APPENDIX K

ARCHAEOLOGICAL SURVEY AND SHPO LETTER

A Phase I Remote-Sensing Archaeological Survey & Phase II Shipwreck Assessment at the Location Of a Proposed Terminal Groin at the Mouth of the Cape Fear River, Bald Head Island, Brunswick County, North Carolina

Submitted to:

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Abstract

Olsen Associates, Inc. (OA) is the project engineer representing the Village of Bald Head Island, North Carolina in its efforts to control erosion at the western end of Bald Head Island at the mouth of the Cape Fear River. In order to determine the effects of proposed terminal groin construction activities on potentially significant submerged cultural resources, OA contracted with Tidewater Atlantic Research, Inc. of Washington, North Carolina to conduct a magnetometer and sidescan sonar survey of the proposed construction area. Field research for the project was conducted on 24 May and 3 August 2012. Analysis of the remote-sensing data generated by the Bald Head Island survey identified a total of 104 magnetic anomalies. Four magnetic anomalies had a related acoustic signature and were determined to be associated with a shipwreck. As the wreck is potentially significant and eligible for Nomination to the National Register of Historic Places a 150-foot buffer has been established to protect the wreck. In addition, the exposed remains were subsequently investigated and mapped by archaeological divers between 2 and 5 August 2012. Documentation of the wreck remains mitigates the potential impact of sediment accretion at the site due to construction of the proposed groin. All other targets appeared to have been generated by modern debris such as fish and crab traps, pipes, small diameter rods, cable, wire rope, chain, small boat anchors, boardwalks, temporary sand-filled tube groins, and a tire. No additional investigation of those sites or the wreck remains is recommended in conjunction with proposed groin construction.

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Introduction

The Village of Bald Head Island, North Carolina plans to construct a terminal groin at the mouth of the Cape Fear River on the western shore of Bald Head Island. In order to determine the effects of proposed construction activities on potentially significant submerged cultural resources the project engineering firm, Olsen Associates, Inc., of Jacksonville, Florida contracted with Tidewater Atlantic Research, Inc. (TAR) of Washington, North Carolina to conduct a magnetometer and sidescan sonar survey of the proposed construction area. The remote-sensing investigation conducted by TAR archaeologists was designed to provide accurate and reliable identification, assessment and documentation of submerged cultural resources in the study area. The assessment methodology was developed to comply with the criteria of the National Historic Preservation Act of 1966 (Public Law 89-665), the National Environmental Policy Act of 1969 (Public Law 11-190), Executive Order 11593, the Advisory Council on Historic Preservation Procedures for the protection of historic and cultural properties (36 CFR Part 800) and the updated guidelines described in 36 CFR 64 and 36 CFR 66. The results of the investigation were designed to furnish OA with the archaeological data required to comply with submerged cultural resource legislation and regulations.

The terrestrial portion of the remote-sensing survey was conducted around low tide on 24 May 2012, and the underwater portion around high tide on 3 August 2012. Analysis of the remote-sensing data generated during the Bald Head Island terrestrial and marine surveys identified a total of 104 magnetic anomalies. A cluster of four magnetic anomalies had related acoustic signatures clearly associated with a shipwreck. Following consultation with NCDCR personnel at Fort Fisher, the vessel was investigated by TAR archaeological divers. Between 2 and 5 August 2012, exposed sections of the surviving hull structure were documented. As the wreck is potentially significant and eligible for nomination to the National Register of Historic Places (NRHP) a 150-foot buffer has been established to protect the wreck. In addition, the exposed remains were subsequently investigated and mapped by archaeological divers between 2 and 5 August 2012. Documentation of the wreck remains mitigates the potential impact of sediment accretion at the site due to construction of the proposed groin. All other magnetic targets appear to have been generated by modern debris such as fish and crab traps, pipes, small diameter rods, cable, wire rope, chain, small boat anchors, temporary sand-filled tube groins, and a tire and are not recommended for avoidance. No additional investigation of those sites or the wreck remains is recommended in conjunction with proposed groin construction.

Project personnel consisted of Gordon P. Watts, Jr., principal investigator, John W. Morris, Joshua A. Daniel and Robin C. Arnold. Dr. Watts and archaeologist John W. Morris conducted the terrestrial portion of the survey. Dr. Watts, Mr. Daniel and Mr. Morris carried out the marine portion of the remote-sensing survey and vessel documentation. Ms. Arnold and Dr. Watts carried out the historical and literature research. Dr. Watts and Mr. Daniel analyzed the remote-sensing data. Dr. Watts, Mr. Daniel, and Ms. Arnold prepared this report.

Project Location

The remote-sensing project area is situated at the mouth of the Cape Fear River. The remote-sensing investigation area is located on the western side of Bald Head Island approximately 2,700 feet south-southwest of Bald Head Lighthouse. The area surveyed is polygonal in shape measuring approximately 2,915 feet long and 960 feet wide at its extreme points and covers an area of 46.06 acres. To ensure sufficient data would be available to locate any potentially significant targets in the project area, with the exception of an inaccessible surf zone, remote-sensing data were collected along 22 parallel lanes spaced on 50-foot intervals.

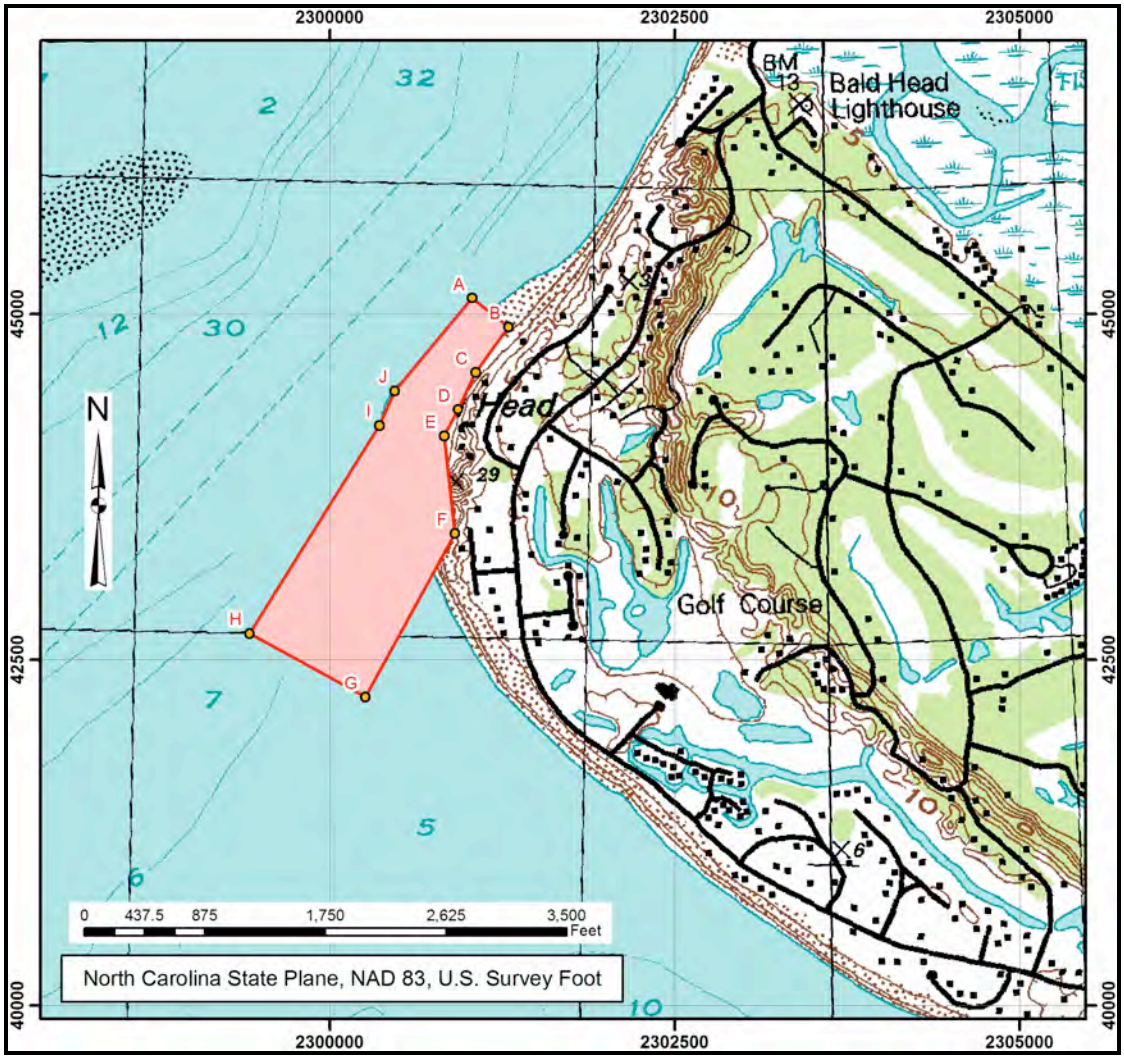

Figure 1. Project Location Map (USGS "Cape Fear, North Carolina" 1:24,000).

The survey boundaries are defined in North Carolina State Plane Coordinates, based on NAD 83, U.S. Survey Foot. Ten points define the terrestrial and marine survey areas. Geographical coordinates for those points are as follows:

Control Point	X coordinate	Y coordinate
A	2301030.1	45118.2
B	2301294.7	44907.8
C	2301054.6	44578.9
D	2300927.9	44309.3
E	2300825.7	44120.9
F	2300905.5	43413.2
G	2300255.7	42229.9
H	2299414.2	42692.0
I	2300355.1	44197.1
J	2300470.1	44446.8

Research Methodology

Literature and Historical Research

TAR historians conducted a literature search of primary and secondary sources to assess the potential to find significant historic and/or cultural resources within the proposed project site. A general background history of Bald Head Island and the lower Cape Fear region was prepared from source material in the TAR research library. Preliminary wreck-specific information was collected from sources including: *Derelicts* (Sprunt 1920), *Disasters to American Vessels, Sail and Steam, 1841-1846* (Lockhead 1954), *Encyclopedia of American Shipwrecks* (Berman 1972), *Shipwrecks of the Civil War* (Shomette 1973), *Merchant Steam Vessels of the United States 1790-1868* (Lytle and Holdcamper 1975), *Shipwrecks of the Americas* (Marx 1983), *Official Records of the Union and Confederate Navies in the War of the Rebellion* (National Historical Society 1987), *Ship Ashore!* (Mobley 1994), The Cape Fear-Northeast Cape Fear Rivers Comprehensive Study (Underwater Archaeology Unit [2 vols.] 1996), *North Carolina Shipwreck Accounts,* (Charles 2004), and *The Big Book of the Cape Fear River* (Jackson 2008). In addition, the NRHP online database (National Park Service n.d.), the Automated Wreck and Obstruction Information System (NOAA n.d.) the Northern Shipwrecks Database (Northern Maritime Research 2002), and "Lifesaving Station No. *Cape Fear*, District No. *Six*" (Gottshall [transcriber] n.d.) were queried for wreck-specific information.

Personnel at the Underwater Archaeology Branch (UAB) of the North Carolina Office of State Archaeology (Fort Fisher), the North Carolina Maritime Museum (Southport), the Brunswick County Library, and the Smith Island Museum of History were contacted for shipwreck data associated with Bald Head Island and the lower Cape Fear River.

Terrestrial Remote-Sensing Survey

The project terrestrial and inter-tidal areas were examined visually and investigated using a cesium magnetometer at low tide. Where possible, archaeologists walked the shoreline to identify evidence of vessel remains or other cultural features. Magnetic anomalies were located using GPS. A TRIMBLE GeoExplorer Series GeoXT handheld DGPS capable of +/-3 feet was employed to collect positioning data for cultural material located within the survey area. The GeoXT utilizes WAAS satellites to provide differential corrections in the field. A display shows both transects and target locations. The GeoXT was interfaced with a small PC running Hypack survey software to identify survey lanes and collect magnetometer data. A GEOMETRICS 856 cesium vapor magnetometer was used to identify buried ferromagnetic cultural material along each of the terrestrial survey lanes (Figure 2).

Figure 2. The G-856 magnetometer, Trimble DGPS and PC used for the terrestrial remote sensing survey.

Marine Remote-Sensing Survey

In order to reliably identify submerged cultural resources, TAR archaeologists conducted a systematic remote-sensing survey of the proposed groin site. Underwater survey activities were conducted from the 24-foot survey vessel *Atlantic Surveyor*, and a pedestrian survey collected data on the beach during low tide. In order to fulfill the requirements for survey

activities in North Carolina, magnetic and acoustic remote-sensing equipment were employed. This combination of remote sensing represents the state of the art in submerged cultural resource location technology and offers the most reliable and cost effective method to locate and identify potentially significant targets. Data collection was controlled using a differential global positioning system (DGPS). DGPS produces the highly accurate coordinates necessary to support a sophisticated navigation program and assures reliable target location.

An EG&G GEOMETRICS G-881 marine cesium magnetometer, capable of plus or minus 0.001 gamma resolution, was employed to collect magnetic data in the survey area. To produce the most comprehensive magnetic record, data was collected at 10 samples per second. Due to shoal water within the project area, the magnetometer sensor was towed just below the water surface at a speed of approximately three to four knots. Magnetic data were recorded as a data file associated with the computer navigation system. Data from the survey were contour plotted using QUICKSURF® computer software to facilitate anomaly location and definition of target signature characteristics. All magnetic data were correlated with the acoustic remote-sensing records.

Figure 2. Launching the EG&G GEOMETRICS G-881 magnetometer.

