON SULLIVAN'S ISLAND 02/02/1864 AND DESTROYED BY UNION GUNFIRE.
PRINCE ALBERT*		138-FOOT PROPELLER STEAMER BLOCKADE RUNNER	1864	SC	CHARLESTON HARBOR	RAN AFOUL OF THE WRECK OF THE MINHO WHILE ENTERING CHARLESTON HARBOR 08/09/1864 AND DESTROYED BY UNION GUNFIRE. STATE SITE FILE 38CH880.
PRINCE OF WALES		SCHOONER-RIGGED BLOCKADE RUNNER	1861	SC	GEORGETOWN	RAN AGROUND AT NORTH INLET SOME 9 MILES FROM THE ENTRANCE OF GEORGETOWN AFTER BEING FIRED UPON BY UNION BLOCKADING VESSEL 12/24/1861. BURNED TO PREVENT CAPTURE.
QUEEN OF THE WAVE		180-FOOT STEAMER BLOCKADE RUNNER	1864	SC	NORTH SANTEE RIVER	RAN AGROUND AT THE MOUTH OF THE NORTH SANTEE RIVER 02/24/1863. BURNED TO PREVENT CAPTURE. CARGO SALVAGED BY UNION FORCES. STATE SITE FILE 38GE105.
RACCOON		201-FOOT SIDE- WHEEL STEAMER BLOCKADE RUNNER	1863	SC	CHARLESTON HARBOR. SPENCE:30DEG 08'12"N; 79DEG 14'W	RAN AGROUND ON DRUNKEN DICK SHOAL WHILE INBOUND FOR CHARLESTON DURING PURSUIT BY UNION BLOCKADERS 07/19/1863. BURNED TO PREVENT CAPTURE.
RATTLESNAKE		201-FOOT TWIN- SCREW STEAMER BLOCKADE RUNNER	1865	SC	CHARLESTON HARBOR	RAN AGROUND ON NORTH EASTERN SIDE OF BREACH INLET DURING PURSUIT IN LATE JANUARY 1865. CURRENT LOCATION AND CONDITION OF WRECK UNKNOWN.
ROSE		125-FOOT SIDE- WHEEL STEAMER BLOCKADE RUNNER	1864	SC	GEORGETOWN	CAPTURED BY UNION FORCES AFTER RUNNING AGROUND NEAR THE SOUTH END OF PAWLEY'S ISLAND 06/02/1864. BURNED BY CREW OF USS WAMSUTTA. STATE SITE FILE 38GE67.
ROVER		SCHOONER-RIGGED STEAMER BLOCKADE RUNNER	1863	SC	MURRELL'S INLET	RAN AGROUND AT MURRELL'S INLET 10/19/1863 AND BURNED TO PREVENT CAPTURE.
RUBY		177-FOOT SIDE- WHEEL STEAMER BLOCKADE RUNNER	1863	SC	CHARLESTON HARBOR	RAN ASHORE ON THE BAR OFF FOLLY ISLAND NEAR THE ENTRANCE TO LIGHT HOUSE INLET 07/10/1863. FIRED ON BY UNION FORCES. BURNED AND BLOWN UP BY CAPTAIN AND CREW TO PREVENT CAPTURE. SOME CONTEMPORARY SALVAGE OF CARGO.

VES_NAME	PREV_NAME	VES_TYPE	WRECK	LOC_ST	LOCATION	COMMENTS
SAMUAL ADAMS		SCHOONER-RIGGED BLOCKADE RUNNER	1862	SC	CHARLESTON HARBOR	RAN ASHORE NEAR WESTERN END OF ISLE OF PALMS WHILE BEING PURSUED BY UNION BLOCKADERS 04/12/1862. CURRENT LOCATION AND CONDITION UNKNOWN.
SARAH		SCHOONER-RIGGED BLOCKADE RUNNER	1862	SC	BULL'S BAY	RUN ASHORE NEAR BULL'S BAY AND BURNED TO PREVENT CAPTURE. CURRENT LOCATION AND CONDITION UNKNOWN.
STONEWALL JACKSON	LEOPARD 1857; STONEWALL JACKSON 1862	222-FOOT SIDE-WHEEL STEAMER BLOCKADE RUNNER	1863	SC	CHARLESTON HARBOR	SHELLED ON HER APPROACH TO CHARLESTON. RAN AGROUND ONE-HALF MILE OFF ISLE OF PALMS AND BURNED 04/12/1863. SOME CONTEMPORARY SALVAGE.
STONO*	U.S. GUNBOAT ISAAC SMITH 11-GUN 09/09/1861	171-FOOT BLOCKADE RUNNER	1863	SC	CHARLESTON HARBOR	WRECKED ON BOWMAN'S JETTY ON SULLIVAN'S ISLAND WHILE BEING PURSUED BY USS WISSAHICKEN. SOME MODERN SALVAGE UNDER A STATE LICENSE IN THE 1980S. SEE ALSO TABLE 2.1. SITE FILE 38CH880 REMOTE SENSING SURVEY BY SCIAA IN 1995 AND 2001.
SUMTER (CSS)		SCREW STEAMER TROOP TRANSPORT	1863	SC	CHARLESTON HARBOR	POSSIBLY SIDEWHEEL STEAMER (SHOMETTE 1976). ACCIDENTALLY SUNK BY FRIENDLY GUNFIRE FROM FT MOULTRIE 8/30/1863. RAN AGROUND AND SANK NEAR FT. SUMTER.
THOMAS WATSON		BLOCKADE RUNNER	1861	SC	CHARLESTON HARBOR	RAN ASHORE ON NORTH BREAKERS OFF STONO INLET AND ABANDONED 10/15/1861. CAPTURED BY USS FLAG AND SET AFIRE AFTER SOME SALVAGE. CURRENT LOCATION AND CONDITION OF WRECK UNKNOWN.
TROPIC	TROOP TRANSPORT HUNTRESS 1838; TROPIC 1862	225-FOOT SIDE-WHEEL STEAMER BLOCKADE RUNNER	1863	SC	CHARLESTON HARBOR?	ACCIDENTALLY OR INTENTIONALLY BURNED TO PREVENT CAPTURE WHILE OUTBOUND FROM CHARLESTON 1/18/1863. CURRENT LOCATION AND CONDITION UNKNOWN.
VIRGINIA DARE		211-FOOT SIDE-WHEEL STEAMER BLOCKADE RUNNER	1864	SC	DEBORDIEU ISLAND	RAN ASHORE NEAR SOUTH END OF DEBORDIEU ISLAND SIX MILE FROM GEORGETOWN WHILE BEING PURSUED BY UNION BLOCKADER FROM WILMINGTON 01/07/1864. SOME CONTEMPORARY SALVAGE OF CARGO. CURRENT LOCATION AND CONDITION OF WRECK UNKNOWN ALTHOUGH SECTIONS OF A HEAVILY TIMBERED VESSEL WERE RECOVERED BY A DEVELOPER DURING EXCAVATION FOR FOOTINGS FOR A CONDOMINIUM IN 1988 FROM THAT AREA. STATE SITE FILE 38GE65.