A 445/900 kHz KLEIN SYSTEM 3900 digital sidescan sonar (interfaced with SONARPRO SONAR PROCESSING SYSTEM) was employed to collect acoustic data in the survey area (Figure 3). Due to shoal water within the project area, the sidescan sonar transducer was deployed and maintained between 3 and 5 feet below the water surface. Acoustic data were collected using a range scale of 30 and 50 meters to provide a minimum of 200% coverage and high target signature definition. Acoustic data were recorded as a digital file with SONARPRO and tied to the magnetic and positioning data by the computer navigation system.

Figure 3. Launching the KLEIN SYSTEM 3900 digital sidescan sonar.

A TRIMBLE AgGPS was used to control navigation and data collection in the survey area. That system has an accuracy of plus or minus three feet, and can be used to generate highly accurate coordinates for the computer navigation system on the survey vessel. The DGPS was employed in conjunction with an onboard laptop loaded with HYPACK navigation and data collection software (Figure 4). Positioning data generated by the navigation system were tied to magnetometer records by regular annotations to facilitate target location and anomaly analysis. All data is related to the North Carolina State Plane Coordinate System, NAD 83.

Vessel Documentation

Shipwreck remains were relocated using DGPS and sidescan sonar. Reference buoys were placed on the extremities of exposed structure to facilitate mapping and establishing the

precise location of the hull remains. Archaeological divers equipped with wireless communications (Figure 5) recorded the wreck using a baseline web and measured drawings. Once buoys were moved to specific locations on the wreck remains, baseline stations A and F, and DGPS was used to establish those geographical positions.

Figure 4. Computer navigation system located at the research vessel helm.

Remote-Sensing Data Analysis

To ensure reliable target identification and assessment, analysis of the magnetic and acoustic data was carried out as it was generated. Using QUICKSURF® contouring software, magnetic data generated during the survey were contour plotted at 3-gamma intervals for analysis and accurate location of magnetic anomalies. The magnetic data was examined for anomalies, which were then isolated and analyzed in accordance with intensity, duration, areal extent and signature characteristics. Sonar records were analyzed to identify targets on the basis of configuration, areal extent, target intensity and contrast with background, elevation and shadow image, and were also reviewed for possible association with identified magnetic anomalies.

Data generated by the remote-sensing equipment were developed to support an assessment of each magnetic and acoustic signature. Analysis of each target signature included

consideration of magnetic and sonar signature characteristics previously demonstrated to be reliable indicators of historically significant submerged cultural resources. Assessment of each target includes avoidance options and possible adjustments to avoid potential cultural resources. Where avoidance is not possible the assessment includes recommendations for additional investigation to determine the exact nature of the cultural material generating the signature and its potential NRHP significance. Historical evidence was developed into a background context and an inventory of shipwreck sites that identified possible correlations with magnetic targets (Appendix A). A magnetic contour map of the survey area was produced to aid in the analysis of each target.

Figure 5. Diver with wireless communications mask suiting up.

Historical Background

European settlement of the present day Cape Fear region began as early as 1526 when Lucas Vásquez de Ayllón led an expedition from Florida into the Cape Fear region. One of the Spanish vessels was recorded lost near the mouth of the Cape Fear River, referred to by the Spanish as the Jordon River. During the brief existence of the Spanish settlement, the area was known as the "Land of Ayllón" (Lee 1965:3-4).

The next attempt to settle the Cape Fear region came almost a century and a half later with the arrival of the English. Settlers from the New England colonies came to the area eager to establish a Puritan colony in the less harsh climate of the south. Under the leadership of Captain William Hilton, a group arrived in the summer of 1662 to find a suitable location. Arriving at the river and "Cape Fear" as he called it, the group remained for three weeks during which time they purchased the surrounding area from the Indians. The Puritan settlers that followed during the winter of 1662 remained in the Cape Fear vicinity for only a brief time before abandoning the area (Lee 1965:4-5).

In early 1663, King Charles II granted territory south of Virginia to eight noblemen in tribute for restoring the Stuart dynasty to the monarchy. That conveyance included the area from Georgia to the Albemarle Sound region of North Carolina. The territory was divided into three counties: Albemarle [Albemarle Sound area], Clarendon [Cape Fear region] and Craven [South Carolina]. Shortly after, the Lords Proprietors received a proposal from a group of Barbadians for a settlement within the Cape Fear region. In late spring 1664, a group of 200 settlers, under the command of John Vassall, established a colony at the confluence of the Charles [modern Cape Fear] River and Town Creek (Potter 1993:5-6). The capital, Charlestown, was the first English town in Carolina (Lee 1965:5). The colony was reported to have reached a population of 800 and extended some 60 miles along the river at its zenith.

In October 1665, a second expedition by the Barbadians was launched with the intent of establishing a colony in the vicinity of Port Royal. A small fleet consisting of a frigate, sloop and a flyboat, under command of Sir John Yeamans, stopped at the Charlestown settlement after an arduous journey from Barbados. While entering the river, the flyboat, carrying the new colony's armament, ran aground on the shoals on the west side of the channel [modern Jay Bird Shoals] and was lost (Potter 1993:9, 29). The loss of this important cargo abruptly ended the Port Royal venture. Within another two years Charlestown would also be abandoned. Difficulty in obtaining supplies, differences between the proprietors and settlers over land policies and hostilities with the Natives resulted in the colony being deserted by late 1667 (Potter 1993:10-11).

In 1726, permanent settlements on the lower Cape Fear were established by South Carolina and upper North Carolina colonists (Lee 1977:7). On the west bank of the river, about 12 miles above its mouth and several miles below a shoal in the river called "the Flats," Maurice Moore established the town of Brunswick. A shoal located at the mouth of Town Creek impeded larger ships from venturing further upstream. Situated below "the Flats", Brunswick was accessible to vessels of large or small size (Lee 1977:12).

In April 1733, another community was established 15 miles upstream from Brunswick. The new settlement became known as New Town or Newton to distinguish it from the "old town" of Brunswick. In 1740, the town was incorporated and the name was changed to Wilmington (Lee 1977:12).

As hostilities with France and Spain grew during the 1740s Governor Gabriel Johnston authorized the construction of a fort along the lower Cape Fear to protect the burgeoning towns of Brunswick and Wilmington. Construction began in July 1745 on a small bluff overlooking the mouth of the river. Johnston's Fort, as it was called, was still uncompleted in 1748 when two Spanish vessels entered the river and raided Brunswick (Carson 1992:20). Efforts to finish construction intensified after the raid and in less than a year the fort was completed. The resulting structure was small and poorly constructed. It was manned by only three men and armed with four rusty cannons (Carson 1992:20). In 1751, the fort was assigned to double as a quarantine station.

Development based upon a maritime economy played a major role in the growth of both Wilmington and Brunswick during the eighteenth century. Vessels of varying size entered the Cape Fear from other coastal ports, the West Indies and Europe. Larger vessels, unable to cross over "the Flats," called at Brunswick, while vessels of smaller size could travel further up the river to Wilmington. Consequently, Brunswick was established as the center for overseas shipping and Wilmington as the center for local and West Indian trade (Lee 1977:16-17).

Rice, cattle, swine, lumber and naval stores made up the majority of the exports from the port district of Brunswick. Prior to the Revolution numerous ships left the Cape Fear River for other ports. The West Indies served as the main destination of these ships with English ports following a close second. A lesser number carried cargo to coastal ports, mostly in the northern colonies, but occasionally some ventured south, down the coast to Charleston (Lee 1977:33).

The Cape Fear region played a minor role in the events of the American Revolution. In June 1775, Royal Governor Martin fled from New Bern to Fort Johnston, then under the protection of the British man-of-war *Cruizer*. Growing patriot activity in the area forced the governor to relocate to the warship a month later. All portable materials were transferred to the ship and the fort's guns were spiked and pushed into the river (Carson 1992:22). Local forces later burned the fort and its outbuildings.

Knowing that a large number of Loyalists inhabited the interior of the colony Governor Martin initiated a plan to subjugate the region using a combination of British and Loyalist forces (Sprunt 2005:113). British reinforcements arrived off the North Carolina coast by the end of March, but by then the opportunity to subdue the colony had passed. On 27 February 1776, Colonel James Moore and the First North Carolina Continentals with a group of militia defeated a contingent of Scottish Loyalists at the battle of Moore's Creek Bridge. This battle, called the "Lexington and Concord of the south," kept the British from occupying the South at the beginning of the war (Powell 1989:180-182).

Naval operations were of limited importance in the Cape Fear region. In mid-1776, British warships began taking up regular station over the mouth of the river. In May of the following year two British men-of-war entered the river and destroyed a number of colonial vessels at anchor (Watson 1992:29). To counter the threat posed by British warships the General Assembly voted to purchase and arm three brigs for the defense of the Cape Fear River. However, these vessels proved inadequate for the task and suggestions were made for either selling them or sending them on trading or privateering expeditions (Watson 1992:29).

The lower Cape Fear remained quiet until 1781 when Major James H. Craig was dispatched by Lord Cornwallis in Charleston to take Wilmington. Craig, with a force of 18 vessels and 400 troops, quickly captured the defenseless town (Sprunt 2005:114). From Wilmington, Craig dispatched parties throughout the countryside to rally local Loyalists and to obtain supplies for Cornwallis's troops, then marching through North Carolina. After being checked by Colonial forces in the battle of Guilford Courthouse the British retreated to Wilmington to recoup and replenish supplies. Later, when Lord Cornwallis moved north to suppress Virginia, Craig remained behind in Wilmington to disrupt Colonial activity in that region. News of Cornwallis's surrender at Yorktown made the British position in Wilmington untenable and on 17 November Major Craig evacuated the city.

After the conclusion of the war there was a shift in the maritime development of the Cape Fear region. Almost all the ships that left the Cape Fear now went to Charleston and few to England or the West Indies (Lee 1977:33). Inbound ships now proceeded up to Wilmington. This shift brought about the decline of the town of Brunswick as was indicated by the change in name of the "Port of Brunswick" to the "Port of Wilmington" (Lee 1977:34).

During the last decades of the eighteenth century the area that would become the town of Southport consisted of little more than the remains of Fort Johnston and the homes of local river pilots. The region's potential, however, was realized by three men from Wilmington, Joshua Potts, John Brown and John Husk, who the viewed the area, with its salubrious sea breezes, as an ideal spot for a new town. Though the men's initial petition was rejected in 1790 the group persevered and on 15 November 1792, the General Assembly issued a charter for the establishment of a town on the bluff overlooking the mouth of the river.

The town was named Smithville, after Benjamin Smith who introduced the bill into the legislature. The town was laid out with lots offered for sale in Wilmington and Fayetteville newspapers (Figure 6). The charter specified that no person could purchase more than six lots in their name and the purchase price of lots was to be 40 shillings per lot (Carson 1992:26). The town plan also reserved space for Fort Johnston, which was rebuilt in 1804.

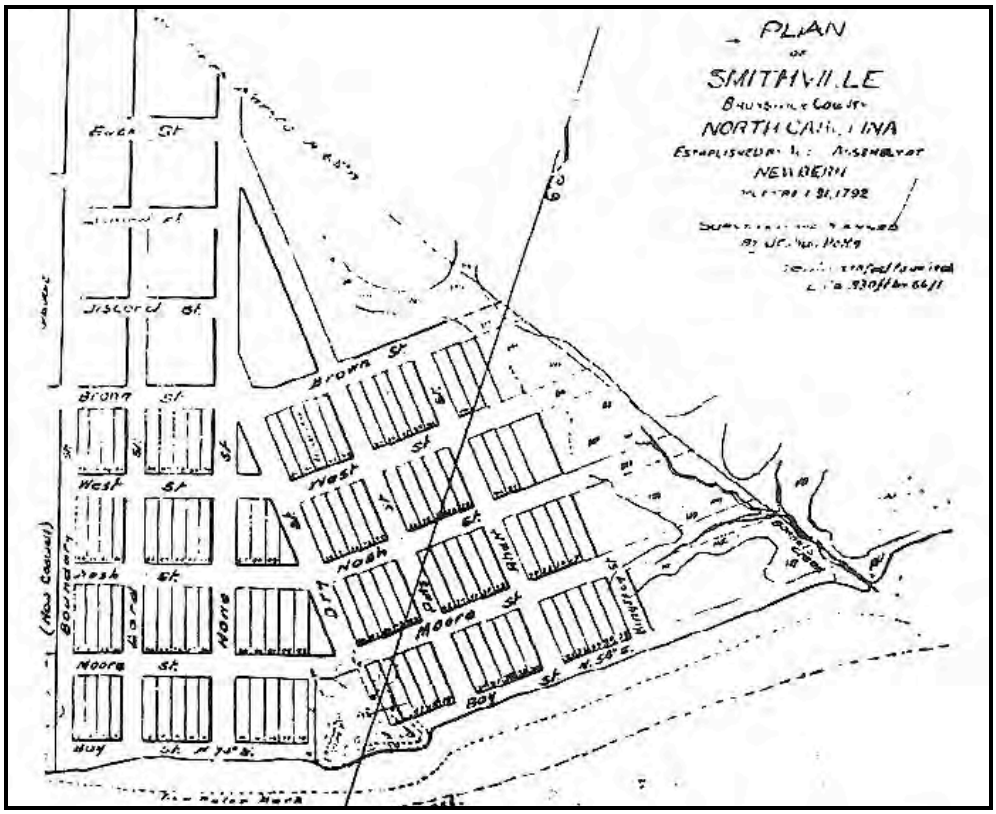

Figure 6. Plan of the town of Smithville, 1792 (Carson 1992:27).