APPENDIX D

UNITED STATES ARMY TRANSPORTS IN SOUTH CAROLINA (in date order)

VES_NAME	PREV_NAME	VES_TYPE	WRECK	LOC_ST	LOCATION	COMMENTS
OSCEOLA (USS)		120-FT TRANSPORT/SUPPLY STEAMER	1861	SC	SC COAST	U.S. ARMY TRANSPORT OSCEOLA WENT ASHORE POSSIBLY NEAR GEORGTOWN AND WAS LOST 11/13/1861.
PEERLESS (USS)		TRANSPORT/SUPPLY STEAMER	1861	SC?	ATLANTIC OCEAN	LOST IN A STORM IN EARLY NOVEMBER 1861 WITH THE UNION; BELVIDERE; AND OSCEOLA.
UNION (USS)		QUARTER MASTER'S STEAMER	1861	SC	SC COAST	REPORTED AS GOING ASHORE WITH THE OSCEOLA POSSIBLY NEAR GEORGTOWN IN EARLY NOVEMBER 1861.
GOVERNOR (USS)		230-FT SIDEWHEEL TRANSPORT STEAMER	1861	SC	POSSIBLY AT LORAN 45333.5 59483.5	USED AS AN ARMY TROOP TRANSPORT FOR PORT ROYAL SOUND EXPEDITION AND LOST IN A STORM 11/2/1861 40 MILES NE OF CHARLESTON.
GOVERNOR MILTON (USS)		85-FT STEAM TUG	1863	SC	S. EDISTO RIVER	RAN AGROUND NEAR WILLTOWN BLUFF 7/10/1863. BURNED TO PREVENT CAPTURE. SOME CONTEMPORARY SALVAGE.
BOSTON (USS)		215-FT TRANSPORT STEAMER	1864	SC	ASHEPOO RIVER	RAN AGROUND AND DESTROYED TO PREVENT CAPTURE 5/25/1864. INCOMPLETE SALVAGE CONDUCTED UNDER STATE LICENSE 1981 TO 1884. REMOTE SENSING SURVEY BY SCIAA IN 2003. STATE SITE FILE 38CN57.
GENERAL SHERMAN (USS)		200-FT TINCLAD STEAMER	1874	SC	ATLANTIC OCEAN	BUILT FOR WAR DEPT. RETURNED 1865. FOUNDERS APPROXIMATELY 8 MILES OFF MYRTLE BEACH SC IN 52 TO 58 FEET OF WATER. HEAVILY COLLECTED BY SCUBA DIVERS.

APPENDIX E

FOREIGN FLAG SHIPWRECKS IN SOUTH CAROLINA (in date order)

VES_NAME	PREV_NAME	VES_TYPE	WRECK	LOC_ST	LOCATION	COMMENTS
THETIS			1781	SC	CHARLESTON HARBOR	NAVYDB:SANK IN A STORM MAY 12 1781 OFF ST LUCIA W INDIES? MARX:SANK AT CHARLESTON DOCKS DURING A HURRICANE 8/9/1781.
CHARLES-TOWNE		HALF GALLEY	1744	SC	CHARLESTON HARBOR	LOST 04/08/1744 DURING A STORM NEAR CHARLESTON WHILE ESCORTING A SLOOP OVER THE BAR. LOCATION UNCERTAIN.
ACTAEON (HMS)		603-TON FRIGATE-28GUN	1776	SC	CHARLESTON HARBOR	BURNED BY CREW TO AVOID CAPTURE 06/29/1776 AFTER RUNNING AGROUND ON MIDDLE GROUND SHOAL. SPELLING IN MARX ACTEON; SPELLING IN LYON ACTAEON. SOME CONTEMPORARY SALVAGE OF GUNS COLORS BELL AND STORES. POSSIBLY LOCATED IN 2001 BY MAGNETOMETER. STATE SITE FILE 38CH269.
LONDON		WARSHIP	1781	SC	CHARLESTON HARBOR	NAVYDB:SANK IN A STORM. MARX:SANK AT CHARLESTON DOCKS WITH HMS THETIS IN HURRICANE 8/9/1781.
AEOLUS (HMS)		SUPPLY/ARMED TRANSPORT VESSEL	1780	SC	CHARLESTON HARBOR	CONTEMPORARY ACCOUNTS ALSO NAME HER EOLUS ACETUS AND ACTEUS. RAN AGROUND NEAR SULLIVAN'S ISLAND AFTER RUDDER WAS DAMAGED BY ENEMY FIRE. BURNED AND BLEW UP TO PREVENT CAPTURE. STATE SITE FILE 38CH268.
RATTLESNAKE		SCHOONER-10GUN	1780	SC	STONO RIVER	SOUTH CAROLINA NAVY. RUN AGROUND AND BURNED ON THE EAST BANK OF THE STONO RIVER 02/14/1780
NEW CREEK CUT GALLEY		ROW GALLEY	1780	SC	CHARLESTON HARBOR	CAUGHT FIRE AND BLEW UP NEAR NEW CUT CREEK ON 02/19/1780.
ALLIGATOR (HMS)		GALLEY OR SLOOP-12GUN	1782	SC	ASHLEY RIVER	CAPTURED 03/19/1782 AND BURNED NEAR CHARLESTON.
2-CANNON WRECK (LITTLE LANDING VESSEL 1)		SAILING VESSEL-POSSIBLE GUNBOAT	LATE 18TH CENTURY	SC	COOPER RIVER MOUTH	EXCAVATED BY SCIAA 1985 1988 1989. ARTIFACTS INCLUDING 3 CANNON SUGGESTS A BRITISH REVOLUTIONARY VESSEL. STATE SITE NUMBER 38BK758.
CRUIZER		SLOOP-8GUN	UNKNOWN	SC	CHARLESTON HARBOR?	BURNED; CAPT: FRANCIS PARRY; BUILT 8/31/1752.
COLIBRI (HMS)		365-T BRIG SLOOP-16GUN	1813	SC	PORT ROYAL SOUND	RAN AGROUND ON A FALLING TIDE LEAVING PORT ROYAL SOUND. BALLAST GUNS AND MASTS REMOVED TO LIGHTEN VESSEL. WRECK POSSIBLY ON COLE SCARE REEF.

APPENDIX F

SOUTH CAROLINA STATE NAVY WRECKS

VES_NAME	PREV_NAME	VES_TYPE	WRECK	LOC_ST	LOCATION	COMMENTS
<i>BRICOLE</i>		146-FT FRIGATE-44GUN	1780	SC	COOPER RIVER MOUTH	ORIGINALLY BUILT AS A TRANSPORT. USED FOR HARBOR DEFENSE. NAVYDB: SOUTH CAROLINA STATE NAVY. BURNED TO WATERLINE. IN LATE MARCH 1780 THE <i>BRICOLE</i> WAS SCUTTLED ALONG WITH THE <i>NOTRE DAME QUEEN OF FRANCE</i> AND <i>GENERAL MOULTRIE</i> BETWEEN SHUTES FOLLY ANF GILLON STREET.
<i>GENERAL MOULTRIE</i>		SHIP-20GUN	1780	SC	COOPER RIVER MOUTH	NAVYDB: SOUTH CAROLINA STATE NAVY. BURNED TO WATERLINE. IN LATE MARCH 1780 THE <i>GENERAL MOULTRIE</i> WAS SCUTTLED ALONG WITH THE <i>BRICOLE QUEEN OF FRANCE</i> AND <i>NOTRE DAME</i> BETWEEN SHUTES FOLLY AND GILLON STREET.
<i>NOTRE DAME</i>		BRIG-16GUN	1780	SC	COOPER RIVER MOUTH	NAVYDB: SOUTH CAROLINA STATE NAVY. BURNED TO WATERLINE. IN LATE MARCH 1780 THE <i>NOTRE DAME</i> WAS SCUTTLED ALONG WITH THE <i>BRICOLE QUEEN OF FRANCE</i> AND <i>GENERAL MOULTRIE</i> BETWEEN SHUTES FOLLY ANF GILLON STREET.

APPENDIX G

ARTIFACTS FROM THE SKULL CREEK WRECK (38BU723)

The following artifacts (Figure F.1) were recovered from the Skull Creek Wreck (38BU723), located in the Skull Creek segment of the Intercoastal Waterway, Beaufort County, South Carolina. All but one of the artifacts represent a surface collection comprising a range of ship fasteners, collected during a reconnaissance survey by David Brewer, Joseph Beatty III, and Mark Newell on September 4, 1985. These artifacts were catalogued into the State's curation system on May 5, 1986 and have been curated by SCIAA. A single fragment of a peened copper pin was recovered during a return visit to the site by staff of the Maritime Research Division on September 13, 2001 following a remote sensing survey over the site and is currently at the Division's Columbia office.

Catalog Number	Quantity	Description
38BU723-1 through 7	7	Cut copper spikes ranging in length from 13.8 cm to 15.2 cm and 5 x 6 mm to 7 x 8 mm in cross section. Round heads range from 1.5 cm to 1.8 cm in diameter and are from 5 mm to 8 mm thick, narrowing towards the shank.
38BU723-8 through 10	3	Cut copper spikes ranging in length from 15.0 cm to 15.6 cm and 8 x 8 mm to 9 x 9 mm in cross section. Round heads range from 1.6 cm to 1.8 cm in diameter and are from 5 mm to 8 mm thick, narrowing towards the shank.
38BU723-11 through 12	2	Cut copper spikes ranging in length from 14.6 cm to 15.5 cm and 8 x 8 mm to 9 x 10 mm in cross section. Round heads range from 1.9 cm to 2.0 cm in diameter and are from 5 mm to 8 mm thick, narrowing towards the shank.
38BU723-13	1	Cut copper spike 16.5 cm in length and 10 x 10 mm in cross section. The round head is 1.7 cm in diameter and is 8 mm thick, narrowing towards the shank.
38BU723-14	1	Cut copper spike 7.1 cm in length and 7 x 8 mm in cross section. Round head is 2.0 cm in diameter and is 8 mm thick, narrowing towards the shank. Two fragments of wood bear the impression of the nail shaft.
38BU723-15	2	Wrought iron nail fragment 11.3 cm in length and 6 x 6 mm in cross section. No head extant. Surface fully

Catalog Number	Quantity	Description
		involved with corrosion products extending out approximately 1.0 to 1.5 cm from the shank.
38BU723-16 and 17	2	Two wood plank fragments. One fragment is 19.0 x 6.5 x 3.0 cm and contains the remains of 6 headless copper tacks, each with a 5 x 5 mm square shaft and approximately 3.0 cm in length. The second fragment is 13.0 x 5.0 x 2.5 cm and contains the remains of 5 headless copper tacks, each with a 5 x 5 mm square shaft and approximately 2.5cm in length.
38BU723-18	1	Copper rod or pin with an incomplete length of 40.0 cm and 2.0 cm in diameter. Proximal end peened to 2.5 cm. Surface lightly coated with a calcareous layer with some oyster shells adhering.
38BU723-19 (2001)	1	Copper rod or pin with an incomplete length of 27.5 cm and 2.3 cm in diameter. Proximal end peened to 2.5 cm with two splits evident. Surface lightly coated with a patina and calcareous layer.