With the growing amount of vessel traffic sailing up to Wilmington there arose a need for improvements in the navigability of the river. As early as 1784, measures were taken to improve the conditions of the lower Cape Fear River (Lee 1977:36). Improvements were needed at the treacherous entrances to the river, at the Bar and upstream at New Inlet. Three major shoals between Wilmington and the sea also caused problems for ships trying to navigate the river. The "upper shoal," located near the foot of Clarks Island, off the southern tip of Eagles Island, had eight and one-half feet of water. The "middle shoal," also known as "the Flats," had nine feet. The "lower shoal," at the foot of Campbell Island, had nine and one-half feet. The main channel of the river was then located in a narrow passage between Campbell Island, Clarks Island and the west bank (Lee 1978:112).

In addition to the shoals, ships deliberately sunk during the American Revolution as obstructions needed to be removed (Lee 1977:36-37). Around 1819, Hamilton Fulton, a noted English engineer, was hired to make improvements on the Cape Fear River mainly between Wilmington and the ocean where a system of jetties was planned. Work continued for six years until financial limitations halted this project. Some improvements were made on the river up until the start of the Civil War with sporadic financing by the state and local Wilmington businessmen (Lee 1977:37).

Steam vessels first appeared on the Cape Fear River in 1817. The first steamboat to arrive was the side-wheel *Prometheus*, built in Beaufort for a firm in Wilmington that intended to run the vessel from Wilmington to Fayetteville and Southport. The following year the Clarendon Steamboat Company was established at Wilmington. The company held the

exclusive right to operate steamboats on the Cape Fear for a period of seven years provided that it kept one boat in service. In addition to the *Prometheus*, the side-wheel *Henrietta*, also made regular runs between Wilmington and Fayetteville (Lee 1977:37-38). By 1822, a second steamship venture, the Cape Fear Steamboat Company, had begun service on the river. With time the number of steamboats on the river increased significantly (Lee 1977:38).

By the 1850s, nearly a hundred vessels of all types were in Wilmington at the same time. Many of the ships were large square-rigged foreign craft, while others were side-wheel steamers. Most, however, were American schooners engaged in the coastal trade (Lee 1978:116).

Development of the Cape Fear region was soon disrupted by the Civil War. After Confederate forces in South Carolina attacked the U.S. garrison at Fort Sumter, President Abraham Lincoln declared a state of open rebellion and called for volunteers to preserve the Union. Lincoln also issued a proclamation on 19 April 1861 establishing a blockade of Confederate ports in South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Texas. Eight days later, Lincoln extended the blockade to include ports in Virginia and North Carolina. With North Carolina's withdrawal from the Union, Governor John W. Ellis ordered the occupations of forts Johnston and Caswell.

Union naval forces were inadequate to properly enforce the blockade at the onset of the war. In 1861, U.S. navy registers listed 90 vessels, 50 of which were propelled by sail and were considered obsolete for the task at hand. The remaining 40 were steam, but several of the deep draft vessels proved unsuitable for the shallow southern waters. Eight others were laid up while 22 vessels remained at station off foreign shores and would require at least six months travel to reach the United States (Browning 1980:24). However, within a few months of Lincoln's proclamation, Secretary of the Navy Gideon Welles took steps to implement an effective blockade off the southern coastline.

The navy department bought or leased nearly any vessel that could be of service. In nine months, U.S. Navy agents purchased 136 ships, constructed 52 and commissioned and repaired another 76 (Engle and Lott 1975:180). The Union blockade in turn gave rise to the practice of blockade running. At the beginning of the blockade, practically any vessel was considered suitable for breaking through the Atlantic squadrons to carry cargo in or out of the isolated southern ports. The most successful of the early runners were steamers that had belonged to the Southern Coasting Lines and were idle due to the outbreak of the war. The illicit trade carried on by these ships reaped considerable profit, but failed to compare with the great capital resources brought in during the latter part of the war.

Wilmington provided North Carolina with a deep-water port. By 1860, Wilmington had emerged as a modern shipping center with excellent internal communication. Three railroads ran through the city and daily steamboat service to Charleston and New York, as well as, up the Cape Fear River to Fayetteville. With the capture of New Bern, Roanoke Island and Beaufort, Wilmington was the only North Carolina port left open for the importation and exportation of goods. As long as supplies were imported through the two inlets of the Cape

Fear River and transported along the railroad lines, which connected with Lee's army in Virginia, the Confederacy had a lifeline. Wilmington soon became the most vital seaport in the "Southern Cause" (Pleasants 1979:15).

Wilmington became the key port for "runners" largely because of the area's topography. Located 28 miles from the mouth of the Cape Fear River, the port had access to the Atlantic through two separate entrances; eastward through New Inlet and southward through the river mouth (Figure 7). Although the two entrances were only six miles apart, Smith's Island, a strip of sand and shoal, lay in between. Continuing along Cape Fear were the dangerous Frying Pan Shoals, which extended 10 miles further into the Atlantic, making the distance by water between the two entrances a little less than 40 miles (Soley 1883:91).

Figure 7. Chart that depicts the two entrances into the Cape Fear River (National Historical Society 1987, I 12:38).

This geographical configuration proved highly advantageous for blockade runners and the initial blockade of Wilmington proved ineffective. When the *Daylight*, the first and at the time the only Union vessel sent to blockade these waters, arrived, it immediately experienced the difficulties associated with guarding the dual entrances of the Cape Fear River. While pursuing a steamer out of the western bar entrance, the *Daylight* inadvertently allowed several other small vessels to pass out of the New Inlet entrance. Within three months of the *Daylight's* arrival, 42 vessels either entered or cleared Wilmington (Browning 1980:27).

During a two-year period (January 1863-November 1864), Confederate naval sources listed numerous vessel stations on the Cape Fear. These vessels were identified as: the ironclad sloop *North Carolina*, the floating battery *Artic*, the steam gunboat *Yadkin*, the steam gunboat *Equator*, the torpedo boat *Squib*, and the ironclad sloop *Raleigh*, and two, long one-gun cutters. In November 1864, Confederate Secretary of the Navy Stephen Mallory also reported to President Jefferson Davis that two new torpedo boats were under construction at Wilmington (U.S. Navy [USN], 1921, ser. II, vol. 2, 1921:630,528-532, 630,743-745).

The capture of Wilmington proved difficult because both entrances to the Cape Fear were guarded by powerful fortifications and lesser works. Collectively those fortifications became known as the Lower Cape Fear Defense System. The central point of that system was Fort Fisher, located on Confederate Point. That fortification was originally a small earthworks constructed to protect New Inlet. By 1864, Fort Fisher had become the largest seacoast fortification in the Confederacy. Shaped like an inverted "L," Fort Fisher's land face ran 628 yards and was guarded by 20 of the heaviest seacoast guns. The sea face included a 130-pound Armstrong rifle and a 170-pound Blakely, both from England (Browning 1980:35). Extending from the land face was a string of torpedoes, which could be exploded from inside of the fort (Pleasants 1979:22). Mound Battery, towering to a height of 60 feet with two mounted heavy guns, stood near the end of Confederate Point. Augusta Battery, which stood behind Mound Battery, was located near the river (Pleasants 1979:24).

Fort Holmes, on the other side of New Inlet on Smith's Island, shared the protection of Smith's Inlet in the Cape Fear River with the batteries at Oak Island. Oak Island, located opposite Fort Holmes, held another series of forts and batteries, such as Fort Campbell, Fort Caswell and Battery Shaw (Pleasants 1979:24). Fort Caswell guarded the western bar entrance. Captured by Confederate militia on 14 April 1861, Caswell was renovated into a strong casemated work with new armament consisting of seven 10-inch, four 8-inch Columbiads and a 9-inch Dahlgren gun (Browning 1980:35; Pleasants 1979:24). Both Fort Caswell and Fort Holmes were responsible for shelling union vessels in the Middle Ground area, including the stranded tug *Violet*, which went aground off the Western Bar Channel on the night of 7 August 1864.

After his tug struck the shoal Ensign Thomas Stothard requested assistance from the crew of the nearby 866-ton brig USS *Vicksburg* to attempt to re-float the *Violet.* Despite their quick response, the extra manpower and effort proved fruitless as Stothard was ordered to fire the *Violet* after midnight. In response to a court of enquiry [sic] investigation, Captain Stothard submitted an incident report to Captain B.F. Sands of the USS *Fort Jackson* and offered this account:

> After all preparations for sending officers, crew, and ship's effects off in boats that he [Lieutenant-Commander Braine of the USS *Vicksburg*] and Acting Volunteer Lieutenant Williams, of the *Emma*, had sent, all of which I did, sending property, a list of which you will find enclosed, also a list of crew, I made preparations for her destruction as follows: I put a lighted slow match to a powder tank in the magazine and closed the door, then filled a large, fine drawer with shavings and straw taken from pillows and mattresses, partially covered it with another, and sprinkled two quarts of spirits of turpentine over all and on the woodwork around it; hung up an oilcloth from the table, one corner hanging in the shavings, which I touched with a lighted match (in the wardroom), after all the boats, but mine in waiting, had left the side, and I followed about 2:00 o'clock a.m. this morning. The explosion of the magazine containing about 200 pounds of powder occurred within half an hour afterwards, and by daylight she was effectually consumed. One 12-pounder was thrown overboard, one left on the forecastle, spiked with rat-tail file, and the 24-pounder was directly over the magazine aft when it exploded, so that it was thrown into the sea (National Historical Society [NHS] 1987, Ser. I, 10:343,344).

Rear-Admiral S.P. Lee recommended that no action be taken to discipline the acting officer of the *Violet*. Lee remarked to Union Secretary of the Navy Gideon Welles, that: "Stothard is a very intelligent and efficient officer, notwithstanding this casualty" (NHS 1987, Ser. I, 10:344). Prior to its destruction, the *Violet* (ex-*Martha*) was described as a fourth-rate, wooden screw steamer measuring 85 feet in length, with a beam of 19 feet. The 166-ton tug housed one, inverted, direct-acting engine with a 30-inch diameter cylinder and one return flue boiler (U.S. Navy 1921, Ser. II, 1:233).

Farther up river from the *Violet* wreck site there were a series of forts and batteries used as secondary defenses for Wilmington and as protection for blockade runners outbound from Smith's Inlet. Fort Lamb was located on the west side of the Cape Fear River on Reeve's Point. Above Fort Lamb was Fort Anderson, the most important of the secondary defenses. Partially built from the ruins of Old Brunswick Town, Anderson consisted of a series of trenches and earthworks approximately a mile long. Three smoothbore 24-pounders, three rifled 32-pounders and six smoothbore 32-pounders comprised the Fort's armaments. By 1864, Fort Anderson had become an inspection station for all craft heading up the Cape Fear River to Wilmington (Pleasants 1979:25). Several lesser forts, including Stokes, Lee, French, Campbell, Strong and Sugarloaf, were situated on the east side of the river (Pleasants 1979:25).

In addition to this impressive array of forts, a naval construction program was initiated in Wilmington to contribute to the defenses of the harbor. The success of the ironclad ram CSS *Virginia* in the March 1862 battles at Hampton Roads demonstrated the superiority of armored warships to naval officers of both the North and South. In late March 1862, Confederate Secretary of the Navy Stephen R. Mallory, sent "instructions relative to gunboats" to Commander William T. Muse, the ranking naval officer at Wilmington. Shortly thereafter, the navy began building two ironclads in the city, the *Raleigh* at James Cassidy's shipyard at the foot of Church Street, and the *North Carolina* at the Beery shipyard on Eagle Island (Still 1985:5-17, 79-92).

Both vessels utilized a design based on plans conceived by naval constructor John L. Porter. The plans called for a tightly framed hull, with a slight deadrise and a hard chine. The vessels were to be 174 feet long (150 feet between perpendiculars) with a draft of 13 feet. Amidships, a 105-foot long casemate, angled at thirty-five degrees and covered with 4 inches of iron plate, protected the gun deck. Two boilers provided steam for the vessel's two horizontal engines, which were geared to a single 10-foot screw. The first ironclad built on this design, the CSS *Richmond*, was completed in Richmond in 1862. Known as the *Richmond* class, this group, consisting of five vessels, was numerically the largest standardized class of ironclads constructed by the Confederacy (Holcombe 1993:63-64).

The two Cape Fear ironclads entered into active service by late 1863/early 1864 (*North Carolina* in December 1863 and the *Raleigh* in April 1864) after numerous delays resulting from material shortages, strikes and epidemics. However, the usefulness of these two vessels to the Confederacy's war effort was limited. *Raleigh* grounded on a shoal near the mouth of New Inlet and was destroyed after a sortie against the blockading squadron on 7 May 1864, less than a month after entering service. The *North Carolina*, on the other hand, was reduced to serving as a floating battery; its deep draft and lack of motive power rendered the vessel ineffective as a ram.

The ironclad was further hampered by the use of unseasoned timber in its construction. Warping and splitting timbers caused the ship to leak incessantly and an infestation by teredo worms further weakened the hull. For most of its career, the ironclad remained at anchor near Smithville, positioned to support the nearby forts in the defense of Wilmington. The *North Carolina* finally sank at its moorings in September 1864. Though useless as an offensive weapon, the *North Carolina* served as a deterrent, preventing the United States Navy from entering and seizing the lower Cape Fear until the fall of Fort Fisher in the closing days of the war.

When hostilities ended in 1865 so did some of the regular river trade. The prewar steamer service between Wilmington, Charleston and Savannah was not resumed, since rail service had been established. Steamship service did, however, resume to the northern cities of Baltimore, Philadelphia and New York (Lee 1977:91). The coastal trade also revived and was conducted mainly by schooners ranging between 150 and 600 tons. Because of the decimation of American shipping during the war international commerce was carried in foreign bottoms, usually of British, German or Scandinavian origins (Sprunt 2005:501).