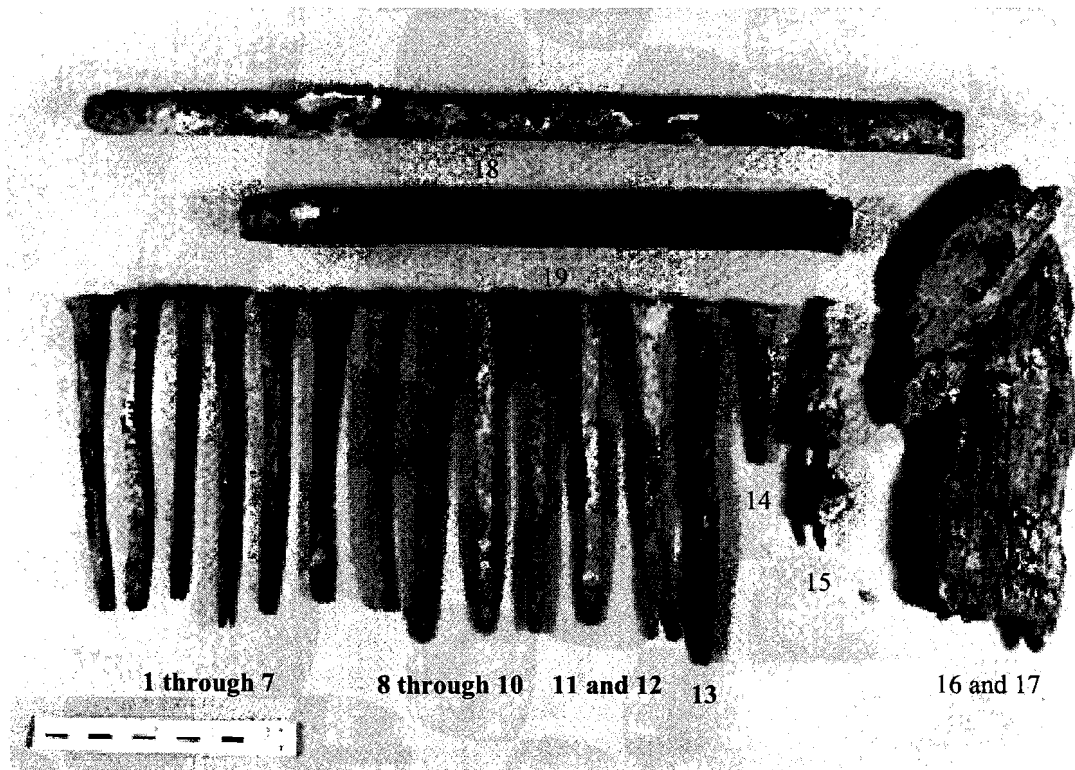


Figure G.1: Artifacts recovered from the Skull Creek Wreck (38BU723) in 1985.

APPENDIX H

ARTIFACTS RECOVERED DURING THE 2003 FIELD SEASON Station Creek Wreck (38BU2080) and USS *Harvest Moon* (38GE440)

Catalog No.	Date	Quantity	Description
38BU2080-1 (SC2-S1/SC2-36)	05-29-03	2	Ballast stones, black flint with oyster shells. 7.8cm (3in) X 6.2cm (2-7/16in) X 5.5cm (2-3/16in). (Figure G.1).
38BU2080-2 (SC2-S1/SC2-36)	05-29-03	1	Nail, wrought iron 15cm (6 in.) X 1.0cm (3/8-in) X 0.8cm (5/16-in). Head: 1.5cm (5/8-in) square, 0.4cm (3/16in) thick. (Figure G.2).
38BU2080-3 (SC2-S1/SC2-36)	05-29-03	1	Wood, Pulley Sheave Diameter: 10.0 to 11.0cm (3-3/4-in X4-1/4-in). Thickness: 3.2cm (1-5/16-in). Hole: 4.0 cm (1-1/2-in). Two 0.6cm diameter holes 6.0cm (2-3/8-in) apart Rebate one side 7.5 (3-in) X 2.5cm to 4.0cm (1-in) to 1-7/8-in) X 1.0cm (3/8-in) deep. (Figure G.3).
38BU2080-4 (SC2-S1/SC2-36)	05-29-03	4	Copper, hull sheathing with hull plank fragment with 2 copper nails attached. Cu: 16.0cm (6-1/2-in) X 9.5cm (3-3/4-in) X 0.47mm. (.0185in) Nail: 3.3cm (1-1/4-in) X 0.29cm (1/8-in) X 0.33cm (6/32-in) Head: 0.98cm (3/8-in) diameter. Nail: 5.0cm (2-in) X 0.34cm (6/32-in) X 0.39cm (3/16-in) Head: 1.2cm (1/2-in) diameter. Wood: 14.0cm X 4.0cm X 1.6cm. (Figure G.4).
38BU2080-5 (SC2-S1/SC2-36)	05-29-03	3	Copper, hull sheathing with hull plank and copper nail. Cu: 11cm (8-5/16in) X 5.5cm (2-3/16in) X 0.47mm (.0185in) Nail: 4.0cm X 0.35cm square. Head: 0.8cm square Wood: 8.5cm X 5.5cm X 1.6cm. (Hard gray coating

Catalog No.	Date	Quantity	Description
			on outboard surface). (Figure G.5).
38BU2080-6 (SC2-S1/SC2-36)	05-29-03	1	Wood, trenail fragment. Possibly as many as 18 facets, badly eroded. 5.5cm X 3.4cm diameter. (Figure G.6).
38BU2080-7 (SC2-S1/SC2-36)	05-29-03	1	Ceramic, stoneware, vessel base and side fragment, gray salt glaze exterior, brown glaze interior. 16.5cm X 11.0cm X 0.5 to 0.8cm thick. (Figure G.7).
38BU2080-8	05-29-05	1	Copper, drift pin, peened both ends. Bent along its length. 136.4cm X 2.0cm diameter. Peened to 2.2cm one end, 4.4cm at the other end. (Figure G.8).
38BU2080-s1 (SC2-S1/SC2-36)	05-29-03	1	Wood, hull plank, sample for species identification.
38BU2080-s2 (SC2-S1/SC2-36)	05-29-03	1	Wood, frame, sample for species identification.
38BU2080-s3 (SC2-S1/SC2-36)	05-29-03	1	Wood, ceiling, sample for species identification.
38GE440-s1	05-01-03	1	Wood, unknown structure, taken 3.0 meters below sediment, sample for species identification. 3.0cm X 1.4cm X 0.5cm.

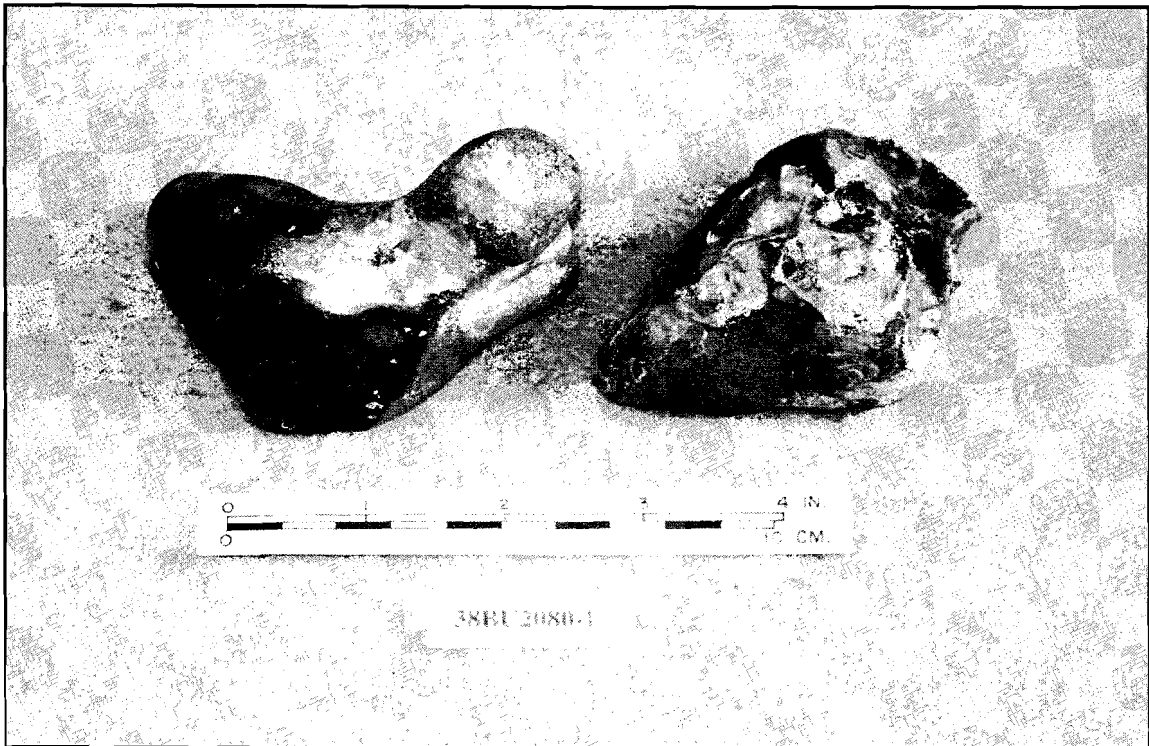


Figure G.1: Flint ballast (38BU2080-1).

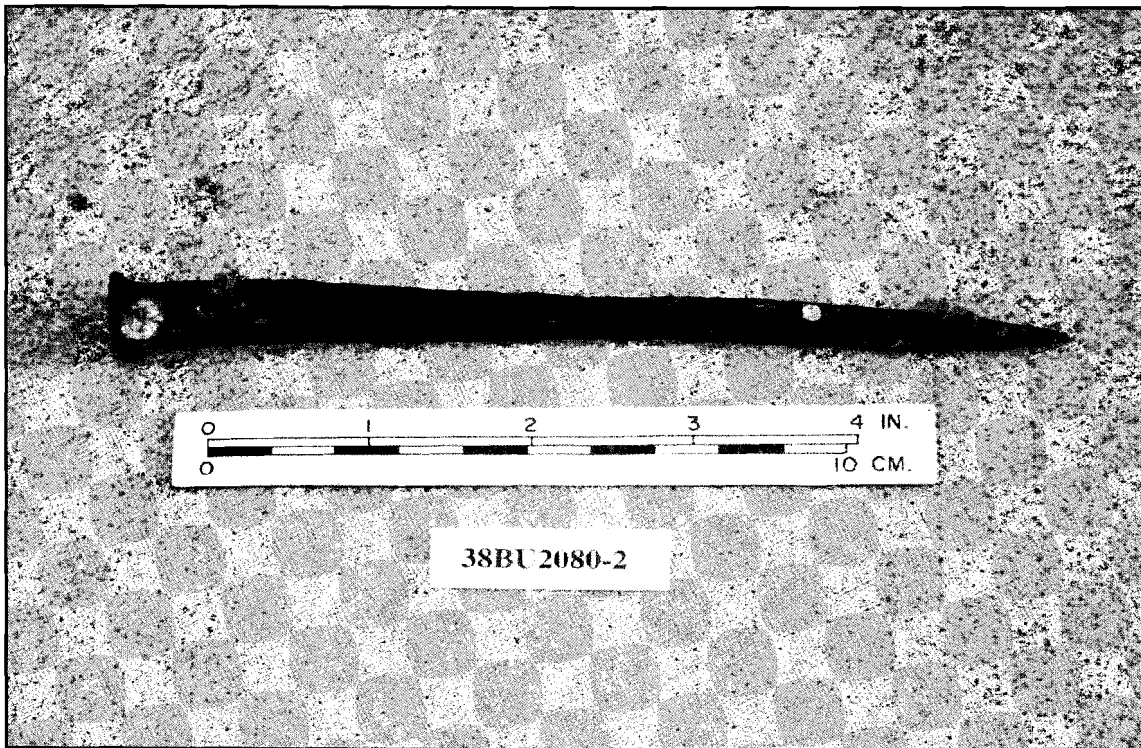


Figure 7.2: Nail (38BU2080-2).