Industry had been severely interrupted during the war, but was beginning to make a comeback. Naval stores and lumber continued to be the principal exports with the addition of some cotton. Exports recorded for the year 1871 amounted to some 95,000 bales of cotton, 100,000 bushels of peanuts, 112,024 barrels of spirits of turpentine, 568,441 barrels of rosin, 37,867 barrels of tar and 17,963 barrels of turpentine (Sprunt 2005:513-514). Without the use of slave labor the rice industry declined dramatically (Lee 1977:86-87). By the turn of the century, a decrease in the availability of pine trees resulted in a decline of the naval stores industry. With improvements in cultivation and transportation, cotton became a major industry in Wilmington until its decline in the 1930s. Guano from the West Indies was brought in for the new fertilizer plants. The production of creosote impregnated wood also helped increase shipping in the region (Lee 1977:87-88).

During the last quarter of the nineteenth century efforts were undertaken to develop Smithville into a port city. In 1886, the North and Southern Railroad Company announced plans to extend rail service from Wilmington to Smithville. Developers, envisioning a port that would rival Charleston and Norfolk, requested that the town's name be changed to Southport to draw attention to the "Port of the South" (Carson 1992:61). In anticipation of the expected development the town's dirt roads were paved in crushed shell and the dredge boat *Woodbury* began deepening and straightening the channel to accommodate increased vessel traffic. However, the proposed rail line did not materialize and Southport remained a small town relying on fishing and tourism for its economic livelihood. The Wilmington, Brunswick and Southport Railroad eventually extended a line to the town in 1911.

Improvements to navigation on the Cape Fear River had deteriorated during the war. Continual silting reduced the navigable channel. By 1870, federally financed projects were again started to improve the conditions of the river. One such project was the closure of one of the two inlets. New Inlet was closed in 1881 with the belief that the increased force of the concentrated flow would sweep out the channel. The closure was accomplished by placing a rock dam that extended for more than a mile from Federal Point to Zeke's Island. The dam was completed in 1881 and later became known as "the Rocks." Another rock barrier was later built between Zeke's Island and Smith's Island. The channel depth was dredged to accommodate the deeper draft vessels (Lee 1977:91).

Two life-saving stations were established near the mouth of the Cape Fear River during the 1880s. Those stations included the Cape Fear station (b. 1882) at east end of Bald Head Island and the Oak Island station (b. 1889) located west of Fort Caswell. Each station was equipped with line-throwing guns and self-righting surfboats (Sprunt 2005:527). Surfmen maintained a constant vigil of the sea from the station house and conducted regular nightly beach patrols; additional patrols were conducted in daylight during stormy weather. Both stations remained active until the 1930s when new Coast Guard facilities were constructed to replace them.

A particularly severe hurricane struck the Cape Fear region during late August 1893. Originating in the Cape Verde islands, the powerful storm intensified as it passed Cuba on 26 August and shortly afterwards made landfall at Charleston. Roving bands of its destructive winds "sank or disabled five ships" in southeastern North Carolina. These maritime losses included: the schooners *Kate E. Gifford* and *Enchantress,* brig *Wustrow* (all west of Oak Island), the schooner *Jennie Thomas* (disabled south of Oak Island), and the schooner *Three Sisters* that "floundered [sic] near Bald Head Island" (Mobley 1994:117). Local lifesaving station keepers Dunbar Davis [Oak Island] and J. L. Watts [Cape Fear] cooperated with volunteer surfmen who "exhaustively went from wreck to wreck utilizing breeches buoy, surfboat[s], a team of oxen, and sheer fortitude to render assistance to the disaster victims" (Mobley 1994:117).

In the aftermath of the hurricane, several derelicts were towed into Southport after 29 August and well into September 1893. According to a Federal report, the American three-masted schooner *Three Sisters* was first among the number (U.S. Hydrographic Office [USHO] 1894:13, 17; U.S. Treasury Department 1895:). On 1 September, the Norwegian bark *Linda* was towed to Southport by the British steamship *Eric*. The tug *Blanche* reportedly towed an

unknown potential hurricane casualty to the port on 7 September. On the following day, the tug *Alexander Jones* towed the American three-masted schooner *William Smith* to Southport. Another schooner of the same type [identity unknown] was also towed there on 21 September 1893. On 17 October, the *Julia A. Trubee* was towed to Southport by an unknown vessel. In this instance, the cause of the American three-masted schooner abandonment was not recorded (USHO 1894:13, 17).

On 20 July 1895, the U.S. Marine Hospital Service appropriated $25,000 for the construction of a quarantine station at Southport. The new station was to be located on the river on the east side of the channel between the upper end of Battery Island and Price's Creek Lighthouse (Carson 1992:73). The entire station was to be built on a pier 600 feet long and to consist of a hospital building, a disinfecting house, attendant's quarters and a kitchen. The station opened for service by the middle of 1897 with Dr. J. M. Eager appointed as the station's first quarantine officer. A report for the fiscal year 1907 illustrates the level of activity at the station:

> [Eighty six] vessels spoken and passed; 19 steamers and 1 sailing vessels inspected and passed; 2 steamers and 3 sailing vessels disinfected; and 485 crew on steamers, 125 crew on sailing vessels, and 3 passengers on sailing vessels inspected. The vessels disinfected were from Bahia, Portobello, Santos, Rios, and Barbados (Brown 1974).

By 1937 the station had become obsolete and was placed on caretaker status. As the facility was located on water and not a navigation hazard it was left to deteriorate and on 19 August 1951, the abandoned station was destroyed by fire (Brown 1974).

The fishing industry provided the financial stamina for the economy on the lower Cape Fear during the early years of the twentieth century. The principal source of income for Southport was the menhaden fisheries. Most catches were processed into oil, which was used in the manufacture of paints, linoleum, tanning solutions, soaps and waterproof fabrics (Carson 1992:96). Leftover scrap was ground up for fertilizer and feed for livestock. The Southport Fish Scrap and Oil Company and the Brunswick Navigation Company established processing plants along the Elizabeth River while additional plants could be found above the town on the Cape Fear River.

World War I initiated a revitalization of the economy with the establishment of the Carolina Shipyard in May 1918. At about the same time, the Liberty Shipyard started producing steel ships as well as experimental concrete ships. The success of the shipyards was short-lived and the economy fluctuated for several years until it fell during the 1930s. Though Wilmington saw moderate success in shipping and shipbuilding after the war, most of the yards had closed by the mid-1920s and competition from Norfolk and Charleston slowly relegated the city to an import distribution center catering mainly to regional trade (Watson 1992:145).

This trade averaged 200,000 or more tons through most of the 1920s, but with the coming of the Great Depression, the amount fell to 94,007 tons by 1932 (Watson 1992:150). Wilmington's economy would not fully recover from the effects of the depression until the end of the decade. Despite this economic uncertainty, foundations were laid for future development. By the beginning of World War II, Wilmington boasted 54 wharves, piers and

docks and the opening of the Atlantic Intracoastal Waterway expanded the city's trade with its hinterland and increased its role in the coastal trade (Watson 1992:148-9).

With war in Europe and German submarines prowling the east coast during the early 1940s protection and defense of the coast became a top priority in Washington. The vulnerability of the Cape Fear had been confirmed during World War I and U.S. Navy officials were anxious to be prepared for future enemy intrusions (Gannon 1990:242-243). On 17 November 1941, the U.S. Navy reacquired the 248.8-acre Fort Caswell reservation, sold into private hands in 1929. The old fort grounds were to be used for training, communications and submarine tracking (Carson 1992:126).

The U-boat threat finally reached the Cape Fear region in early 1942. On 16 March, the 11,641-ton tanker *John D. Gill* was torpedoed in the coastal waters off the mouth of the river. As a result of the high number of vessel losses during the early stages of the war, defensive measures were put into place. Coastal communities were systematically blacked out, a more efficient convoy system was devised and additional planes and patrol vessels were put into service along the North Carolina coast (Stick 1952:237-239).

In addition to the menace that Axis submarines and aircraft represented during the conflict, a significant hurricane struck the project area in late summer 1944. On 1 August, the tropical storm made landfall near Southport and the Oak Island coast guard station reported maximum wind speeds of 80 miles per hour. To the north, "substantial damage" occurred in Wilmington and Wrightsville Beach and the combined losses of real estate and crops amounted to two million dollars (Galecki 2005:133-134).

World War II also brought renewed growth to the shipyards and relief to the area (Lee 1977:88-90). The increased jobs and higher wages allowed Wilmington's economy to increase and become stable. After the war many of the people brought in to build ships chose to stay and make Wilmington their home. In 1945, the State Port Authority was formed, promoting ports in Wilmington and Morehead City and creating new jobs. In 1955, the military established the Sunny Point Army Terminal [Military Ocean Terminal at Sunny Point]. The facility serves as a terminal for shipping military hardware and ammunition to American forces around the globe. The base is a major employer in the area and local service and retail industries serving the military contribute to the economic prosperity of the region. By 1960, the population of Southport was reported as 2,034 residents. At that time, the town boasted a popular bookmobile, a new water tank, a "lighted" athletic field and a picnic area at the community park. Maritime news included the launch of a "big, new charter boat," the *Riptide*. Herman Sellers constructed the vessel for Glenn Trunnell of Southport. Other local commercial fishermen commenced discussions on the merits to install an artificial reef near the town. In September 1960, Hurricane *Donna* struck the region and fortunately caused only minimal damage in Brunswick County (Reaves 1999:169,172).

In early February 1970, the Atomic Energy Commission approved construction of a 385 million dollar nuclear power plant to be situated north of Southport. The downtown also experienced a significant economic boost when First-Citizens elected to build a bank in Southport, its first branch in Brunswick County. At the same time, waterfront interests offered services to the public such as the modern 150-seat restaurant Herman's and the new 450-foot long "fishing and pleasure pier" (Reaves 1999:243).

Today, the region presents a strong economy with a state port facility that is daily frequented by international cargo vessels. The economy is further augmented by the military and commercial fisheries, which provide an important source of income to area residents. In addition, Southport and the coastal communities on Oak Island and the resort on Bald Head Island are popular tourist destinations. The area's offshore waters are a sportsman's paradise catering to recreational boaters and sport fishermen alike.

Improvement History of the Entrance Channel to the Cape Fear River

In 1870, the U.S. Army Corps of Engineers (USACE) initiated a project to improve navigation on the Cape Fear River. An examination of the river conducted by a commission appointed by the War Department suggested that priorities at that time should be given to closing off the channel between Smith's and Zeke's Islands (U.S. Army Corps of Engineers [USACE] 1870:70). In 1874, the closing off of New Inlet had increased the flow of water in the main navigation channel and scouring effects were noted to be deepening the channel over Bald Head Bar (USACE 1874:88-89). The officer in charge of operations also stated that a suction dredge was employed at Bald Head Bar to assist in the scouring process. Furthermore, the officer's report also noted that there were two channels into the river: a western channel with two bars (an outer with 14 feet at low water and an inner or "rip" with 10 feet at low water) and the Bald Head channel (USACE 1874:69). It was suggested that since the Bald Head channel was the natural channel all efforts should be directed towards maintaining a 12-foot level of water over it and that the western channel be disregarded.

In 1889, the project was modified to provide for a 20-foot depth, at low water, from Wilmington to the Ocean. Surveys conducted during the fiscal year ending 30 June 1890 reported that the depth of water over bar had reached 16 feet (USACE 1890:131). The wreck of a Civil War gunboat was uncovered during dredging activities on the bar in 1891. The boiler from the wreck reduced water depths in the channel to 13.5 feet providing a serious impediment to navigation (*The Messenger* [*TM*] 16 May 1891). Examinations of the wreck indicated that it was a wooden-hull vessel approximately 110 tons and 100 to 110 feet long (USACE 1893; Appendix L:1451). Portions of the flue and the boiler were removed by agents of the Federal government in 1890. On 20 May 1893, Messrs. Johnston and Townsend were awarded a contract to remove the rest of the wreck structure (USACE 1893, Appendix L:1451). The wreck site was dynamited and remaining sections of boiler recovered for disposal. Inspections of the wreck area by First Lieutenant E. W. Lucas, E. D. Thompson and Robert Merritt revealed no trace of the hull and soundings in the vicinity indicated a depth of water of 22 feet (*TM* 7 July 1893; USACE 1893, Appendix L:1451).

The River and Harbor Act of 2 March 1907 provided for additional dredging for completing the channel to the mandated 20-foot depth level. In addition, the Act also authorized for improvements in excess of 20 feet as appropriations permitted (USACE 1912:459). The project was modified again in the River and Harbor Act of 25 July 1912. Those modifications called for a channel of 26 feet deep at low water with widths of 300 feet in the river, increasing to 400 feet across the bar and in curves in the river (USACE 1912:459-460). The controlling depths of the channel were increased to 30 feet in the River and Harbor Act of 2 March 1919. In 1922, the USACE discontinued the contemporary current entrance

channel and authorized for a new one over the bar with the same dimensions as the previous one (USACE 1922:682-683). The new channel was to run in a southwesterly direction from Bald Head Point. These improvements were noted as being completed in 1932.

In the River and Harbor Act of 2 March 1945, the controlling dimensions for the navigation channels on the Cape Fear River were increased further. Water depths from the outer end of the bar to Wilmington were increased to 32 feet and all channels were now to maintain a width of 400 feet throughout (USACE 1945:632-631). The project was estimated to be 65 per cent complete by the end of the fiscal year. In 1950, the controlling depths over the ocean bar were increased to 35 feet (USACE 1950:653-654). Additional modifications to the navigation channels were authorized in the River and Harbor Act of 23 October 1962. Among the provisions of that Act was the deepening and widening of the entrance channel to 40 feet deep and 500 feet wide (USACE 1962:360-361). The channel was to maintain those dimensions as far as Southport were they were reduced to 38 feet deep and 400 feet wide up to Wilmington. The project was reported as being completed in 1973 (USACE 1979:6-9).