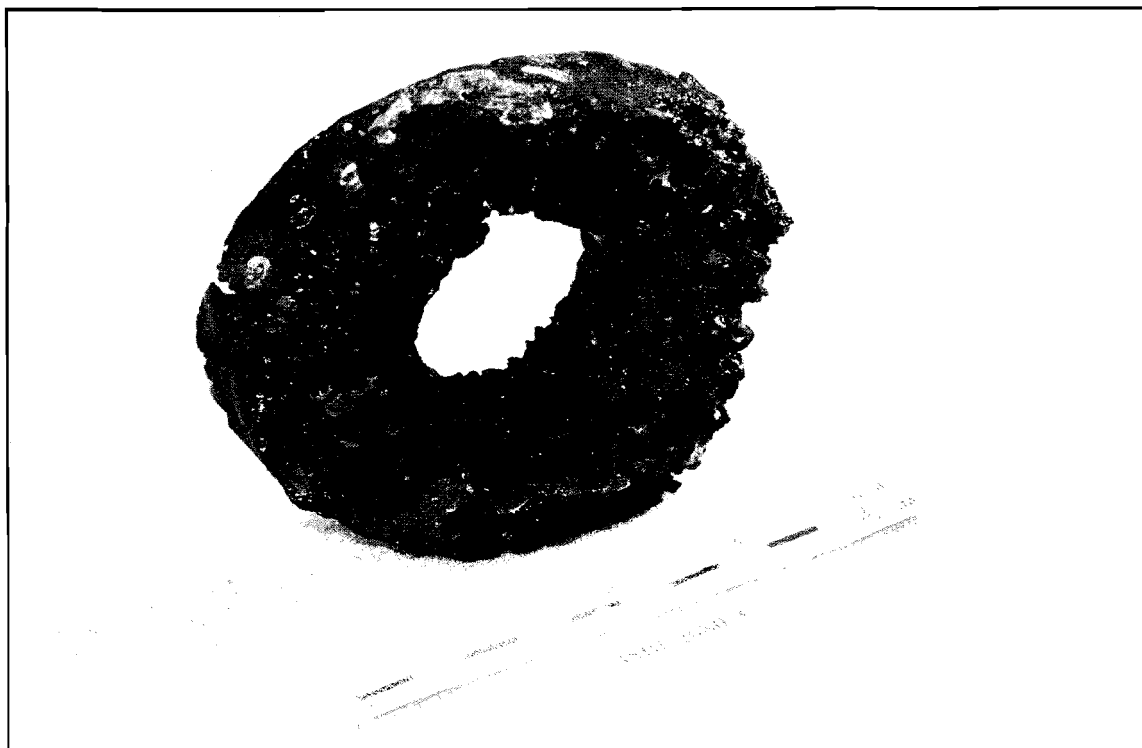


Figure G.3: Pulley Sheave (38BU2080-3).

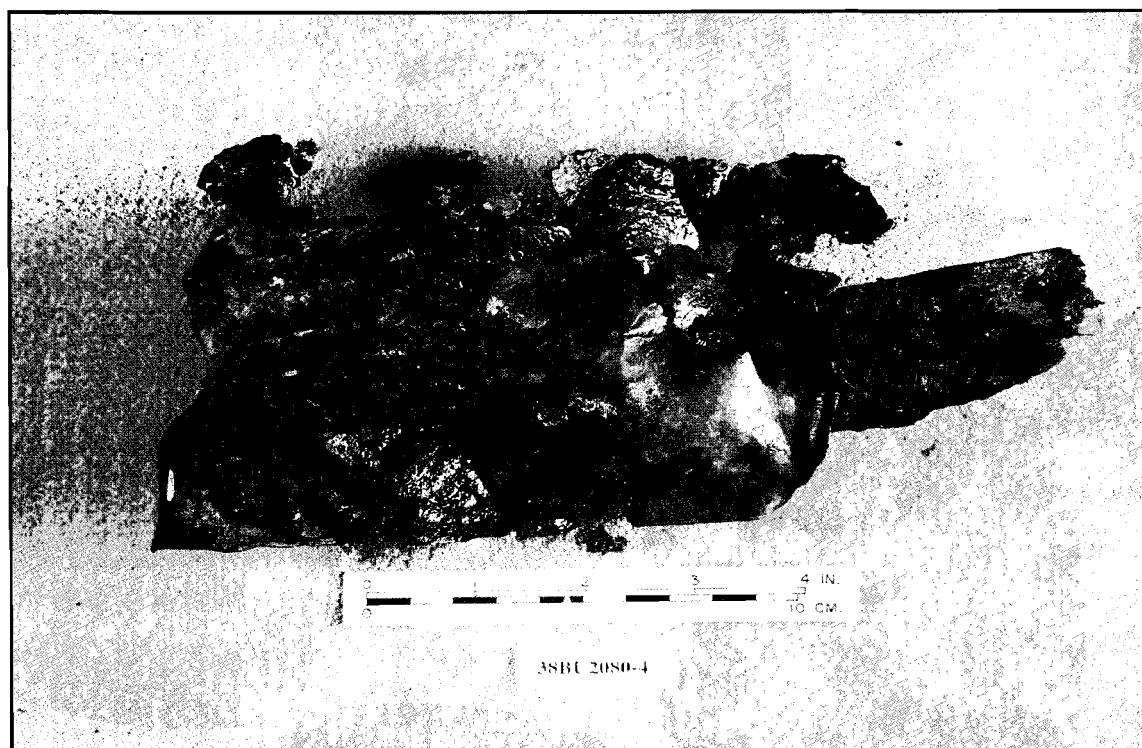


Figure G.4: Hull Plank and Copper Sheathing (38BU2080-4).

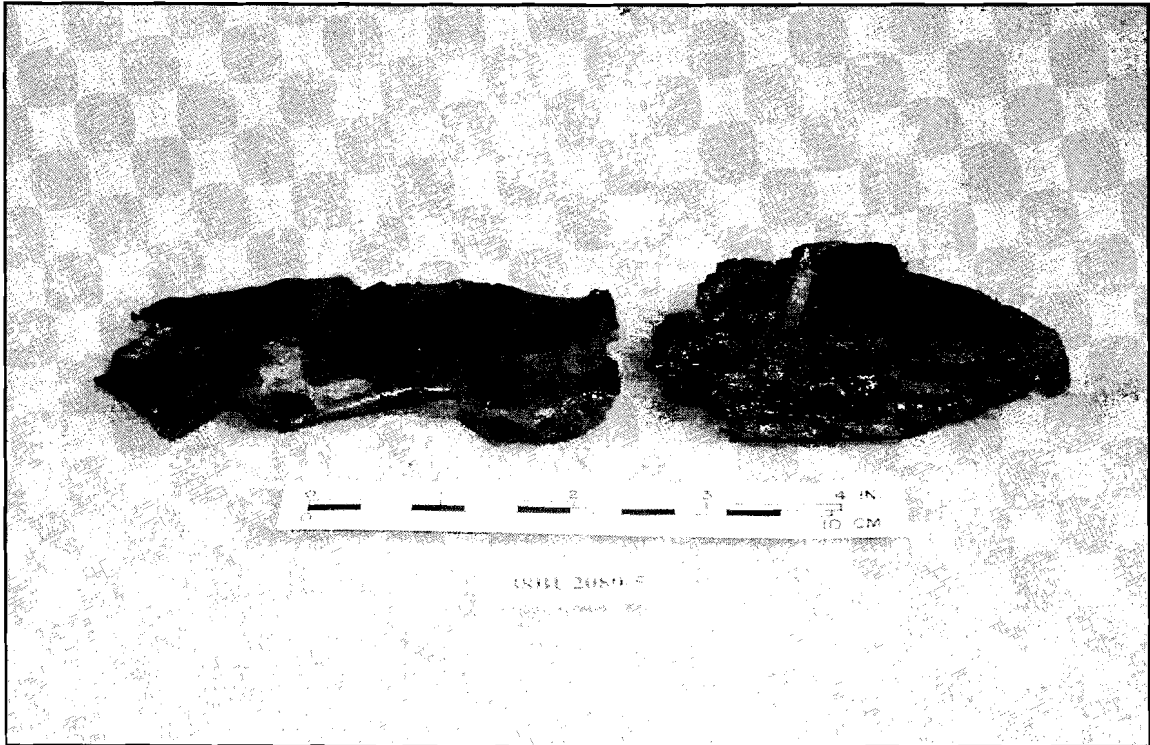


Figure G.5: Hull plank and copper sheathing (38BU2080-5).

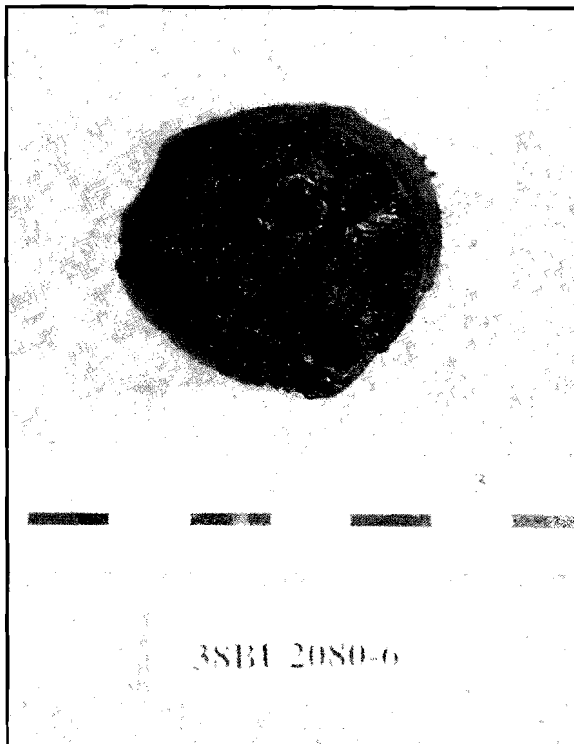


Figure G.6: Treenail (38BU2080-6).

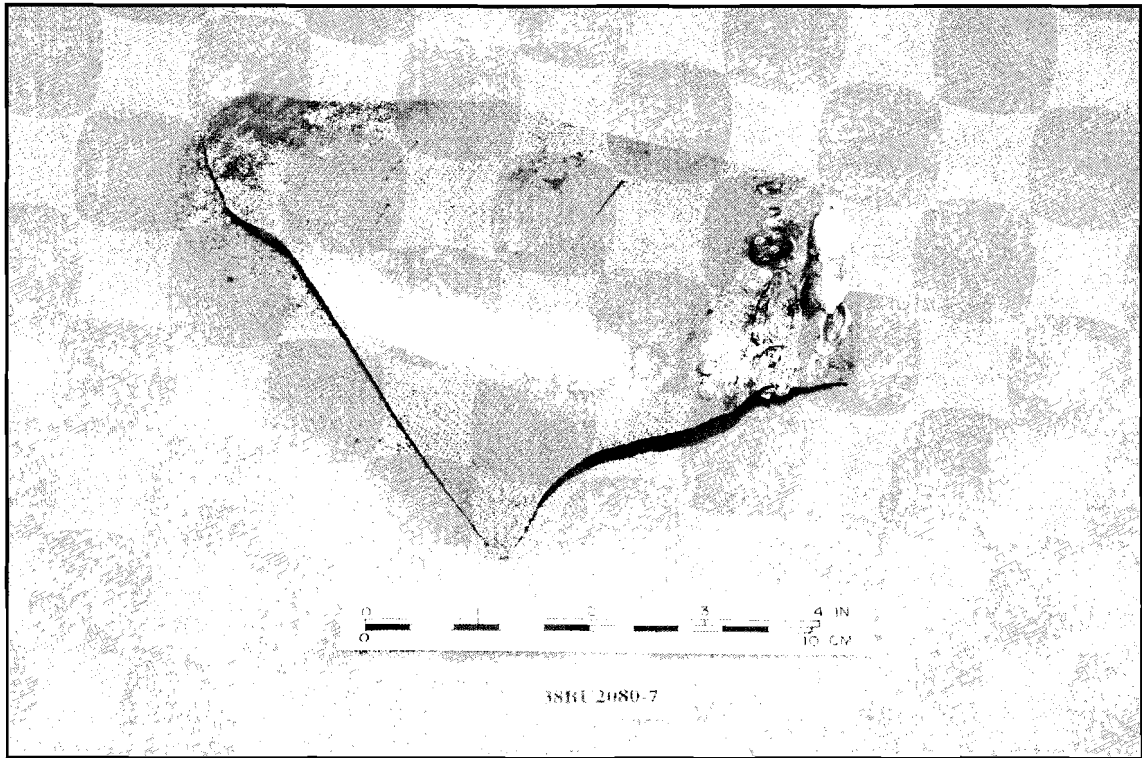


Figure G.7: Stoneware (38BU2080-7).