Description of Findings

The remote-sensing survey of the Bald Head Island investigation area identified a total of 104 magnetic anomalies and two acoustic targets (Figure 8).

None of the terrestrial anomalies were determined to have signature characteristics suggestive of potentially significant cultural resources. All were associated with modern construction features such as walkways, sand bags or modern debris visible on the ground surface. With the exception of a four anomalies, none of the marine magnetic signatures were determined to have characteristics suggestive of potentially significant cultural resources.

That cluster of four magnetic anomalies (86, 89, 90, and 93) (Appendix B) was associated with acoustic signatures (Appendix C) created by a shipwreck (Figures 9 and 10). One additional acoustic target and one associated magnetic signature (103) were generated by a vehicle tire. No additional investigation of this target is recommended.

Shipwreck Documentation

After consultation with UAB personnel at Fort Fisher, a Phase II investigation of the shipwreck site was determined to be necessary. Archaeological diver investigation of material generating the shipwreck signatures confirmed that the site was indeed the remains of a vessel. The surviving hull remains were found in three basic sections that include: a fragment of the bow, a large section of the lower hull, and a section of the stern (Figure 11).

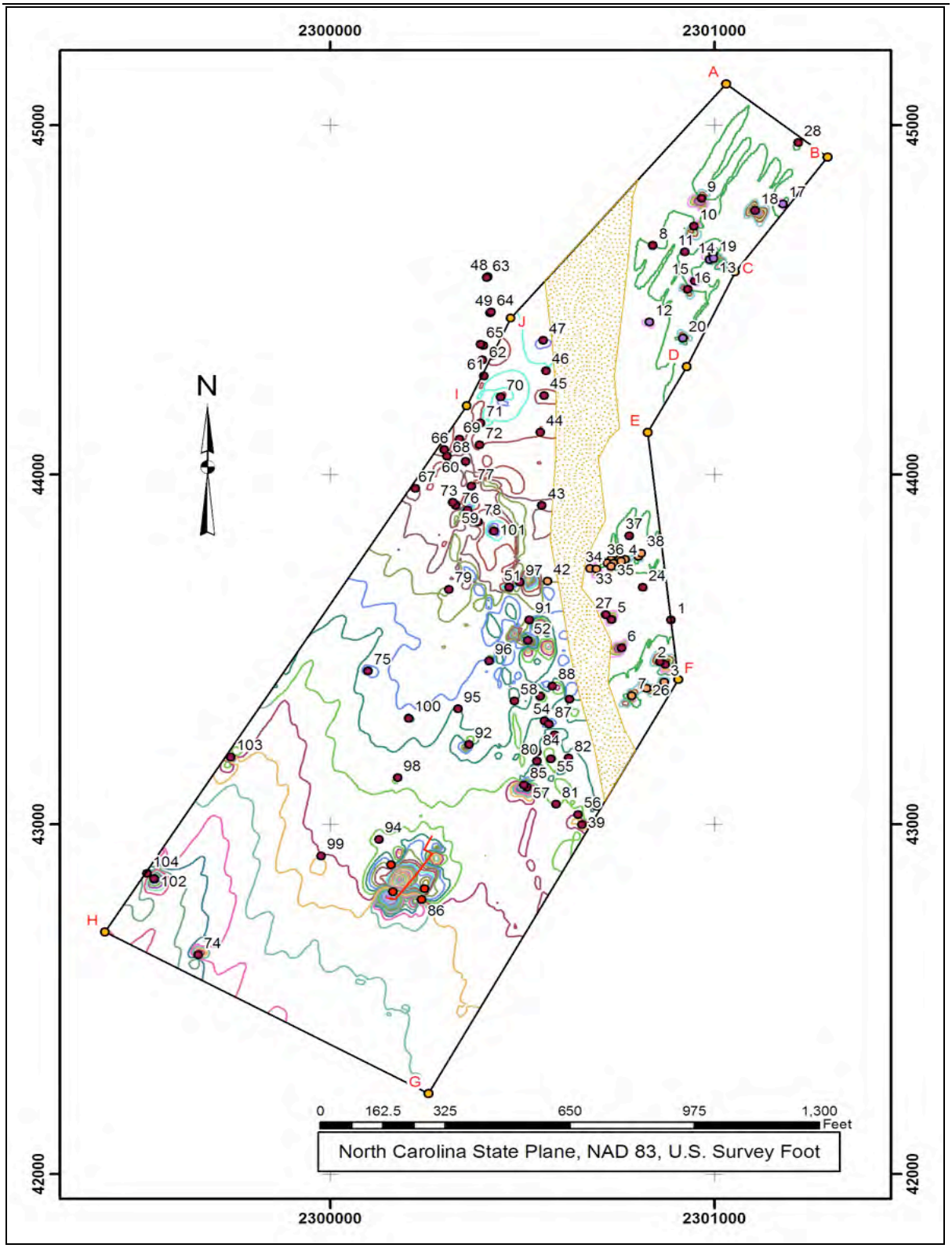

Figure 8. Magnetic contour map with anomalies.

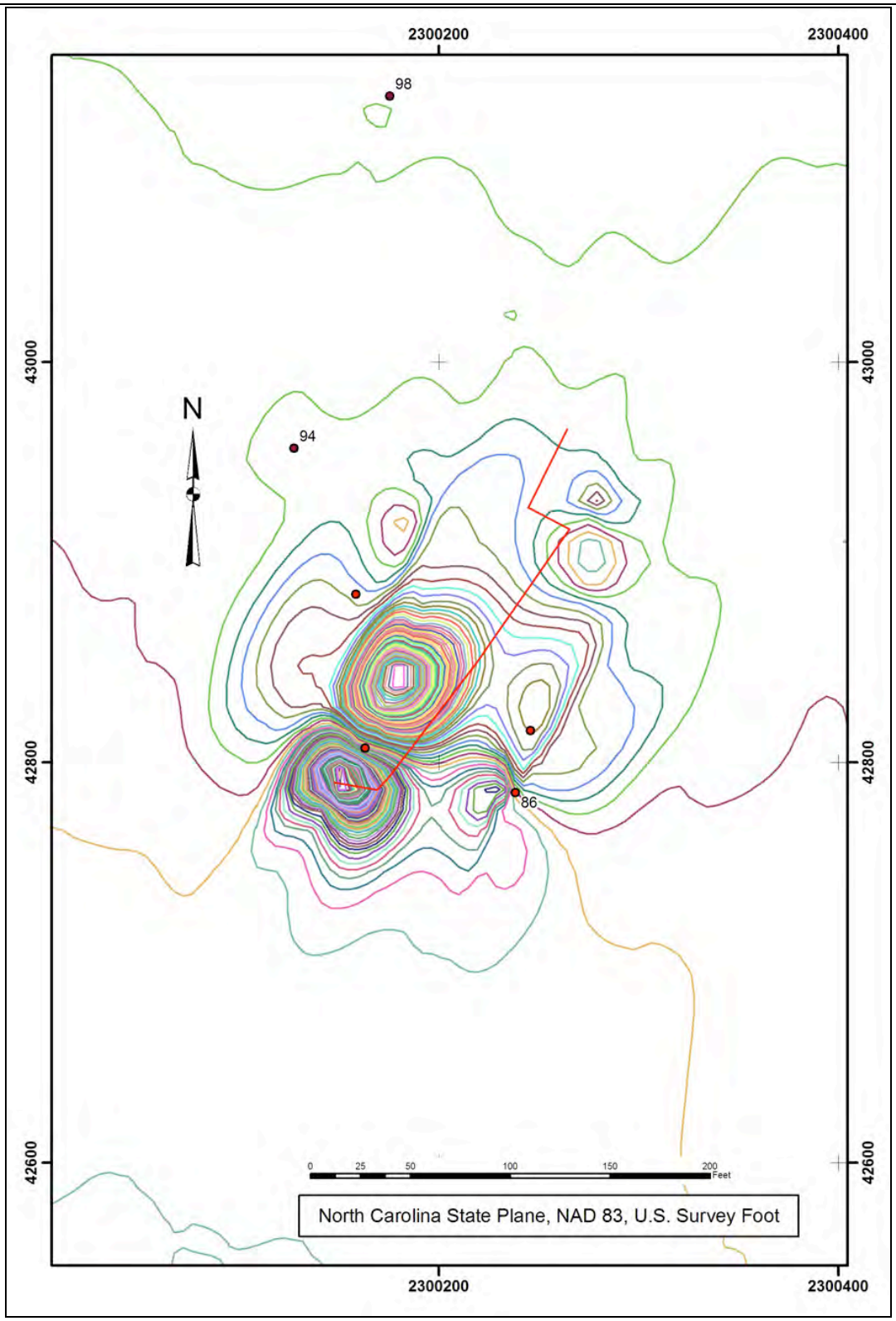

Figure 9. Shipwreck magnetic anomaly with shipwreck baseline.

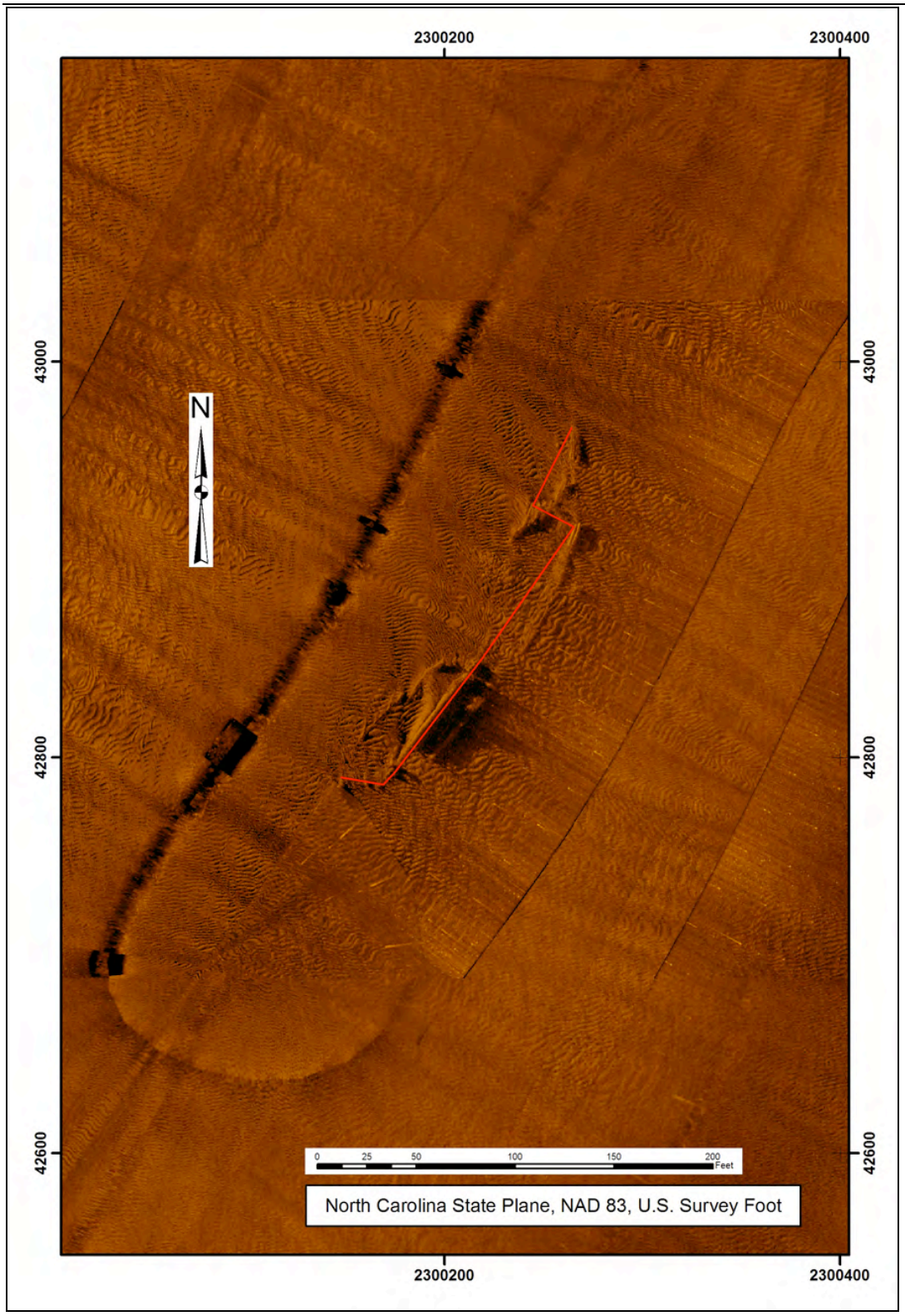

Figure 10. Shipwreck sonar image with baseline.

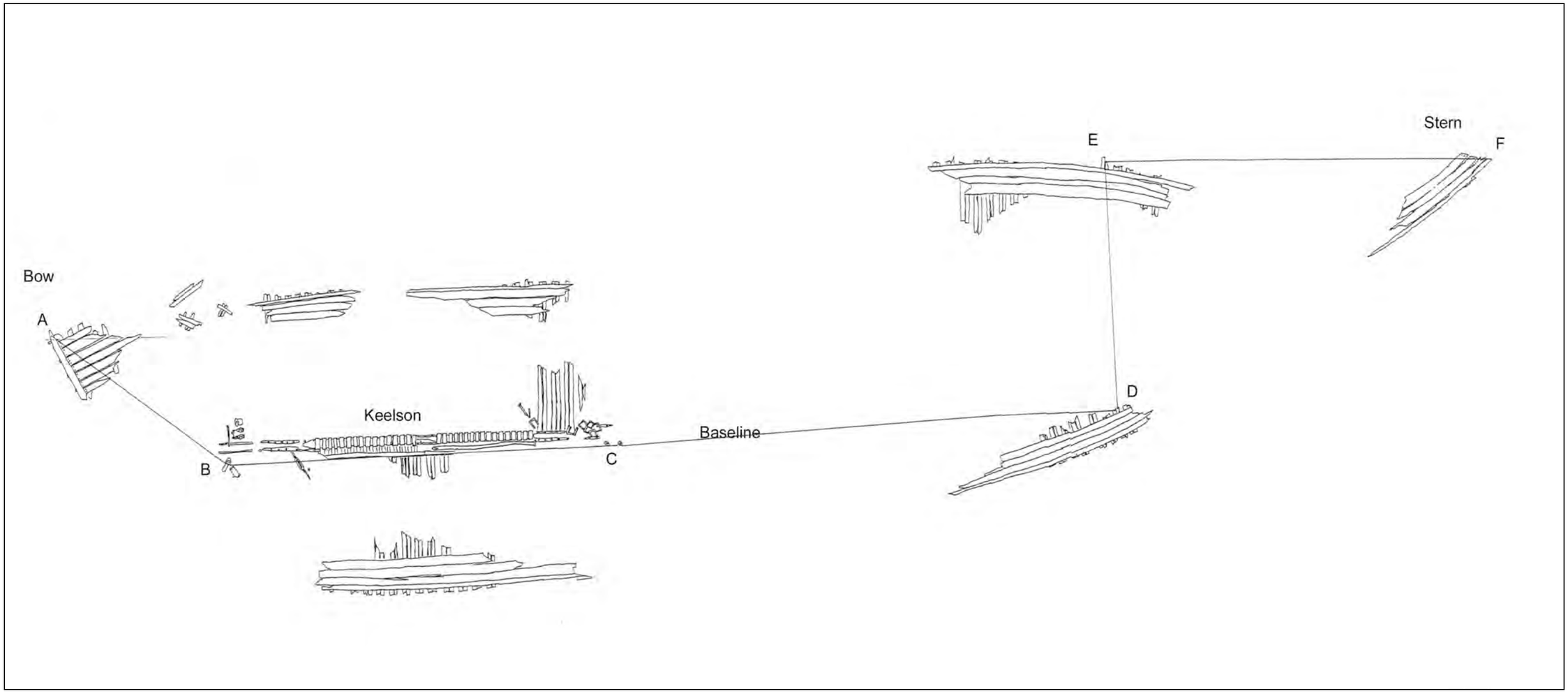

Figure 11. Plan of exposed wreck remains.

Remains of the bow lay southwest of the largest section of hull remains. It consisted of an eight-foot section of the stem, inner stem, port cant frames, exterior planking and a cast-iron hawse pipe. Due to deterioration, the exact dimensions of the cant frames and planking could not be determined. The stem section measured 5 inches across the face and 12 inches fore and aft. The aft face and measurements for the inner stem were inaccessible.

The largest section of remains was the lower hull. That section of exposed hull was approximately 48 feet in length and 32 feet in width. It consists of the keel, keelson, reinforcing iron straps on the keelson, floors, futtocks, ceiling strakes and bilge wales. The keelson was only exposed at the forward end of the hull section and measured 12 inches sided and 20 inches moulded. Two 11-foot, 6-inch sections of the keelson were reinforced by "U" shaped wrought iron straps. The straps measured 6 inches in width, 2 inches in thickness and were installed every 3 inches. Each strap was 17 inches in length and 15 inches across the base of the "U" (Figure 12). A cluster of the wrought iron straps was located aft of those that remained attached to the keelson. No evidence of mast steps was found on the surviving remains of the keelson.

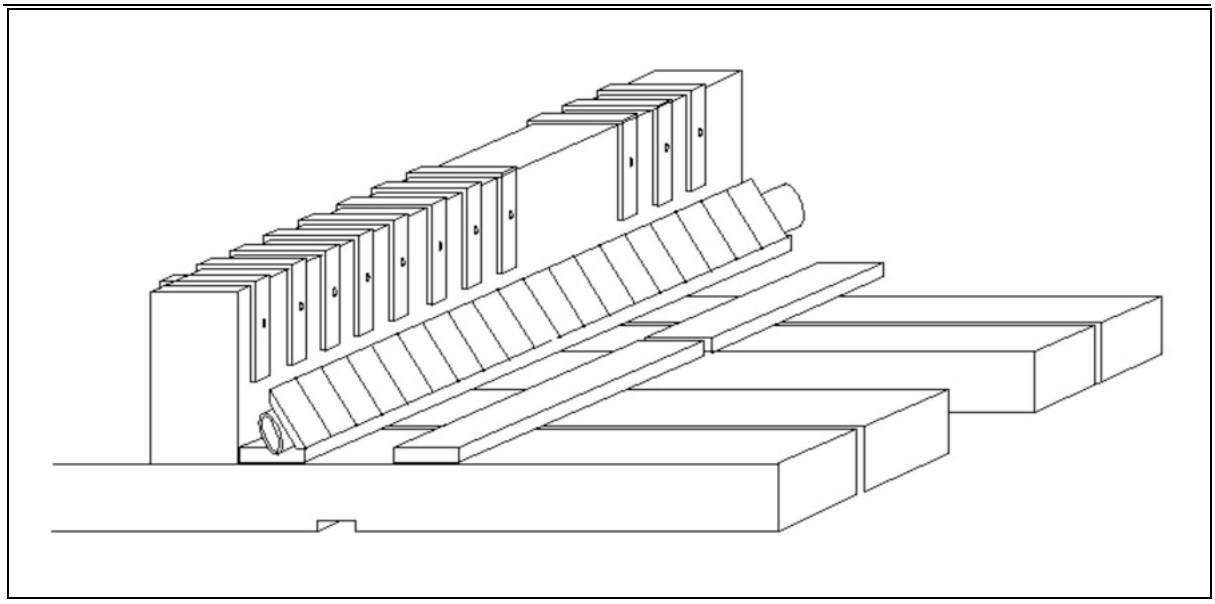

Figure 12. Illustration of the keelson configuration.

The floors immediately outboard of the keel/keelson measured 9 inches sided and 12 inches moulded. At the turn of the bilge the futtocks measured 9 inches sided and 8 inches moulded. Space measured at 10 inches. All of the examined floors and futtocks were oak. Two inboard ceiling planks were exposed on the port side and both measured 12 inches wide and 3 inches thick. At the turn of the bilge a composite wale covered the compass timber. The bilge wales on both sides of the hull were composed of three 12-inch sided by 10-inch moulded timbers. The size of a fourth wale timber could not be determined due to deterioration but appeared to be fashioned to make the turn of the bilge. Hull planking was 11 to 12 inches wide and 2.5 inches at the turn of the bilge.

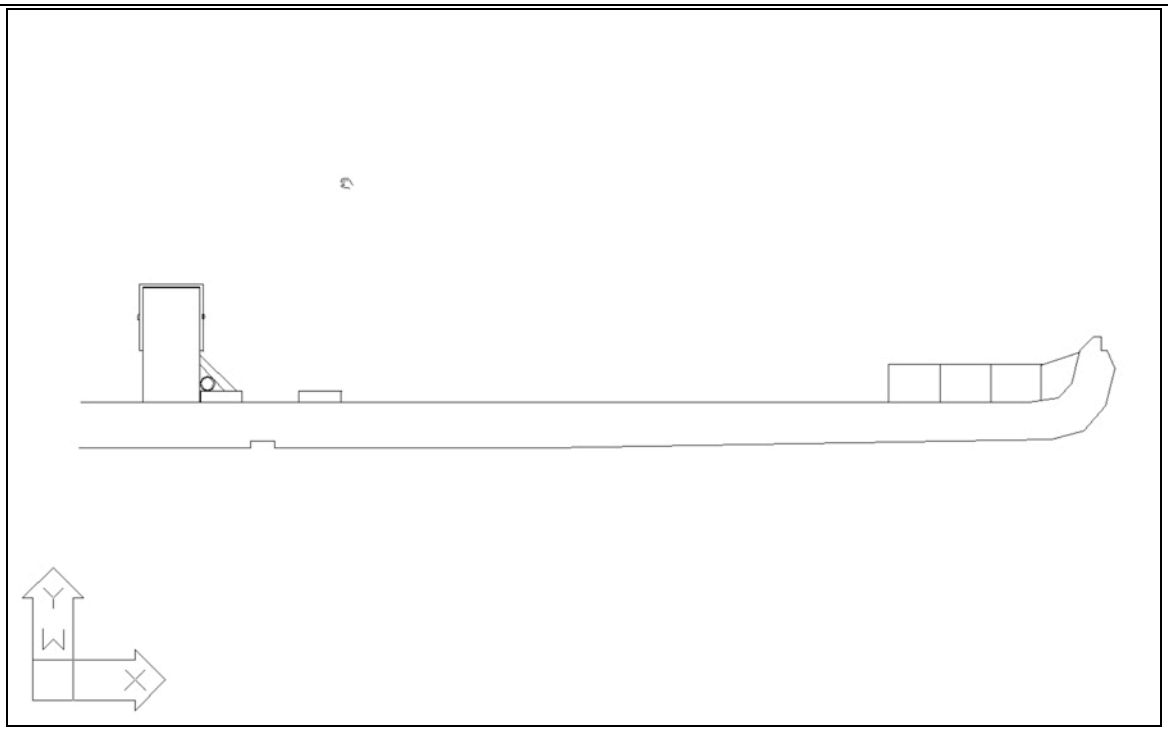

Figure 13. Cross section of the port side of the hull approximately midships (looking aft).

An iron pipe approximately 5 inches in diameter was attached longitudinally to the port base of the keelson and was protected by covering boards. It terminated near the forward end of intact keelson structure. Near that point off the starboard side of the keelson, the remains of what appeared to be a heavily concreted Worthington steam pump was found. Immediately outboard of the pump, what appears to be a steam cylinder was partially exposed. On the port side of the keelson, immediately aft of the pump and cylinder, a second hawse pipe and two other iron pipes were found (Figure 11 at Station B).

A fragment of lower hull in the stern was found off the north end of the main section of wreckage. That section of hull measured approximately 30 feet in length. That portion did not contain the remains of the keelson and the bilge wales were approximately 10 to 12 feet outboard of the location of the keel/keelson. No evidence of the stern deadwood or sternpost was identified in the area.

Conclusions and Recommendations

A survey of historical and archaeological literature and background research confirmed evidence of sustained historical maritime activity associated with Bald Head Island and the Cape Fear River area that continues to the contemporary date. Documented transportation activities in the vicinity of Bald Head Island and neighboring waterways date from the first half of the sixteenth century. The Cape Fear River region became a focus for European activities as early as 1526 when Lucas Vásquez de Ayllón led an expedition from Florida

into the Cape Fear region. Permanent settlement along the banks of the Cape Fear River began during the second decade of the eighteenth century.

As a consequence of nearly 400 years of navigation in the coastal region of Brunswick County and settlement along the banks of the Cape Fear River since the eighteenth century, there is a high probability that historically significant submerged cultural resources are located in the area. While no shipwrecks in the project vicinity have been listed on the NRHP or with the UAB, previously identified vessel remains document that they exist; as there are at least 27 shipwrecks recorded in the coastal waters near Bald Head Island and the mouth of the Cape Fear River (Appendix A). Because of their association with the broad patterns of North Carolina history, the remains of sunken vessels preserve important information about the maritime heritage of the North Carolina coast.

Remote sensing of the terrestrial survey area identified 104 magnetic anomalies. However, none of those magnetic anomalies are considered to be associated with potentially significant cultural resources. No additional investigation of that area is recommended in conjunction with the currently proposed project. The marine remote-sensing survey identified 104 magnetic and two acoustic targets. Two of the magnetic anomalies and the corresponding sonar images were determined to be generated by the remains of a vessel. That site was recommended for additional investigation. Archaeological diver reconnaissance of the wreck confirmed that it consisted of fragments of a large wood hull vessel.

The wreck remains appear to be those of a vessel approximately 160 to 190 feet in length. As no evidence of steam propulsion was discovered, it appears that the ship was a sailing vessel. The most likely candidates appear to be a large schooner or possibly a ship or bark rigged cargo vessel. The steam pump and cylinder appear to most likely represent machinery for dewatering, firefighting and/or power for a steam windlass or capstan for sail and/or cargo handling or ground tackle.

An accurate estimate of tonnage is impossible based on the available data. However, a reasonable range could vary from about 460 to approximately 700 tons using the formula: estimated length times estimated beam times estimated depth of hold divided by 100. Historical research indicates that at least three vessels could be candidates for association with the wreck remains. The largest of those vessels is the 704-ton schooner barge *Virginia* that foundered in 1906. The smallest is the 404-ton bark *Aphid* wrecked on Ella Shoal in 1893. Perhaps the most-likely candidate is the 639-ton schooner *Charles H. Valentine* wrecked off Bald Head Point on Smith Island in 1911.

Because the wreck is located within 70 feet of the initially proposed groin location (Figure 14) a shift in the construction alignment is recommended to provide a minimum of 150 feet of clearance (Figure 15). As the groin is designed to cause sand to accrete along the southwestern shoreline of Bald Head Point, the wreck remains will likely be covered with several feet of sediment. That sediment will afford protection for the surviving hull remains. Because a preliminary plan for the exposed hull structure has been developed and details of design and construction recorded, burial of the remains will be a positive impact on the site and no additional investigation is recommended.