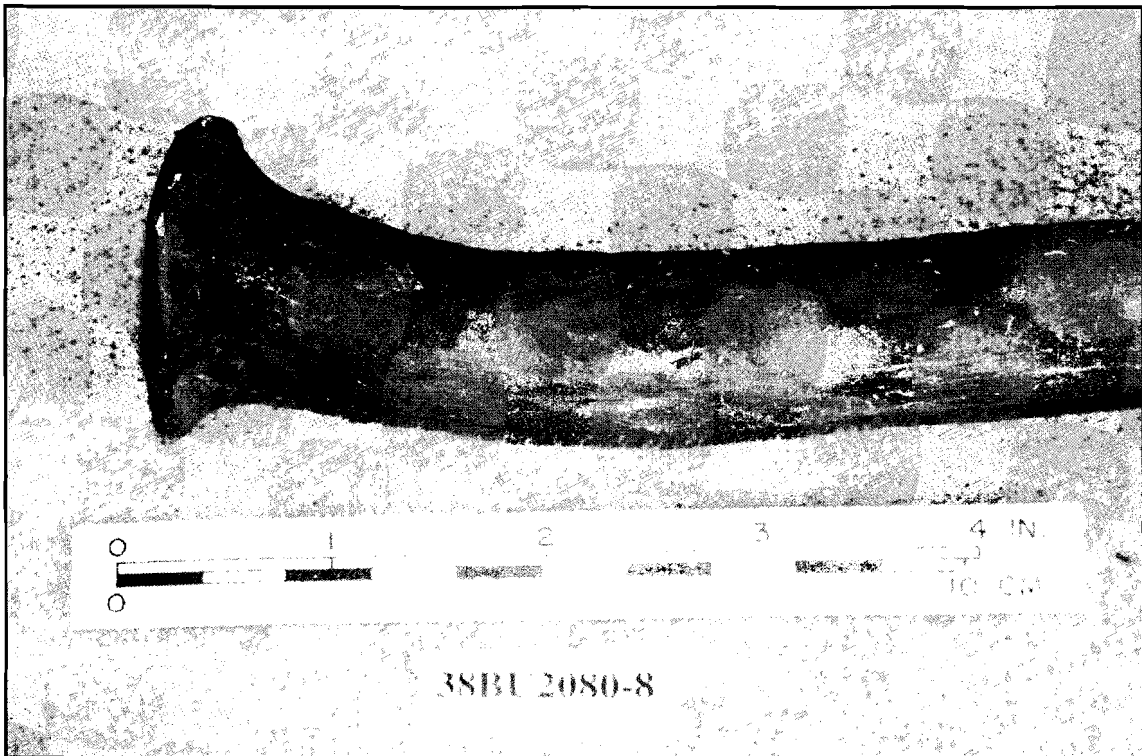


Figure G.8: Copper drift pin (38BU2080-8).

APPENDIX I

ANALYSIS OF WOOD SAMPLES FROM THE STATION CREEK WRECK (38BU2080) AND USS *HARVEST MOON* (38GE440)

Dr. Lee A. Newsom
Department of Anthropology
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During the 2003 field season, staff of the Maritime Research Division collected samples of wood from two shipwreck sites included in the Naval Wrecks Survey. In April, while probing the deeply buried remains of USS *Harvest Moon* (38GE440), a plug of wood came up stuck in the end of the water probe (See Appendix H). The wood came from a structure buried approximately three meters (9 ft, 10 in) below the mud bottom, possibly from an upper deck.

In May, during ground-truthing and recording the exposed hull structure of the Station Creek Wreck (38BU2080), MRD staff recovered samples of wood from various components of the wreck. They included, frames, a hull plank, ceiling, and a treenail fragment (See Appendix H). Each samples was divided and both halves stored in zip-lock plastic bag containing seawater. All samples were kept refrigerated until being shipped to Dr. Newsom for analysis. The other half of each sample has been retained at SCIAA.

Dr. Newsom ran all searches for matching anatomical characteristics worldwide to entertain a more complete perspective. Hence, for 38BU2080, many of the characteristics identified indicate several possible geographic regions, including Europe, Korean, and the Caribbean, as well as Eastern North American varieties. However, only those matches that came up 100% are shown below.

Pines, according to wood anatomy, are divisible/separable into seven wood anatomical groups, oaks into three anatomical groups -- thus each of the pine and oak specimens were well enough preserved to assign them to the correct anatomical group. The two species of *Guaiaicum* are not separable by wood anatomy alone (hence, "*Guaiaicum* sp."). *Guaiaicum* is a circum-Caribbean tree (but also occurs naturally along the pacific coast of Central America up to Mexico), long associated with shipbuilding, especially used for pulley sheaves.

Station Creek Wreck (38BU2080)

Hull plank (38BU2080-s1)-*Pinus* sp., *strobis* anatomical group (white pine anatomical group), very likely American white pine, *Pinus strobus*.

Frame (38BU2080-s2)-*Pinus* sp., *taeda* anatomical group (hard pine anatomical group), southern "hard" a/k/a "yellow" pines, e.g., longleaf pine (*Pinus palustris*).

Ceiling (38BU2080-s3)-*Pinus* sp., *taeda* group as above.

Treenail (38BU2080-6)-*Pinus* sp., *strobis* group as above.

Pulley Sheave 38BU2080-3-*Guaiacum* sp., *lignum vitae*.

USS *Harvest Moon* (38GE440)

Wood, unknown structure (38GE440-s1)-*Quercus* sp., oak, white oak anatomical group, very likely American white oak, *Quercus alba*.