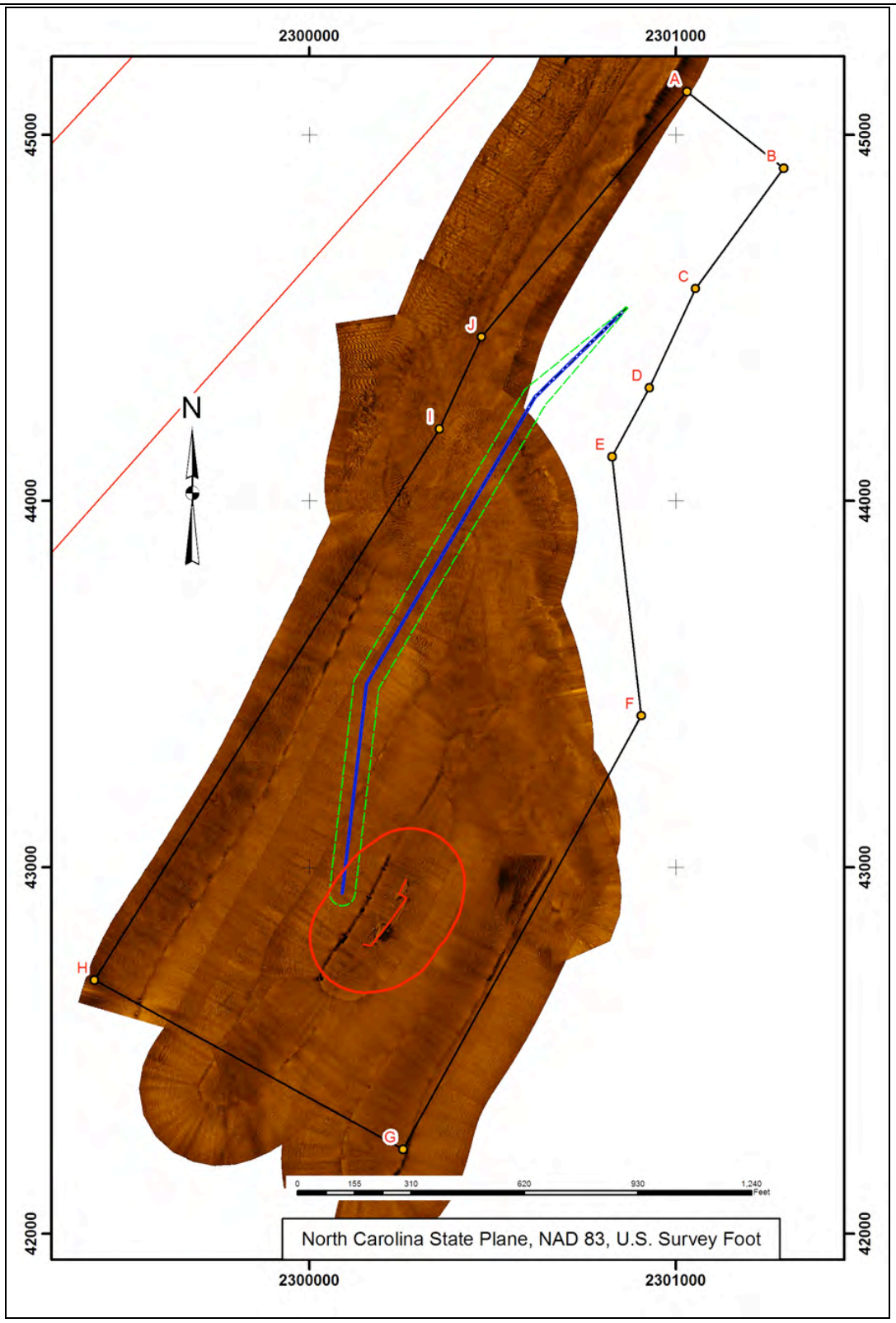

Figure 14. Wreck location with 150-foot buffer on the original groin location.

Figure 15. Location of the 150-foot wreck buffer and realigned groin.

Based on the remote sensing data only one significant anomaly was identified. That proved to be the lower hull remains of a large wooden vessel from the late 19th century or early 20th century. Documentation of the Bald Head Point shipwreck generated sufficient data to satisfy Phase II non-disturbance investigation of the vessel identified by UAB. Alteration of the alignment of the proposed groin will leave the wreck remains 150 feet southeast of the southeastern extent of construction. During construction, the contractor should be made aware of the location of the wreck and provide assurance that vessels engaged in construction of the groin will not infringe on the buffer created to preserve the surviving vessel remains. As the proposed groin is designed to foster sediment accretion along the shoreline south of Bald Head Point, the wreck remains should be recovered and thus protected. Unless changes are necessary in proposed groin construction plans, no additional investigation of the wreck is recommended.

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Appendix A

Known shipwrecks in the vicinity of the mouth of the Cape Fear River, North Carolina

Vessel	Type	Use	Date of Loss	Location	Disposition
Spanish Vessel			1526	Mouth of the Cape Fear River	
Sir John	Fly Boat		Oct. 1665	Middle Ground	
Unknown			Feb. 1767	Cape Fear River Bar	
Enterprise			15 Feb. 1768	Mouth of the Cape Fear River	
Clementine			March 1775	Middle Ground	Salvaged(?)
Unknown			Feb. 1784	Mouth of the Cape Fear River	
Neptune	Brig		26 Jan. 1789	Middle Ground	
Sabine		Privateer	11 Sept. 1814		
Florie		Blockade Runner	Oct. 1864	Inside Bar	
Georgiana McCaw		Blockade Runner	2 June 1864	SW of Baldhead Light	
Violet		U.S.S. Gunboat	7 Aug. 1864	Western Bar	Possibly cleared by USACE
Frying Pan Shoals Lightship		Light Ship	20 Dec. 1861	North of Fort Caswell	Sunk by U.S.S. *Mount Vernon*
Ellen	Schooner	Blockade Runner	26 June 1862	Burned while ashore at Bald Head Channel	Taken in tow by U.S.S. *Victoria*. Sunk in 15 minutes.
Emily	Schooner	Blockade Runner	26 June 1862	Burned under the guns of Fort Caswell	
Lizzie	Sloop	Blockade Runner	1 August 1862	Captured and burned by U.S.S. *Penobscot* off Bald Head.	
Ella	Steamer	Blockade Runner	3 Dec. 1864	Run ashore on Bald Head Beach.	Partially Salvaged
Agnes Emily Frye	Steamer	Blockade Runner	27 Dec. 1864	Lost 2 miles south of Fort Caswell off Old Inlet	
Pine	Sloop		May 1868	Cape Fear Bar	
Alex Sprunt		Lighter	Feb. 1872		
Felicitus	Bark (Ger.)		July 1874	Main Bar	Salvaged
Maria Needham	Bark (Br.)		14 Jan. 1874	Middle Ground	Salvaged
Vapor	Schooner		5 Nov. 1895	Cape Fear Bar	
San Antonio	Bark (Br.)		13 Jan. 1890		Salvaged
Ogir	Bark (Nor.)		10 Nov. 1894	Middle Ground	Salvaged
Clarence H	Schooner		9 Dec. 1902	South of Cape Fear Bar	
Col. Thos. F. Austin	Schooner		24 Feb. 1916	Middle Ground	
Unknown	Bark		13 June 1930	Middle Ground	

Appendix B

Magnetic Anomaly List
(All coordinates North Carolina State Plane, NAD 83, U.S. Survey Foot)

Map Designation	Lane	Number	Characteristics	Intensity (gammas)	Duration (feet)	X	Y	Assessment
1	2	1	Positive Monopolar	21	34	2300887.1	43583.7	Small single object
2	2	2	Dipolar	52	46	2300871.9	43457.4	Small single object
3	2	3	Negative Monopolar	23	11	2300870.3	43405.7	Associated with a temporary groin
4	1	1	Dipolar	98	34	2300762.3	43750.6	Associated with a temporary groin
5	1	2	Positive Monopolar	24	31	2300732.4	43585.7	Small single object
6	1	3	Positive Monopolar	38	24	2300758.7	43504.4	Small single object
7	1	4	Dipolar	80	43	2300785.8	43367.8	Associated with a temporary groin
8	6	1	Dipolar	8	40	2300840.3	44655.4	Small single object
9	7	1	Dipolar	61	49	2300966.7	44790.0	Small single object
10	8	1	Dipolar	44	56	2300946.8	44709.7	Small single object
11	8	2	Dipolar	17	14	2300923.8	44636.7	Small single object
12	8	3	Positive Monopolar	22	24	2300831.4	44435.8	Associated with a boardwalk
13	9	1	Positive Monopolar	65	17	2300996.6	44631.8	Associated with a boardwalk
14	9	2	Positive Monopolar	71	19	2300987.7	44614.2	Associated with a boardwalk
15	9	3	Dipolar	61	13	2300949.3	44553.8	Small single object
16	9	4	Dipolar	63	26	2300930.6	44529.4	Small single object
17	10	1	Positive Monopolar	43	27	2301178.8	44774.0	Associated with a boardwalk
18	12	1	Negative Monopolar	57	36	2301107.0	44754.5	Small single object
19	12	2	Multicomponent	192	22	2300998.5	44618.4	Associated with a boardwalk
20	12	3	Dipolar	84	25	2300918.1	44389.6	Associated with a boardwalk
21	14	1	Dipolar	84	25	2300747.5	43750.0	Associated with a temporary groin
22	15	1	Positive Monopolar	65	38	2300731.8	43756.0	Associated with a temporary groin
23	16	1	Dipolar	46	27	2300803.2	43766.3	Associated with a temporary groin
24	17	1	Positive Monopolar	11	18	2300814.2	43677.1	Small single object
25	20	1	Negative Monopolar	22	39	2300859.3	43465.1	Small single object
26	20	2	Negative Monopolar	21	19	2300824.0	43388.6	Associated with a temporary groin
27	16	2	Positive Monopolar	17	43	2300717.6	43598.9	Small single object
28	12	4	Positive Monopolar	24	11	2301218.1	44949.0	Small single object
29	14	2	Multicomponent	29	10	2300676.7	43731.7	Associated with a temporary groin
30	14	3	Dipolar	21	24	2300721.2	43746.8	Associated with a temporary groin
31	14	4	Dipolar	9	12	2300752.6	43757.3	Associated with a temporary groin
32	14	5	Positive Monopolar	127	14	2300768.2	43757.0	Associated with a temporary groin
33	14	6	Dipolar	120	27	2300737.7	43746.5	Associated with a temporary groin
34	1	7	Positive Monopolar	114	22	2300692.7	43730.2	Associated with a temporary groin

Map Designation	Lane	Number	Characteristics	Intensity (gammas)	Duration (feet)	X	Y	Assessment
35	15	2	Dipolar	90	25	2300731.8	43737.2	Associated with a temporary groin
36	15	3	Dipolar	101	20	2300758.0	43751.8	Associated with a temporary groin
37	15	4	Dipolar	10	11	2300778.7	43825.0	Small single object
38	16	3	Dipolar	25	14	2300810.0	43775.2	Associated with a temporary groin
39	1	1	Negative Monopolar	18	64	2300655.8	42998.7	Small single object
40	1	2	Positive Monopolar	2	42	2300695.7	43051.2	Small single object
41	1	3	Multicomponent	10	130	2300623.4	43357.8	Moderate single object
42	1	4	Multicomponent	10	95	2300565.7	43694.5	Associated with a temporary groin
43	1	5	Positive Monopolar	6	37	2300551.6	43911.5	Small single object
44	1	6	Negative Monopolar	6	43	2300547.5	44120.6	Small single object
45	1	7	Multicomponent	6	58	2300557.6	44226.1	Small single object
46	1	8	Dipolar	3	33	2300562.0	44297.1	Small single object
47	1	9	Dipolar	6	64	2300555.3	44383.3	Small single object
48	19	1	Positive Monopolar	6	75	2300410.6	44565.9	Small single object
49	19	2	Dipolar	10	68	2300415.9	44462.7	Small single object
50	19	3	Multicomponent	14	84	2300397.0	44327.5	Small single object
51	19	4	Multicomponent	28	122	2300466.9	43677.4	Moderate single object
52	19	5	Multicomponent	43	155	2300515.0	43525.2	Moderate single object
53	19	6	Positive Monopolar	4	29	2300547.3	43366.7	Small single object
54	19	7	Negative Monopolar	7	58	2300559.1	43295.5	Small single object
55	19	8	Positive Monopolar	3	30	2300575.2	43187.2	Small single object
56	19	9	Multicomponent	8	116	2300645.2	43027.7	Small single object
57	20	1	Dipolar	22	133	2300512.4	43105.8	Moderate single object
58	20	2	Negative Monopolar	4	42	2300479.9	43352.6	Small single object
59	20	3	Negative Monopolar	9	66	2300327.1	43911.9	Possible Cable
60	20	4	Dipolar	3	37	2300352.8	44037.7	Small single object
61	20	5	Positive Monopolar	8	49	2300399.9	44281.5	Small single object
62	20	6	Dipolar	11	93	2300398.7	44369.1	Small single object
63	20	7	Positive Monopolar	6	65	2300407.2	44562.9	Small single object
64	20	1	Dipolar	6	56	2300419.5	44464.8	Small single object
65	20	2	Dipolar	21	90	2300391.8	44372.8	Moderate single object
66	20	3	Positive Monopolar	4	49	2300296.6	44071.1	Small single object
67	20	4	Dipolar	4	53	2300222.2	43960.2	Small single object
68	18	1	Positive Monopolar	3	36	2300304.7	44052.3	Small single object

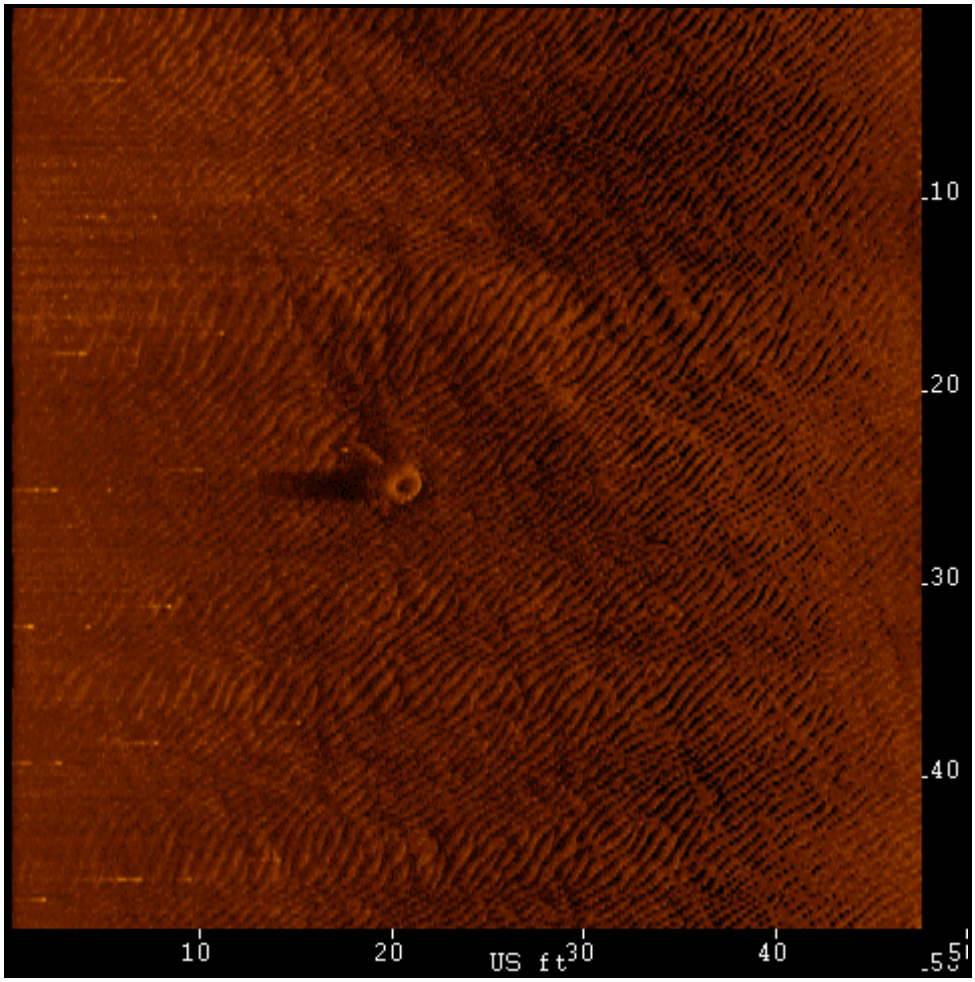
Map Designation	Lane	Number	Characteristics	Intensity (gammas)	Duration (feet)	X	Y	Assessment
69	18	2	Dipolar	3	39	2300336.6	44101.2	Small single object
70	17	1	Dipolar	19	49	2300443.4	44221.4	Moderate single object
71	17	2	Multicomponent	6	44	2300391.0	44147.4	Small single object
72	17	3	Dipolar	4	58	2300388.7	44084.7	Small single object
73	17	4	Negative Monopolar	2	59	2300318.8	43919.9	Possible Cable
74	16	1	Dipolar	27	104	2299656.6	42625.7	Moderate single object
75	16	2	Negative Monopolar	8	48	2300099.2	43438.2	Small single object
76	15	1	Dipolar	54	87	2300357.5	43898.4	Possible Cable
77	15	2	Positive Monopolar	5	42	2300367.9	43966.7	Small single object
78	15	3	Multicomponent	6	101	2300384.9	43864.7	Possible Cable
79	15	4	Positive Monopolar	4	62	2300308.9	43671.7	Small single object
80	3	1	Multicomponent	18	96	2300539.1	43180.4	Moderate single object
81	3	2	Dipolar	4	55	2300588.0	43057.4	Small single object
82	5	1	Positive Monopolar	4	68	2300621.2	43188.8	Small single object
83	5	2	Positive Monopolar	3	57	2300584.5	43255.2	Small single object
84	5	3	Negative Monopolar	3	40	2300538.2	43206.7	Small single object
85	5	4	Dipolar	58	85	2300504.5	43112.6	Moderate single object
86	**6**	**1**	**Multicomponent**	**24**	**286**	**2300238.4**	**42784.8**	**Associated with a shipwreck**
87	7	1	Negative Monopolar	3	56	2300569.9	43286.3	Small single object
88	7	2	Dipolar	13	92	2300578.9	43395.1	Small single object
89	**7**	**3**	**Multicomponent**	**68**	**275**	**2300246.0**	**42815.8**	**Associated with a shipwreck**
90	**8**	**1**	**Multicomponent**	**362**	**320**	**2300163.2**	**42806.9**	**Associated with a shipwreck**
91	10	1	Multicomponent	86	77	2300518.1	43584.4	Moderate single object
92	10	2	Dipolar	23	78	2300361.1	43227.7	Moderate single object
93	**10**	**3**	**Multicomponent**	**22**	**263**	**2300158.5**	**42883.8**	**Associated with a shipwreck**
94	11	1	Negative Monopolar	4	87	2300127.5	42956.7	Small single object
95	11	2	Dipolar	4	44	2300333.3	43329.4	Small single object
96	11	3	Dipolar	9	52	2300414.1	43466.9	Small single object
97	12	1	Multicomponent	53	104	2300494.1	43692.5	Moderate single object
98	12	2	Dipolar	3	41	2300175.5	43132.7	Small single object
99	13	1	Dipolar	6	103	2299976.6	42909.3	Small single object
100	13	2	Positive Monopolar	5	90	2300204.9	43303.2	Small single object
101	14	1	Multicomponent	19	58	2300426.0	43838.4	Possible Cable
102	21	1	Positive Monopolar	26	139	2299542.3	42844.4	Moderate single object

Map Designation	Lane	Number	Characteristics	Intensity (gammas)	Duration (feet)	X	Y	Assessment
103	21	2	Multicomponent	30	173	2299741.5	43192.3	Tire
104	22	1	Positive Monopolar	6	78	2299523.5	42859.3	Small single object

Appendix C

Sonar Targets

SS-1



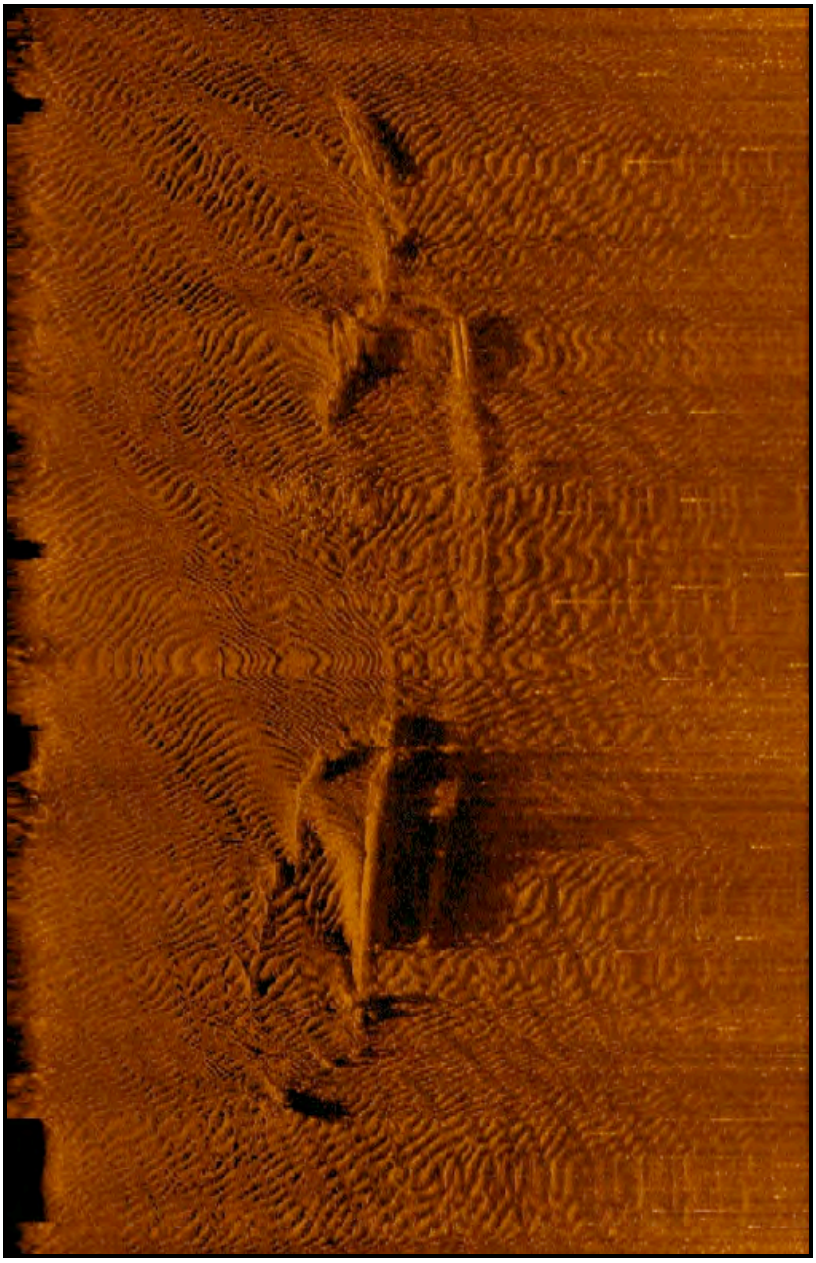
Contact Info: SS-1

- Sonar Time at Target: 08/03/2012 12:37:14
- Click Position (Lat/Lon Coordinates)
  33.8645264736 -78.0127738223 (WGS84)
- Click Position (Projected Coordinates)
  (X) 2299745.37 (Y) 43175.20
- Map Proj: NC83F
- Acoustic Source File: BHI12_L_15_120803085400.xtf
- Ping Number: 5268
- Range to Target: 29.63 US Feet
- Fish Height: 3.86 US Feet
- Heading: 55.500 degrees
- Event Number: 0
- Water Depth: 0.00
- Line Name: 15

User Entered Info

Target Height: 2.2 US Feet
Target Length: 6.9 US Feet
Target Shadow: 20.6 US Feet
Target Width: 6.9 US Feet
Mag Anomaly: 103
Avoidance Area: No
Classification 1: Tire
Area: Bald Head Island
Description: A single tire.

SS-2



Contact Info: SS-2

- Sonar Time at Target: 08/03/2012 13:06:32
- Click Position (Lat/Lon Coordinates)
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- Click Position (Projected Coordinates)
  (X) 2300221.28 (Y) 42859.00
- Map Proj: NC83F
- Acoustic Source File: BHI12_L_15_120803092000.xtf
- Ping Number: 31243
- Range to Target: 23.73 US Feet
- Fish Height: 3.42 US Feet
- Heading: 206.600 degrees
- Event Number: 0
- Water Depth: 0.00
- Line Name: 15

User Entered Info

Target Height: 4.6 US Feet
Target Length: 194.3 US Feet
Target Shadow: 54.1 US Feet
Target Width: 31.7 US Feet
Mag Anomaly: 86, 89, 90, 93
Avoidance Area: Yes
Classification 1: Wreck
Area: Bald Head Island
Description: Shipwreck

North Carolina Department of Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Pat McCrory, Governor
Susan W. Kluttz, Secretary
Kevin Cherry, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

January 17, 2013

Dave Timpy
US Army Corps of Engineers
Wilmington Regulatory Field Office
69 Darlington Avenue,
Wilmington, NC 28403

Re: Construction of a Terminal Groin at the Juncture of Bald Head Island and the Entrance to the Cape Fear River, SAW 2012-00040, Brunswick County, ER 12-0437

Dear Mr. Timpy,

We have received the archaeological survey report "A Phase I Remote-Sensing Archaeological Survey & Phase II Shipwreck Assessment at the Location of a Proposed Terminal Groin at the Mouth of the Cape Fear River, Bald Head Island, Brunswick County, North Carolina" from Tidewater Atlantic Research, Inc. (TAR) for the above project. The report meets our office's guidelines and those of the Secretary of the Interior and we would like to take this opportunity to comment.

The terrestrial and underwater survey conducted by TAR identified 104 magnetic anomalies and two acoustic targets. A cluster of four magnetic anomalies (86, 89, 90, and 93) associated with one acoustic signature were generated by the remains of a vessel requiring additional archaeological investigation. The remaining targets were determined to not warrant further investigation.

A Phase II non-disturbance investigation of the shipwreck remains, determined it to be a large wood hull sailing vessel dating to the late 19th or early 20th century. This shipwreck is deemed potentially eligible and requires avoidance. Because the wreck is located within 70 feet of the proposed groin location, TAR proposed a shift in the construction alignment to provide a minimum 150 foot buffer. We concur with this recommendation that a 150 foot buffer is required around the wreck location. Additionally, during construction all contractors should be made aware of the location of the wreck and provide assurance that vessels and equipment engaged in construction of the groin will not infringe on the buffer created, to preserve the surviving vessel remains.

These comments are made pursuant to Section 106 of the National Historic Preservation Act of 1966, North Carolina legislation (G.S. 121-22 to 28, Article 3), and the Abandoned Shipwreck Act of 1987 (P.L. 100-298).

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above referenced ER tracking number.

Sincerely,

Renee Gledhill-Earley

for Ramona M. Bartos

cc: Chris McCall,Village of Bald Head Island
Eric Olsen, Olsen Associates, Inc.